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Adherence to therapy enhanced by a pharmaceutical service: Dose Administration Aids

Margarida Lopes de Pina Ribeiro

Master in Management

Supervisor:
Professor Generosa Gonçalves Simões do Nascimento, Assistant Professor,
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BUSINESS
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Department of Human Resources and Organizational Behavior

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Abstract

The average life expectancy has been increasing due to aspects such as the advances in medicine and technology. An older population leads to the appearance of several chronic pathologies regarding polymedication, and the outcomes highly depend on patients' adherence to treatment. This is one of the most determining factors in cure, stabilization, or regression of the disease.

The purpose of this project is to highlight the principal failures in the patient journey, from medical appointment to the treatment itself, and to analyze the pharmacist's role as an adherence promoter. In order to understand the gaps, interviews were made to the three main actors in the patient journey (physician, pharmacist, and patient). This study supports the implementation of a new service in a local community pharmacy of Abrantes.

Throughout the interviews it was possible to infer the main adherence to therapy failures, such as the lack of cooperation between healthcare professionals, a non-existent patient-oriented follow-up, and a communication gap between the three main groups.

This project also aimed to overcome the obstacles in the patient journey and to increase adherence to therapy by launching a medication management service for patients – Dose Administration Aids (DAA). Thus, to understand the service's feasibility, it was observed the implementation of DAA in a community pharmacy in Abrantes. Despite claiming some requirements, it was possible to conclude the service benefits both customers and pharmacy.

Keywords: Adherence to therapy; Polymedication; Dose Administration Aids (DAA); Patient Journey; Community pharmacy
JEL Classification: I12, M10, M19

Resumo

A esperança média de vida da população tem vindo a aumentar devido a aspetos como o desenvolvimento tecnológico na medicina. Este envelhecimento da população conduziu ao aparecimento de diversas patologias crónicas às quais estão associadas a polimedicação. O tratamento só é eficaz se houver adesão à terapêutica, considerada um fator-chave para a cura, estabilização ou regressão de uma doença.

O propósito deste projeto é destacar as principais falhas que ocorrem na jornada do doente, desde a consulta até à toma da medicação, avaliando também o papel do farmacêutico na promoção à adesão terapêutica. Para identificar as lacunas neste processo, foram realizadas entrevistas aos três principais grupos, com intervenção direta ou indireta na adesão à terapêutica por parte do doente. Este estudo serve de base à criação de um novo serviço numa farmácia de Abrantes.

Ao longo das entrevistas aos três grupos já referidos, foi possível inferir as principais falhas na adesão à terapêutica, das quais se destacam a falta de cooperação entre os profissionais de saúde, a não existência de um acompanhamento personalizado ao doente e uma lacuna na comunicação entre os intervenientes.

Não obstante, este projeto ambiciona colmatar estas falhas e aumentar a adesão à terapêutica, propondo um serviço farmacêutico que garante a gestão da medicação aos doentes – Preparação Individualizada da Medicação (PIM). De modo a perceber a sua viabilidade, foi observada a implementação do PIM numa farmácia comunitária em Abrantes, que permitiu concluir que apesar de reivindicar alguns requisitos, o serviço é vantajoso tanto para o cliente como para a farmácia.

Palavras-chaves: Adesão à terapêutica; Polimedicação; Preparação Individualizada da Medicação (PIM); Percurso do paciente; Farmácia Comunitária.

Classificação JEL: I12, M10, M19

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Nomenclatures

ANF – Associação Nacional de Farmácias

DAA – Dose Administration Aids

OF – Ordem dos Farmacêuticos

PIM – Preparação Individualizada da Medicação

SIMPATHY – Stimulating Innovation Management of Polypharmacy and Adherence in the Elderly

VBHC – Value-Based Healthcare

WHO – World Health Organization

Introduction

Adherence to therapy is one of the most crucial factors for effective disease management. Nonetheless, chronic patients do not comply with the prescribed medication by 50%.

The World Health Organization (WHO), defines adherence to therapy as "the degree to which the person's behavior corresponds with the agreed recommendations from a health care provider." There are several types of non-adherence. According to Beena Jimmy (2011), one of them is non-conforming and includes a variety of ways in which medication is not taken as prescribed. This behavior can range from skipping doses, taking drugs at incorrect times or incorrect doses, and even taking more than prescribed. One of the most significant reasons for patients' non-adherence is that they forget to take their medication. A study conducted by Rasaq Adisa (2014) showed that 49.6% of patients mentioned forgetfulness as one of the main non-intentional reasons for non-adherence. However, healthcare professionals, such as physicians, pharmacists, and nurses, have a significant role in their daily practice to improve patient medication adherence by developing a relationship with patients and letting them participate in their treatment decisions.

Since non-adherence to therapy is a real problem, how can healthcare professionals and patients work together to solve it?

This project aims to identify problems on the patient's journey and specific barriers for the patient, leading to non-adherence to therapy. To overcome these problems and barriers, it will be necessary to explore and adopt suitable techniques that will improve medication adherence. Concerning the patient journey as a starting point, the problem identification will be focused on two moments: medical appointment and customer service at the pharmacy, particularly when the patient purchases the medications prescribed by the doctor. Special attention will be given to the patients who purchase the medications prescribed by a doctor and start the recommended treatment. In this particular scenario, it is crucial to understand the main reasons and barriers that led them not to follow the doctor's instructions.

Furthermore, since there are ways to improve therapy adherence, it is important to find out if the patient knows these solutions and would be willing to take advantage of them. Thus, it will be possible to understand the current issues between healthcare professionals – physicians, pharmacists, and caregivers - and patient; evaluate patients' difficulties in taking the medication; investigate how adherence to therapy can be improved and how patients react to the solution found.

This project is organized into four chapters. After the introduction, it is presented the Literature Review, with a brief description of the literature about adherence to therapy and community pharmacy and an overview of the healthcare sector. In the Methodology was described the sample and how data was collected and analyzed. Moreover, in the Diagnosis and Results chapter, the data

collected is carefully analyzed to answer the research questions. The last chapter is studying the implementation of a new service in a community pharmacy that aims to improve patient adherence to therapy. Finally, conclusions are presented regarding a summary of the study, some limitations, and recommendations for future work.

Chapter I - Literature Review

1.1. Healthcare Sector

Healthcare is considered one of the most competitive industries globally (Jabnoun & Chaker, 2003). According to the World Health Organization (Constitution of the World Health Organization, 2006, p. 1), health is defined as "*a state of complete physical, mental and social well-being, not merely the absence of disease or infirmity*." Though access to healthcare should not be private to anyone, it is a fundamental human right (Barata et al., 2012).

Barata et al. (2012) points out that the Portuguese Healthcare Service certifies that people have access to adequate medical care, free while using it, and irrespectively of socioeconomic condition. One may conclude that healthcare goes beyond treating a disease (Angelopoulou et al., 1998).

The healthcare sector is one of the most demanding sectors and has undergone many changes. It began by focusing on fundamental and important aspects of life to grow towards becoming a service that provides clients with a more complete and complex approach and whose aims are to treat, cure and prevent while delivering treatment that adds more value to the patient (Serviço Nacional de Saúde, 2020).

There are approximately 10.26 million inhabitants in Portugal (PORDATA, 2020), 21% of whom are over 65, and 14% younger than 15. The Portuguese population's aging also represents the average life expectancy at birth, which has increased over the years and is currently estimated at 80.8 years old, up from 76.4 years in 2000 (PORDATA, 2020). As a result, healthcare services' pressure is growing, since people live longer, and the extended lifespan also represents more diseases, such as chronic diseases (Ministério da Saúde, 2018).

Besides healthcare services' improvements, we have seen a trend towards people who are increasingly informed, concerned about their health, and pursuing medical assistance to cure diseases and mostly prevent them (Delloite., 2019). Therefore, we are experiencing a transition from volume-based to value-based healthcare (VBHC) model. The primary goal is to focus on delivering high quality, safe and cost-effective services to patients. This approach is consistent with a patient-centered healthcare model. It focuses on the entire care cycle, which contradicts the most common and traditional view, focused on the caregiver on each task performed and on the services provided (Elf et al., 2017).

1.2. Value-Based Healthcare

Value-Based healthcare (VBHC) is in general and straightforwardly the simple method of measuring the patient outcomes per euro spent. The primary purpose is to maximize patient outcomes by

improving efficiency, which can be done by accomplishing high-value activities (Lowe, 2018). To enhance the general definition of VBHC, Baumhauer & Bozic (2016) emphasize that the quantity of services delivered is not the proper way to measure VBHC. The important thing is to focus on the outcomes achieved, even if there is a struggle in focusing on the shift from volume to value.

The following equation can picture the main objectives of VBHC:

"Objectives = low cost + high quality + wide accessibility"

Considering the applicability and priority given to measures, cost, quality, and accessibility, the meaning can vary depending on the context. Therefore, increasing quality while reducing cost and maximizing access to healthcare services is the real formulation when measuring value is pointed out (Traoré et al., 2019).

According to the World Economic Forum (2018), the VBHC "*is a genuinely patient-centered way to design and manage health systems. Compared to what health systems currently provide, it has the potential to deliver substantially improved health outcomes at a significantly lower cost*." The purpose of a patient-centered health system is to allow patients to make decisions about the treatment they will receive. This approach emerged from an increasing innovation of the healthcare sector and helped achieve the goals of VBHC. The value should always be defined around the customers' needs and preferences to reach the quality desired (Baumhauer & Bozic, 2016).

1.3. Digital Health

Digital health is defined as the "*use of information and communications technologies to improve human health, healthcare services, and wellness for individuals and across populations*" (Kostkova, 2015: 1). Berners-lee (2019) goes further, arguing that Digital Health is changing the way healthcare is understood, taught, delivered, and advanced in unpredictable ways. In other words, it brings new opportunities to provide more personalized prevention, diagnosis, and treatment experiences, known as digital therapeutics (Mechael & Edelman, 2017).

The aim is to use this kind of technology to boost the healthcare models that already exist and simultaneously develop ways to achieve the quality of care all around the world (Mechael & Edelman, 2017) by changing the way these systems are run and care is delivered (World Health Organization, 2019). Korver (2019) states the synergies between healthcare and technology lead to new opportunities for innovation and enables attractive possibilities for health practice (Lupton, 2015).

Consistent with Thümmler (2015), the growth of digital health is expanding at a high rate. The integration and implementation of new technology, such as mobile phones, tablets, remote patient monitoring devices, and sensors into health systems, can save lives, extend the reach of healthcare services, and reduce healthcare costs (Mechael & Edelman, 2017).

According to World Health Organization (2019), Digital Health is understood as "*the field of knowledge and practice associated with any aspect of adopting digital technologies to improve health, from inception to operation*." It is also designated with other terms such as 'eHealth,' 'm Health,' 'connected health,' and 'Health 2.0'. E-health aims to deliver conditions to improve and enhance healthcare provision, making healthcare increasingly independent of place and time (Korver, 2019).

Everything is being affected by the digital revolution, and healthcare investments in technologies continue to rise (M. M. Pinto et al., 2000). Depending on the available technologies, it is possible to personalize healthcare and medicine (Korver, 2019). As Pinto et al. (2000) said, there is a general agreement that gains in efficiency could be made with digital health.

1.4. Healthcare Service Quality

When measured in a supportive environment in the healthcare sector, quality is referred to as cooperation between patient and healthcare professionals (Cronin & Taylor, 1992). People tend to focus on quality, always searching for it in products and services, and making it a strategic differentiator to maintain a competitive advantage in every industry (Mosadeghrad, 2014).

Also, organizations criticize the quality of a product or service by making quality service a customer perspective (Zeithaml et al., 1993). In the healthcare sector, patients assess quality through interpersonal and environmental factors, to which professionals do not pay as much attention as they should (Yesilada & Direktör, 2015). Thus, managers must focus on monitoring the quality of service delivery, considering the patient's feedback, and implementing strategies to enhance care quality (Chenet et al., 2010).

Quality service may be described as the difference between customer expectations and perceptions. Therefore, customer satisfaction lies in the quality of service, leading them to recommend or re-purchase - customer loyalty (Cronin & Taylor, 1992).

The healthcare service quality can be measured in two dimensions, according to Gronroos (1984), as technical and functional quality. Technical excellence is related to the accuracy of the medical diagnoses and procedures, while functional quality is linked to how healthcare service is delivered to the patient (Lam, 1997).

1.5. Community Pharmacy

A community pharmacy is a healthcare facility that provides a particular population with pharmaceutical and cognitive services. It is often the first option for people to get medical help because pharmacies are known as sources of health information and services (Eckel et al., 2012). This last statement is why the Portuguese community pharmacies evolved and become an important part of

the health sector. They are no longer just a place for dispensing medicines to users, but also to provide healthcare.

Currently, pharmacies develop their activity in two vectors. On the one hand, they are strategically oriented to obtain profit, in a sustained way, since they are a competitive business system (Eckel et al., 2012). On the other, they promote health conditions to the community through the provision of services, such as vaccination; counseling and monitoring of medication dispensing in chronic diseases, e.g., diabetes and hypertension; pharmaceutical consultation (follow-up approach to check for therapeutic adherence and in extreme cases, communication with the doctor), and others.

Patient-centered treatment is now included in the scope of pharmacy practice – with all the cognitive functions of counseling, drug information provision, and drug therapy control – and the technical aspects of pharmaceutical services, including medication supply management, as well as people or public-centered care (Eckel et al., 2012). According to *Ordem dos Farmacêuticos* (2020), in many areas of the national territory, pharmacies are the only available health structure capable of providing proximity care. In these places, the pharmacist is the only professional qualified to inform patients, avoiding unnecessary travel to other health services in the face of minor health disorders through dispensation and advice on the correct use of medications.

According to Aguiar et al. (2014), the quality of care, the advice, and services provided to the population have been evolving and this is a differentiating factors. The delivery of these services contributes to the customers' loyalty, allowing the pharmacy to do better management and periodic optimization of their therapy and the review of medication. These pharmaceutical services can improve quality of life, reduce adverse effects related to medication, reduce morbidity and mortality, and improve health and economic outcomes while relating to the customer (Wiedenmayer, 2006).

1.5.1. Pharmacists' Role

The pharmacist's role has evolved from being a mere manufacturer and supplier of pharmaceutical products to be a provider of services and information and, as of today, recognized as a provider of patient care (Wiedenmayer, 2006). The community pharmacist has a privileged position to contribute in areas such as therapy management, medication administration, identification of people at risk, early detection of various diseases, and promotion of healthier lifestyles. (Ordem dos Farmacêuticos, 2020)

The *Decreto-Lei no 288/2001 de 10 de Novembro* establishes that pharmaceutical activity's exercise as its essential objective the patient itself. Resulting from this, the pharmacist's first and foremost responsibility is towards the health and well-being of the patient and the citizen in general. Article 87 says that the pharmacist must collaborate with all health professionals and with the patient, promoting a safe, effective and rational use of medicines; ensure the patient receives correct

information about the medicines they are about to take; administer to the patient the drug in compliance with the medical prescription or exercise the choice that their knowledge allows and that best satisfies the benefit/risk and benefit/cost ratios (Ministério da Saúde, 2001).

Community pharmacists are committed to providing more and more essential services to the user's health, both in the preventive and therapeutic aspects. As up today, they can increase the clinical outcomes and the quality of life of patients within available services, and they must place themselves correctly within the healthcare system (Wiedenmayer, 2006; Ordem dos Farmacêuticos, 2020).

In July 2014, the community pharmacist's vital role in promoting adherence to therapy was recognized, with his intervention being referred to as one of the public health strategies considered to be a priority.

1.5.2. Services Delivered

Portuguese pharmacies' core activity has been expanding during the last years (Martins & Queirós, 2015). Now, patient-centered care is the focus of pharmacy practice, including all the cognitive functions and technical aspects of pharmaceutical services (Wiedenmayer, 2006).

The term used to represent all the services that pharmacists require to resolve a patient's drug therapy problems is Pharmaceutical Services. In response to local, national and international needs and preferences, pharmacists provide these services in various settings, with an emphasis on communities and individual patients. It includes public health information, education, communication, drug information and counseling; regulatory services; and personnel education and training to support public health. (Ibrahim, 2018; Wiedenmayer, 2006).

Pharmaceutical services are gaining more emphasis on community pharmacies and becoming a reality in customers' daily lives. An example is the signed agreement between the National Pharmacy Association (ANF) and the Ministry of Health that promotes pharmacy services within the scope of prevention and promotion of Public Health programs, including monitoring adherence to therapy. As stated earlier, pharmaceutical services are now patient-centered, contributing to the improvement of health and economic outcomes. That being said, to continue to emphasize these services, it is important to consider the identification of patient needs as a principle to develop value-added pharmacy services (Ibrahim, 2018; Mallet, 1992).

Community pharmacies play a significant role in supplying appropriate and high-quality drugs, offering medical care and guidance (Norris et al., 2012). However, service differentiation is also a key factor to attract customers, as the value they attribute to healthcare services stems from a robust pharmacist-patient relationship (Martins & Queirós, 2015).

1.6. Adherence to Therapy

Adherence to therapy is determinant to the treatment's success. The World Health Organization defines medication adherence as "the degree to which the person's behavior corresponds with the agreed recommendations from a health care provider"(Jimmy & Jose, 2011). Failure to adherence or non-adherence to therapy is a severe problem that affects the patient and the healthcare system. The *SIMPATHY consortium* study indicates that 50% to 80% of patients with chronic conditions may be non-adherent. It has been estimated that non-adherence to medicines costs the European Union EU 125 billion annually (Mair et al., 2017).

The expressions compliance and adherence to therapy have been used simultaneously over time in numerous studies (Branco, 2010). Compliance is the degree to which a patient's action follows the guidance of the prescriber, which implies patient obedience to the physician's authority. Adherence means that the patient and doctor collaborate to find a solution based on medical opinion and the patient's lifestyle, values, and preferences for care (Jimmy & Jose, 2011).

Medication non-adherence in patients can lead to a substantial worsening of the disease, death, and increased health care costs. As Jimmy & Jose (2011) said, there are five overlapping types of non-adherence:

i) Non-fulfillment adherence, in which providers write a prescription, but the medication is never filled or initiated.

ii) Non-persistence is rarely intentional and happens when patients and providers miscommunicate. Patients decide to stop taking medication after starting it, without being advised by a health professional.

iii) Unintentional that arises from capacity and resource limitations prevents patients from doing so by practical barriers, which include cognitive problems, poor organizational skills, polymedication, and difficulty accessing medicines.

iv) Intentional non-adherence arises from the beliefs, attitudes, and expectations where the individual decides not to follow the treatment recommendations (Mair et al., 2017).

v) Non-conforming includes a variety of ways in which medication is not taken as prescribed. This behavior can range from skipping doses, taking medications at incorrect times or incorrect doses, and even taking more than prescribed (Jimmy & Jose, 2011).

The consequences of non-adherence are waste of medication, disease progression, higher risk of severe relapses, lower quality of life, antibiotic resistance, increased use of medical resources such as

nursing homes, hospital visits, and hospital admissions. So, helping people take their medicine appropriately would be better way to avoid all of these consequences.

Therefore, adherence to therapy is dependent on multiple factors that interact with each other (Kenreigh & Wagner, 2005). As Branco (2010) referred, adopting suitable techniques to overcome them will improve medication adherence. These factors can be grouped into three major dimensions: (a)demographic, social, and economic factors; (b) factors relating to the disease and the therapeutic regimen prescribed; and (c) factors related to the patient's relationship with healthcare professionals and health services.

1.6.1. Demographic, social and economic factors

The link between patients' characteristics and their level of adherence to prescribed therapies have been widely studied and led to the following conclusions. Despite being tested regularly, the gender variable has not shown a strong correlation with the degree of therapeutic adherence (Vermeire et al., 2001). Non-adherence is a recurring problem in any age group, but some authors report that it tends to increase globally due to the population aging. Indeed, older patients are particularly susceptible due to the deterioration of their health status, which often causes multi-pathologies and the existence of several chronic diseases, which may require several therapeutic regimens simultaneously and long-term. Also, the decrease of some cognitive or functional faculties can restrict the access and handling of drugs, conditioning the therapeutic regimen and contributing significantly to non-adherence to therapy (Beckman et al., 2005; Branco, 2010).

The compliance rate can also be determined by the performance of third parties with older people in charge, depending on the ability of caregivers to understand and adopt the recommendations given by doctors; the same can be said in the case of children and the ability of their parents or guardians to apply therapies correctly (Bugalho & Carneiro, 2004).

Socioeconomic factors have been reported as very important predictors of the degree of patient compliance. The low level of education, but above all, the low income, unemployment, or lack of job stability, can constitute significant barriers to effective therapeutic adherence (Branco, 2010). In addition to the difficulties of obtaining medical drugs for economic purposes, it is also possible to mention other unfavorable circumstances for their purchase, such as the social isolation of the patient or the geographical distance from the pharmacy and health care units, which require extra costs because of the distances to be covered. (Bugalho & Carneiro, 2004).

The individual's social environment is one of the factors with the greatest predictive potential (Branco, 2010), since those who live alone or have limited sociability networks are more likely to find it difficult to follow medical advice (Vermeire et al., 2001).

1.6.2. Factors relating to the disease and the therapeutic regimen prescribed

Regarding the treatment itself, the most relevant factors are the duration and complexity of the therapeutic regimen. When therapies are simple to apply, and indications are easy to recognize when they are not subjected to regular changes in the therapeutic regimen, when they are short-lived, and when they do not need drastic changes in schedules every day, patients have higher levels of adherence (Branco, 2010).

A different viewpoint is to recognize the patient's experience of illness and the importance of medicine in people's daily lives (Vermeire et al., 2001). The likelihood that the patient will obey the medical advice and apply a therapeutic regimen correctly depends on his motivation, which is linked to the way he effectively views his susceptibility to the disease and its effects, as well as the impact it can have on the quality of life (Branco, 2010). When therapy was intended to cure a disease, seventy-seven percent of patients displayed high levels of compliance with their drug regimen, and only 63 percent of patients agreed when treatment was directed at prevention. However, when the medication was to be taken over a long period, compliance rates dropped dramatically to around 50% for either prevention or cure (Jimmy & Jose, 2011).

The patient's health beliefs and behaviors about the efficacy of the procedure, the prior interactions with pharmacological treatments, and lack of encouragement often influence the degree of adherence to medications (Brown & Bussell, 2011). Side effects can also limit the degree of adherence, indicating several studies that non-compliance tends to decrease when the therapy followed has few side effects and has immediate effectiveness in relieving symptoms and a low cost. The simultaneous prescription of multiple medications, as well as many daily doses or high doses, can also contribute to a lower commitment to treatment, as well as the type of drug and the way it should be administered and handled, the discomfort it causes (the size of the pill and the smell or taste of syrup, for example) or due to negative experiences in the past with the same or similar drugs (Branco, 2010).

Among all these factors, forgetfulness is one of the most observed behaviors in studies on the subject, being frequently referred by patients as the main reason for non-adherence, whether it is the daily forgetfulness of the moment of taking or the forgetfulness of relevant information about the form how the treatment should be applied and other recommendations made by the doctor (Branco, 2010).

Although the literature reports mainly the non-compliance related to the non-application of the rules of the therapeutic regime, the excessive use of medication is also a behavior of poor adherence, which can result in greater toxicity and cause multiplication of side effects; likewise, self-medication,

that is, the consumption of drugs on the patient's initiative without being prescribed by a doctor, also constitutes non-adherent behavior (Branco, 2010).

1.6.3. Factors regarding patient-healthcare professionals' relationship

Healthcare professionals, such as physicians, pharmacists, and nurses, have a significant role in their daily practice to improve patient medication adherence. Many patient-related factors, including lack of awareness of their condition, lack of involvement in the treatment's decision-making, and suboptimal medical knowledge, lead to non-adherence to medication (Brown & Bussell, 2011).

Furthermore, the way patients trust the treatment and the healthcare system is relevant, but the connection with the doctor is also an important factor (Marinker & Shaw, 2003; Osterberg & Blaschke, 2005).

However, not only do physicians often fail to identify drug non-adherence in their patients, but they can also contribute to it by prescribing nuanced drug regimens, failing to explain the benefits and adverse effects of a drug efficiently, and inadequately considering the financial burden on the patient (Brown & Bussell, 2011).

The communication skills used to transmit information in clear and well-assimilated knowledge provide quality to the doctor-patient relationship (Branco, 2010). Also, their attitude and behavior towards the patient and the transmission of clear information, using appropriate language to the educational level and the cognitive capacity of each patient, involve knowing how to listen, understand, and respect the patients' expectations and concerns. There are many ways to improve communication between the patient and the physician and simultaneously increase adherence to therapy, such as involving patients, whenever possible, so that they feel a sense of responsibility and become participants in the care process, making choices about their drugs (Jimmy & Jose, 2011). Besides, simplifying drug use based on patient characteristics can also lead him to collaborate.

Physicians and other healthcare practitioners, on the other hand, should pay attention to the possibility that patients do not comply with prescriptions, considering correcting them wherever possible by the adequacy of the therapeutic regimen to the behaviors and lifestyle of the patient (Branco, 2010). One way is to measure adherence by different methods, which may depend on the patient's characteristics as well as the drug's. Review the efficacy, if any, of the safety aids used with treatment. Also, collaborate with the patient to incorporate the medication regimen into his/her daily regimen (essential in those on complex drug regimens, those having unintentional difficulties in adherence, e.g., elderly). Furthermore, scheduling appropriate follow-up and monitoring medication adherence should also be a priority (Jimmy & Jose, 2011).

These forms of relationship, recognized under different names throughout the literature about the doctor-patient relationship, are evolving, with positive generational differences already observed between doctors in the way they relate to patients.

1.7. Polymedication

The average life expectancy improvement has resulted in an increase of several age-related pathologies and a higher prevalence of chronic diseases (Sousa et al., 2011). To delay the evolution of the disease, improve quality of life, functional capacity, and in some cases, relieve pain, it is normal to resort to medical drugs as therapy. According to the National Health System, in Portugal, drugs' consumption increased by approximately 31.6% (A. Pinto et al., 2012).

Together with advancing age and the appearance of several chronic diseases, presents a major challenge for health authorities around the world. As a result, older adults tend to take multiple drugs in a day that can be referred to as polymedication (Dagli & Sharma, 2015). Polymedication is defined as the simultaneous and chronic use of different drugs by the same individual. There is no unanimity concerning the minimum number of drugs prescribed to consider the individual polymedicated, varying between two and five, depending on the studies (Silva et al., 2004).

Polymedication, if not well managed, may have significant implications for the patient. Prescribers must think consciously about reducing medication reactions. When two medications are taken concurrently, the chance of adverse reactions is 6%. When five drugs are administered risk increases to 50% (A. Pinto et al., 2012).

Identifying and preventing polymedication will lead to better outcomes in the elderly population and improve the quality of life. Medication review is an essential part of the elderly patient to avoid adverse effects that can be caused due to polymedication (Dagli & Sharma, 2015). However, if preventing polymedication is not feasible it is important to ensure adherence to therapy.

Chapter II - Methodology

2.1. Research Design

This project is based on a qualitative study, since it involves an organization' analysis through interviews to identify the problem.

The purpose of this work is to explore the reasons for the lack of adherence to therapy and to assess the feasibility of implementing the Dose Administration Aids (DAA) service in a community pharmacy selected, as part of market analysis.

2.2. Sample

This analysis was based on the patient journey, considering the three main players on adherence to therapy: the physician, the pharmacist, and the patient. Among the 80 interviews held, 27 were physicians, 21 pharmacists and 32 were patients.

In order to conduct a research focused on patients who could benefit from the DAA service, eligibility requirements were developed for the three groups mentioned above. The inclusion criteria for physicians is their specialty (cardiology, endocrinology, and family medicine). For the pharmacists, the requirement used is the place of employment: they must operate in a community pharmacy and provide services to the public. Regarding the patients, they should be diagnosed with diabetes or hypertension and take more than three medications per day.

Additionally, it should be noted that the patients attend the local pharmacy in Abrantes while pharmacists operate in the district of Santarém. For the physicians, they work in the districts of Santarém and Lisbon. The choice of Lisbon district stems from the frequent demand from the Abrantes' population for physicians in this region.

2.3. Data Collection

The interviews were conducted based on three different scripts, one for each representative (Appendix A, B and C).

The physician's interview is divided into five sections. Section I is related to the first consultation environment with the patient and the Section II concern to the physician's performance in the follow-up consultation. Section III addresses the reasons that lead to changes in therapy. Section IV refers to DAA's topic as a pharmaceutical service and requests their opinion about it. Finally, in section V, sociodemographic data was collected.

The pharmacist's interview is also split into five sections. The first one is related to customer service while the second inquires the pharmacists about customer behavior. Third and fourth sections are both related to Dose Administration Aid service. Sociodemographic data was asked in section five.

Lastly, at the pharmacy the patients were confronted with an interview identical to the previous ones. First, they were asked about the consultation environment with the physician. Section II is related to the patient's commitment to treatment, whereas the pharmacist's efficiency was analyzed in section III. The information about pharmaceutical services, namely the service under review, is covered in Section IV. At last, in section V, socio-demographic data was collected again.

In order to prepare the final interview, each script was previously discussed with a representative of each group. It allowed us to identify the more important subjects to be discussed and even how to structure each interview. Please go to Appendix A, B and C to see the first interview in detail.

2.4. Data Analysis

As mentioned above, the first interview was performed with a representative of each group in order to reach the final interview script.

Beginning with the physician, a 26 years old man was interviewed. He works as a family doctor in a healthcare center. Throughout this conversation it was possible to identify some issues that can lead, directly or indirectly, to non-adherence to therapy. One of the initial questions was “On average how long is allocated to each appointment?”. He answered that it is usually twenty minutes, adding that they will be penalized if they overtake that time. Even though there are few exceptions, the time for clarifying doubts is limited, which may leave doubts about therapy.

Another point that should be reviewed is the way physicians communicate how patients should take their medication. As explained by the physician, they communicate verbally and while prescribing the medicine, they write beside each one the way to take it. One of the problems is that elderly patients normally lose the prescription, when delivered in paper. With patients that use the new technologies, physicians do an electronic prescription and suggest to the patient to ask the pharmacist to write on each medicine pack, the right way to take it. Chronic patients are obligated to schedule a follow up appointment every six months, which does not always happen. Nevertheless, one of the biggest problems is that chronic patients do not need to set an appointment to get a new medication prescription.

In the second stage of this interview, the physician was asked if he has access to patient’s appointments history. Although the answer was affirmative, when the patient goes to an appointment in the private sector recommended by the family doctor, the medication prescribed in that appointment will not be included into the patient’s history. When the physician prescribes the same

medication for the second time to the patient, it is asked to the physician if he would reinforce all the information about the medication (e.g. how to take the medication, possible side effects, etc.). The answer was no, unless the physician realizes that the patient is not totally aware of the recommendations.

The second interview was answered by a female pharmacist, 35 years old and 12 years of professional experience. During this conversation, it was remarkable the progress of the pharmacists concerning the relationship with the patient. However, the pharmacist mentioned that their work is not appreciated as it should be by other healthcare professionals and even patients. Throughout the survey, one of the questions asked was if they usually verify if the patient is taking the medication prescribed correctly. The answer was that it depends on the patient and the type of medication. Sometimes, that strategy might not be enough for some patients, so they continue not to take medication as prescribed. Another question was if the pharmacist usually shares with customers some tips on how to remember to take the medication correctly. The answer was no, which can be identified as one of the issues for patient's non-adherence to therapy. Since forgetfulness is one of the major reasons for non-adherence, giving patients strategies to take the medication correctly can help minimize the problem.

Moving on to the last interview/survey, the respondent was a female patient with 74 years old diagnosed with Parkinson (a chronic disease) 10 years ago. This patient usually goes to appointments with a specialist of Parkinson disease in a private hospital. Before stabilizing with the current physician, she tried different physicians because the prescribed medication's effects were not the desired ones. Nowadays, she only schedules an appointment when she does not feel well or if she needs to change the prescribed medication. During the interview, it was asked if she sometimes forgets to take the medication. She answered affirmatively and even confessed that sometimes she chooses consciously to not take some medications. For example, she takes one pill to prevent falls and if she considers she is better, since she has not been falling for a while (e.g. one week), she stops taking that medication.

Consequently, it is possible to conclude that she is not aware of the importance of taking the correct medication as prescribed by the doctor and alerted by the pharmacists. Another conclusion taken from this conversation is that although she is aware of the drug's side effects, these effects sometimes lead her to stop taking that specific medication. After these conclusions, it was asked if she would allow another person to take care of her medicine organization, for which she said no because it was the only thing that she can still do alone nowadays. The patient referred that in the beginning of the disease, she used to organize the medication in a weekly package. However, now she takes the medication directly from the blister when the phone reminder sounds which can increase the non-adherence to therapy.

With the three initial interviews, it is possible to verify that there are some problems along the patient's journey. However, it is necessary to understand where these problems come from. The final scripts were made based of the following topics:

i) Knowledge of the patient regarding the therapy;
ii) Doctor-Patient relationship;
iii) Pharmacist-Patient relationship;
iv) Obstacles that lead to non-adherence to therapy;
v) Patient monitoring by the physician and the pharmacist;
vi) Collaboration between health professionals;
vii) Knowledge of the DAA service by the three groups;
viii) Interest in using the service and, if the answer is affirmatively, how much they are willing to pay for it.

Please go to Appendix D, E and F to see the final scripts.

Therefore, it is used a content analysis to the interviews. As a data processing technique, a documentary analysis was used (Bardin, 2010).

Chapter III - Diagnosis and Results

3.1. Analysis of Interviews with health professionals and patients

A prospective non-randomized study was guided throughout three different surveys, focused on three distinct groups. The physicians, pharmacists and patients' surveys were conducted in an interview environment.

Following a random order, the interviews were carried out by video or phone call to 27 physicians, 21 pharmacists and 32 patients, who met the inclusion criteria described above.

3.1.1. Physicians' Interview

Starting with the physicians, twenty-seven interviews were conducted: 59% were women and 41% men. The prevailing professional experience range is more than 20 years with 44%, followed by 6 to 10 years (26%) and 11 to 15 years (22%) – please refer to Appendix G. The 52% doctors inquired work exclusively in the private sector, 4% in the public sector and 44% in both. The study was conducted with 4 cardiologists, 3 endocrinologists, and 20 family medicine physicians regarding physician specialty. Analyzing the section about the medical appointment, it is important to consider two different scenarios: i) a medical appointment with a new patient, and ii) a medical appointment with a usual patient, in order to understand if the doctor behavior and performance is the same in both.

During the first medical consultation environment, it is important to establish a doctor-patient relationship. This can be done by being able to clarify patients' doubts and taking into consideration their opinions. Additionally, it is important to understand the patient profiles and consider that to decide their own treatment. The average time spent with the patient in the first medical appointment is mostly between 21 to 30 minutes with 44%, followed by 16 to 20 minutes (22%), as shown in Appendix H.

At the beginning of the interviews, physicians were asked about different situations that should be addressed in the first appointment. The results were the following ones: 19% could not manage to dedicate the sufficient time to resolve the reason for the consultation; 26% could not answer all the questions that worried the patient; 33% did not take into account the patients' opinion regarding the overall treatment; 26% did not take into account which treatment was the most convenient for the patient, when different approaches were possible; and 37% did not sought to know if the prescribed treatment would be difficult to follow by the patient.

When it is necessary to prescribe during the first medical consultation, the physician must address the following topics: the importance of taking the medication exactly as planned (schedules, doses, etc.), explain the detailed plan of how the patient should take their medications (schedules, doses,

etc.), mention the potential side effects, the solutions to minimize them and what the patient should do whether he/she misses the medication. During the interviews, doctors were asked about the topics stated above to understand if they were putting them into practice. The results clarified most physicians (85%) mentioned the importance of taking the medication exactly as planned and 89% explained the detailed plan of how the patient should take their medications. Nevertheless, a significant share of the physicians confessed that it is irrelevant to address the potential side effects and solutions to minimize them (41%) and what the patient should do if he/she misses a medication (63%).

Moving on to the second phase of the interview, concerning the follow-up medical appointment, it was asked how often the physician schedules the patient's follow-up appointment. The prevailing answer was quarterly with 44% of the answers (Appendix I). At the same chapter, it was asked if it is required an appointment to renew the patient prescription for which a negative reply was received by 67% of the physicians, even though the interview continued based on a scenario where it is required a medical appointment to renew the prescription of medicines. The topics that should be mentioned in a first medical appointment environment should also be addressed in every situation when there are prescribed medicines, even when renewing the same prescription of medicines. Therefore, the same topics were asked to the physicians to verify if they reinforce them. The results were that 81% reinforce the importance of taking the medication exactly as planned and 63% explain the detailed plan of how the patient should take their medication. However, 63% of the physicians do not reinforce the potential side effects and the solutions to minimize them while 85% do not explain what the patient should do if he/she misses the medication.

Another scenario that must be taken into consideration is the change in the patient's therapy. The reasons that lead to that decision are diverse and so, it was questioned to the physicians the most relevant ones. The main reason with a highlight of 93% remains in the positive or negative evolution of the disease for which the therapy is intended. Followed by the appearance of side effects (81%), patients' refusal of taking the medicines (59%) and social economics factors (56%). Other physicians also mentioned potential reasons as: the patient's request, low level of education, strong religious beliefs and patients' routine – as it can be seen in Appendix J. Once again, within this context, it is necessary to analyze which topics should be addressed and reinforced to the patient. Hence, it was asked to the physicians which key topics they consider important to reinforce in a scenario of change in patient's therapy. Regarding the importance of taking the medication exactly as planned 78% of physicians consider it important and mention this topic in their patients' appointments and 67% also agree in explaining in detail the plan of how the patient should take their own medication.

Nevertheless, 56% mention the potential side effects and the solutions to minimize them and only 26% reinforce what the patient should do if he/she misses a medication.

As a conclusion, it was given the opportunity to the physicians to share their opinion about the reasons that may lead to patients' non-adherence to therapy as it can be seen in Appendix K. Summarizing, the opinions that stood out were: forgetfulness, aversion to taking medications, lack of discipline, socio-economic conditions and illness denial or low expectations of resolution. Using DAA service as a possible solution to decrease the patient's non-adherence to therapy, physicians were asked if they knew the service, of which 52% knew the service and 48% did not. Among the entire sample of physicians, 85% agree with the service and predict that it will be useful to their patients. As well as 89% would recommend this service.

3.1.2. Pharmacists' Interview

Moving forward to the analysis of the interviews with pharmacists, it is important to emphasize that pharmacists include pharmacists, pharmacy technicians and assistants who provide services to the public.

Among twenty-one interviews, 12 pharmacists, 8 pharmacy technicians and 1 pharmacy assistant were analyzed as one group only. This group was 90% women and 10% men. Regarding age of experience, the prevailing age range is between 6 to 10 years with 38%, followed by 11 to 15 years (24%), less than 5 years (19%), 16 to 20 years (10%) and more than 20 years (10%) - please refer to Appendix L. The pharmacists' interview was separated into three mains stages: service to a new customer, service to a frequent customer and knowledge and advantages of Drug Administration Aids (DAA).

The relationship between pharmacist and customer has been improved over the years. Thus, the pharmacist's attention and communication with the customer and how the medication is delivered are the key elements to continue strengthening this relationship and make the service personalized, promoting adherence to therapy. Concerning the average time spent with a new customer, the prevailing time range is less than 10 minutes with 38%, followed by 10 to 15 minutes (33%), 16 to 20 minutes (19%) and 21 to 30 minutes (10%) – Appendix M.

In the beginning of the interviews, pharmacists were asked about different situations that should be addressed during customer service. The results were the following: 10% of the pharmacists do not have time to answer all questions that worry the patient, 24% do not explain in detail the objectives of each medication, 24% do not look the customer's medication history and 71% do not sought to know if the prescribed treatment would be difficult to follow by the customer. The inquired pharmacists said that they only check customers' history if they ask for unusual drugs (either different

pathology medicines or if there might be an adverse interaction or duplication between the medication).

During customer service, the pharmacist should mention all the important points related to the prescription, such as the importance of taking the drugs, the plan of how they should be taken, the potential side effects and what to do in case of failure of a dose. All these topics should be reinforced even if the customer implies that he/she has understood all the instructions from his/her doctor.

In a scenario of a new customer, the results show that 86% of the pharmacists mention and agree with the importance of taking the medication exactly as planned (schedules, doses, etc.) and explaining the detailed plan of how the patient should take their own medications (schedules, doses, etc.). Additionally, 67% consider important to mention what the patient should do if he/she misses the medication while 57% refer to the potential side effects and solutions to minimize them. Considering now the scenario of a frequent customer, the same question was asked to understand if there are differences in the treatment of both. Once again, the results show that 62% of the pharmacists mention and agree on taking the medication exactly as planned and explaining the detailed plan of how the patient should take their own medications while 57% mention what should the patient do if he/she misses a medication. However, only 43% agree that it is important to address the potential side effects and solutions to minimize them.

Throughout the interviews, it was asked the pharmacist' opinions about the main reasons for customers' non-adherence to therapy. The main reason with a highlight of 76% is forgetfulness, followed by lack of discipline (52%), illness denial or low expectations of cure (52%), inability to purchase prescription drugs (socio-economic conditions) (48%), lack of education/knowledge (38%) and lack of planning skills (19%). Other reasons were mentioned such as aversion to taking medications, routine changes, falling asleep before taking the dose and lack of emotional support. Please refer to Appendix N to have a full picture of the reasons mentioned above.

The pharmacists were also questioned if they communicate with the physician and if they usually outline a strategy to promote adherence to therapy of the customer when they found that the customer did not take the medication prescribed by his/her physician correctly, for whatever reason. The answer was negative with 71% of the answers.

Last but not least, the topic of Drug Administration Aids was also discussed. Although all the pharmacists knew this service, only 38% had implemented it in their community pharmacy. Taking into account the pharmacists who provide this service, they reported some of the obstacles they face throughout and after the implementation process. These obstacles were mainly: i) the consumption of time that the service takes from pharmacists; ii) the customers' perception; iii) the lack of economic availability of the customer; and, iv) the fact that customers are unaware of the service. However,

pharmacists confirm that this service improves the professional-customer relationship, increasing his/her loyalty with the community pharmacy. It becomes a differentiating factor for the community pharmacy, adding value to the pharmacist's role and creating a competitive advantage. Considering the pharmacists that do not provide this service, they absolutely agree with it. They have a huge interest in providing this service in their community pharmacy adding that would be really useful to their customers. Regarding the fair price of this service, pharmacists were divided between being a free service or charging from 2.5€ up to 5€.

3.1.3. Patients' Interview

Moving forward to the patient analysis, there were 32 interviews: 53% were women and 47% men. Concerning their condition, 47% were diabetic and 56% hypertensive. In total, 63% take more than 5 drugs per day and 37% take 3 or 4 drugs per day. This interview was divided into three parts, starting with the physician's appointment, following the pharmacy service as a customer, and finally their interest in DAA service and how much they are willing to pay for it.

It was asked how often they go to an appointment and 78% answer quarterly, semi-annually, or as needed (Appendix O). During the appointment, it is essential to know if the physician explains the importance of taking the medication as planned as well as if the patient has no doubts, if they know the purpose of each medication and how to take it. Also, if the patient knows what to do in case of missing a dose. At this stage, 50% do not know what to do in case of missing a dose and 34% cannot clarify all the doubts during the physician appointment. However, in general, the patients consider that the physician mentioned all the other topics stated above. Still related to the physician appointment, it was questioned if the physician validated if the patient was taking any other another medication and 50% answered that the physician did so in every appointment, but the other half mentioned that the physician only confirm their medication in the situation of first appointment or only when they changed their medication.

During pharmacy service, 59% of patients confirmed that the pharmacist did not reinforce the potential side effects and what were the solutions to minimize them, 44% mentioned that it was not explained what to do in case of missing a dose and 41% did not hear the pharmacists talking about the detailed plan of how they should take their medication. Moving on to the patient itself, it was asked to the patient if they strictly follow their physician's prescription plan and 59% replied that they always follow the prescription as planned. However, to understand if patients were telling the truth, it was asked if at any time they did not take their medication as the physician recommended and the results were surprising. In 59% of patients who stated that they strictly followed the detailed plan of their prescription, 58% confirmed that once in a while do not follow the plan as recommended. In order to

explain those situations, forgetfulness, lack of discipline and medication schedule were the main reasons given by the patients. See detailed information in Appendix P.

To complete this analysis, patients were questioned if they had knowledge about pharmaceutical services, of which 88% were aware of what kind of services existed. Nevertheless, 82% out of the 88% did not know about the DAA service. After a detailed service's explanation 38% of patients were interested in using the service and willing to pay from 3 up to 7 € per week.

3.2. Discussion of Results

This research aims to identify the issues linked to the patients' commitment to therapy. Following a statistical study of the interviews carried out, it is possible to correlate with the literature review potential issues to adherence to therapy.

Nowadays, health professionals' activities are guided and focused solely on the patient, as numerous authors stated. The patients' emphasis involves spending more quality time with them, carrying out frequent follow-up, taking into account patient opinion regarding the treatment, and offering different services to encourage and maintain proximity to the patient.

The Appendix Q shows the same question asked to physicians and pharmacists in the two different scenarios (first appointment/visit and follow-up appointment/visit). Although doctors and pharmacists have different responsibilities, it can be confirmed that the time spent with the patient in the second visit is lower when compared to the first visit in both cases. As long as this is a recurrent situation, it should be follow-up appointments frequently scheduled, as well as monitoring the adherence to therapy.

In order to show that the duration of the appointments is a key variable to the relationship between the patient and healthcare professionals, the two groups (physicians and pharmacists) were asked if they had the opportunity to discuss all the themes listed during the time spent with the patient (Appendix R). Both discussed the most important subjects. All the questions that concerned the patient were answered. The prescription medications' objectives were clearly explained, and the patient was also encouraged to pursue the medication. However, few topics were absolutely disregarded, such as finding out if the recommended medication would be difficult to take or even considering the patient opinion in the overall treatment. As Brown & Bussell (2011) said, many factors associated with patients, including lack of involvement in treatment decision-making, contributes to non-adherence to medication. Additionally, the communication skills that health professionals use with patients are another variable that adds value to the partnership between health professionals and patients. According to Jimmy & Jose (2011), one of the potential ways to improve the patients' commitment to

the treatment is engaging them whenever possible so that they feel a sense of responsibility and becoming participants in the care process and make decisions regarding their medications.

In order to identify and check whether the information communicated by health professionals was successfully interpreted, patients were asked, within the context of doctor's consultation and pharmacist's assistance, whether they had understood all the important information. When the information is successfully transmitted it leads to the correct taking of medications, encouraging the adherence to therapy. Appendix S shows a communication gap related to the clarification of the patients' doubts regarding the procedure to follow in case of failure to take a drug and the explanation of the possible side effects and solutions to reduce them. This means that the time allocated to each patient's appointment has not been adequate to respond to all the patient needs. A gap in communication between health practitioners and patients is obviously present.

The monitoring given to patients by health professionals is another critical point for adherence to therapy. It requires regular follow-up appointments, reinforcing prescription, treatment and medication information, realizing when and for what purpose the patient is not compliant with the prescribed medication, and reassessing the patient' medication when appropriate. Through the interview' results, it can be confirmed that follow-up appointments are scheduled by the physician 44% of the time on a quarterly basis. However, when asked to the pharmacist, for how long the patient purchased medicine, the answer was concise for one month. Having that said, it was checked that 67% of the time the physicians see no need for a follow-up consultation, to prescribe patients' medication. The follow-up visit is the starting point to get to know the patient and strengthen the bond between the two in a way. At that point, the doctor can assess, examine, and analyze the patient and understand whether there are any restraints to adherence to therapy. As Branco (2010) said, health professionals should pay attention to the possibility of patients' non-compliance, in order to minimize the consequences or review the therapy. In addition, concerning healthcare professionals' opinions about the main reasons for patients' non-adherence to therapy, these are related to forgetfulness, lack of discipline, illness denial or low expectations of resolution and socio-economic conditions. Forgetfulness is one of the most observed behaviors in studies on the subject, being frequently referred by patients as the main reason for non-adherence, whether it is the daily forgetfulness of the moment of taking or the forgetfulness of relevant information about how treatment should be applied and other recommendations made by the doctor (Branco, 2010). Forgetfulness is also attributed, for instance, to the lack of organization of the patient for not scheduling the prescription for the next day.

Regarding the follow-up appointment, the decline in the physician's performance was noticeable compared to the first appointment (please refer to Appendix T). As mentioned in the literature review, physicians' attitude and behavior towards the patient involves knowing how to listen, understand and

respect the expectations as well as the concerns of the patients. Moreover, physicians should also take into account how the information is transmitted, adapting the language used to the educational level and the cognitive capacity of each patient.

Medication review is an essential part in elderly patients to avoid adverse effects that can be caused due to polymedication but also listen to the patients' concerns and adjust the patient's medication when appropriate. An adjustment in the patient's medication is considered when the medication is reviewed and the doctor observes a positive or negative evolution of the condition, the existence of side effects, the reluctance of the patient to take the medication or socio-economic factors that affect the purchasing of the medication. Following the adjustment in the patient' medication, it is important to reinforce, once again, the main topics about the drug and its use. Analyzing Appendix U, although the physician performance improved when compared to the follow-up appointment, it still falls short of what happens in the first appointment. In view of the topics referred above, the monitoring carried out by health professionals on patients can still be improved.

The cooperation between health professionals is another important feature in adherence to therapy regarding patients' treatment and supervision. It is particularly important to observe and examine what might be the key factors that cause non-adherence to therapy when in direct communication with the patient. As pharmacists are more frequently in direct contact with patients (as we noted earlier, patients go to the pharmacy on a monthly basis, while the patient only goes to the doctor every three months), they should be aware of the possibility of inconsistencies in the usage of patients' drugs. In the event of verification, in addition to attempting to understand the key reason for non-adherence to therapy with the patient, the pharmacist should contact the doctor to alert them about what happened. In the interviews conducted, pharmacists were asked whether, as a rule, they contact the doctor when they notice that the patient does not take the drug correctly as prescribed. Pharmacists' responses were 71% negative, which suggests that there is little cooperation between health professionals. However, in Article 87 of *Decreto-Lei no 288/2001 de 10 de novembro,* says that the pharmacist must collaborate with all health professionals and with patient, promoting a safe, effective, and rational use of medicines

In conclusion, the findings of the conducted interviews confirm the presence of situations during patient journey, leading to non-adherence to therapy, being in line with the questions found in the literature review. Summarizing, it may be considered that there is a lack of communication between patients and health professionals, a potential for improvement in patient monitoring and a lack of cooperation between physicians and pharmacists to carry out a customized patient monitoring. In order to improve the issues highlighted and increase adherence to therapy, a community pharmacy was chosen in Abrantes to implement the DAA service as a potential solution.

Chapter IV – Project of Adherence to Therapy: Dose Administration Aids

4.1. Definition

The Dose Administration Aids requires the use of dispensing boxes (or blisters on strips or blister discs) that allow the pharmacist to organize the patient's medication for them to take it correctly.

Several DAA solutions are currently available, also designated in various formats (e.g. multi-compartmental devices; devices for administration assistance; etc.). This service also provides information regarding the safe use of the drug, given in written or pictographic form and orally, to assist the patient in the proper administration of the medication and encourage greater adherence to therapy.

This service highlights one of the pharmacist's priority duties, ensuring the right, secure and productive use of the drug. However, in particular family doctors, articulation with other health practitioners is considered to be particularly necessary for the successful execution of this service.

4.2. Implementation of Dose Administration Aids in a local community pharmacy

Unintentional non-adherence can be minimized through the use of DAA. However, it is important to recognize that this service is one of several possible solutions, and there may be a need for conjugation with other pharmaceutical services to maximize health outcomes.

It is important to consider four critical steps for the introduction of DAA in order for a community pharmacy to be able to make this service accessible to those in need. The phases are as follows: service acquisition, patient adherence and assessment, service operationalization and delivery to the patient. In order to complete this project, it was possible to display and track the implementation of the DAA service in a local community pharmacy, *Farmácia Ondalux*.

Farmácia Ondalux located in Abrantes's city, started its activity in 2006 and has a highly specialized team with six pharmacists, seven pharmacy technicians, and 2 assistants.

The pharmacy practice is focused on the patient, innovation and to deliver a quality service to its 3000 loyal customers. It stands out for its friendliness, professionalism, and the offer of several complementary services such as home delivery, blood pressure measurement, blood glucose determination, among others.

It is awarded by IAPMEI as *PME Líder* in 2014, 2017 and 2018, and *PME Excelência* in 2015, 2016 and 2019.

Currently, there is already a *Norma Geral* of DAA (2018) that recommends the procedure to be adopted by the pharmacy, in order to standardize this service. The first step of this process is to acquire

the physical equipment and software. However, it is also necessary to evaluate if the community pharmacy has the right conditions to provide this service.

According to *Ordem dos Farmacêuticos* (2018), it is recommended that there are two pharmacists assigned to the service: the responsible Pharmacist, who collects and reviews the patient's pharmacotherapeutic information (with a detailed interview to the patient in an office for personalized assistance) and prepares the device; this pharmacist also carries out the initial verification of the process; and Pharmaceutical supervisor, who is responsible for double checking at the end of the process. Additionally, the pharmacy must have a specific area to prepare, storage and preserve the medication used in this process. This reserved area should ensure that the medication is prepared in the best conditions of hygiene and safety, hence the use of the pharmacy laboratory for this process is recommended. Adding to the acquisition stage, it is important to refer that the pharmacist responsible along with the supervisor must have a certification of the DAA learning course.

Farmácia Ondalux certified 6 of the 15 employees to be able to prepare the DAA service. The decision of certifying 6 employees was made based on the fact that it takes too much time to prepare each individual device and also because of vacations and working hours. In need of a storage area, as a temporary solution, the *Ordem dos farmacêuticos* recommendation to use the pharmacy laboratory it was adopted. *Farmácia Ondalux* decided to expand the pharmacy's warehouse, including a preparation area and exclusive DAA storage, observing all the hygiene and safety best practices.

For the next step regarding patient adherence and assessment, it is necessary to understand which patients are eligible to use the DAA service. The possible candidates can be identified by the staff, according to their personal characteristics (physical limitations, including difficulties in handling medications, mild cognitive difficulties, unintended non-adherence to therapy, little autonomy in day-to-day activities). Furthermore, patients who admit having difficulties in the process of using medications, with complex therapeutic regimens and taking chronic medications are also possible candidates.

An initial interview is conducted to assess the patient’s eligibility to use the service, explain its functionality, and collect all the necessary medical information from the patient.

This interview is preferably conducted in a private office so that the service is as personalized as possible. At this point, all information about the service is explained to the patient and at the same time he is asked to sign the informed consent statement.

At the end, the pharmacist informs the patient that at the next meeting he/she needs to bring all medication. Also, whenever relevant the pharmacist will contact the patient’s physician to clarify some information about the therapy. Furthermore, when medication is ending the pharmacists will inform the patient to schedule an appointment to his/her doctor in order to get a medical prescription.

The pharmacist recommends the patient, if applicable, to leave the medication in custody in the pharmacy so that there is greater control over medication errors. However, when occurs a change in the patients' medication the pharmacist should be notified. Then the pharmacist must confirm this change directly with the physician and update the patient portfolio.

At *Farmácia Ondalux*, it was possible to witness the first patient to acquire the service. After the pharmacist assessed his eligibility, a meeting was scheduled, at which the patient was previously informed that he should bring all his medication. The first interview and evaluation took place in the pharmacy' private office. In this conversation, all the information about the service and how to proceed was clarified. It was also checked if the patient had any doubts before signing the informed consent statement. This interview took about two hours long, where the pharmacist had the possibility to collect all the information about the patient's medical history and his medication.

Moving on to the service operationalization, before the preparation step, a day and an hour must be scheduled for the patient to lift the dispenser / device box. At the time of preparation, the pharmacist must be in the designated space for the preparation of the DAA, away from distractions and totally concentrated on the procedure. The responsible pharmacist should prepare the device in the way that he / she feels most safe and comfortable, however it is recommended by *Ordem dos Farmacêuticos* to place one medication at a time. After this medicine is correctly placed in the blister, it is necessary to ensure its reconditioning. After the device contains all medications, a recount of the units must be made and checked that they are in accordance with the patient's treatment form. This process undergoes a double verification or error detection system, comparing the computer data with the manual registration data. This review should be carried out by the supervising technician or pharmacist. After verification, the device / system must be closed. This is followed by the verification of the information contained in the label on the back of the blister, referring to the medication included in the device / system and its compliance with the patient's file.

In order to control adherence to therapy, the pharmacist informs the patient that it is necessary to bring the previous device. The total of drugs dispensed, and the total of drugs returned must be recorded in the DAA software (to measure adherence to therapy). If the pharmacist verifies non-adherence to therapy, it is recommended to register this information and develop a pharmaceutical intervention accordingly, which may also benefit from articulation with other healthcare professionals.

In *Farmácia Ondalux* this step was controlled by two pharmacists: the responsible pharmacist adopted the recommended process by placing one medication at a time and properly reconditioning medication after medication; the supervisor pharmacist verified the device and before closing it the responsible pharmacist verified one last time.

Upon delivery of the device to the patient, the first time the patient receives the device box, the pharmacist must explain and demonstrate the form of use and storage, the labelling used, and the expiration date. It is also recommended that the first delivery is schedule when the patient need to take his/her medication, for the pharmacist to confirm that the patient knows how to use the device.

A patients' signature is required to confirm the delivery. The pharmacist should remind the patient that he/she must bring the device used in the following period (week / month) to exchange for a new one, even if it still contains medication.

The method described was how *Farmácia Ondalux* delivered the first DAA device.

The DAA service was presented as a solution, with the specificity of being introduced in *Farmácia Ondalux*, to enhance and improve the challenges faced. Since all the events from the implementation of the service to the delivery of the first device to the patient could be tracked and observed, it was possible to observe the advantages of this service.

Regarding the gap in communication with the patient, the DAA service will solve the problem found, more specifically, in the transmission of information and time spent with the patient. This service includes an introductory interview carried out in a personalized service office with the customer. During the interview, the purpose of the service is clarified in depth. The patient's drug history is checked, and the patient has the opportunity to clarify all his/her questions about medication and the key challenges in taking medications. The patient was asked to sign a consent form to confirm all information was understood and no questions were unanswered.

Concerning patient monitoring, it was found that changes in this aspect could be made. While using DAA service, the patient is tracked weekly or monthly, depending on whether the patient chooses to take the device for a week or for a month. Also, once the pharmacy is in control of all medications, it allows the quantity of the medications to be regulated and simultaneously the patient is notified to schedule an appointment to request the prescription of the medicines to be renewed.

Finally, on a regular basis, reviews of the medication are carried out. In the delivery of the used device in exchange for a new one, it is verified if the patient correctly takes the physician' prescription. The pharmacist explains all of these processes and findings and files them in the patient's folder. Regarding the cooperation between health professionals the DAA service requires communication between doctor and pharmacist whenever there is a change in the medication of the patient, when the pharmacist observes irregularities in the patient while taking the medication and finally, when the patient acquires a medication that may interfere with the patient's usual prescription. In such situations, to understand which of the drugs prevails and how long, the pharmacist must immediately contact the physician.

Not all of the three distinct groups interviewed were conscious of the DAA service (Appendix V). However, after a brief clarification of the service most health professionals agree with the provision of this service in order to encourage patients' adherence to treatment and recommendation to the patients. Regarding the patients, 37% are interested in testing out the service and are able to pay for the service between EUR 3 and 7 a week.

4.3. Advantages of DAA

The introduction of the DAA service is a competitive advantage that leads to an improvement of its reputation and should be recognized by the customer and caregivers as an asset. It is a competent and distinctive service that enhances patient proximity. The individual preparation of the patient's medication is a good tool to validate the essential role of the patient-oriented pharmacist and to encourage the idea of family pharmacists, concentrating on clinical and care aspects (Costa, 2016; Domingos et al., 2017).

The DAA service supports and enhances the commitment of patients with the therapy, improving their health outcomes. It also facilitates the pharmacy's appreciation and the community's professional acknowledgement of the pharmacist. The pharmacy fosters patient loyalty by increasing the pharmacist 's assistance and supervision of the patient (Costa, 2016).

4.4. DAA Impact

This project can be evaluated from the perspective of each participant of the patient journey, analyzing the impact that this service can have on them.

Regarding the patient, this service can bring an improvement in adherence to therapy which might lead to a decrease in disease progression, an increase in quality of life and, ultimately, an increase of the average life expectancy.

For the physicians and national health service, it will possibly decrease hospital visits or even hospital admissions, less complications and a decrease in morbidity and comorbidity. The less time spent with these patients will also allow to have additional time for other patients.

Concerning the pharmacists, it is expected to have a decrease in waste medication, an increase of customer' satisfaction and loyalty and an appreciation of the pharmacist' role. Moreover, it will allow to increase revenues directly with the service and indirectly with the cross-selling of other products as a result of knowing more about each customer.

Conclusions

The population aging has been a progressive trend in modern societies as a result of advances in medicine and technology. The rise in average life expectancy has led to several age-related pathologies and a higher prevalence of chronic diseases, mainly treated with polymedication regimes. The medication is the most effective disease control tool, establishing adherence to therapy as a determining factor in cure, stabilization, or regression. Therefore, treatment success depends on taking medication correctly and on time. However, studies indicate that chronically ill patients take approximately only 50% of the drugs prescribed.

The data collected in this study shows that there are some shortcomings in the customer journey, given the most impactful ones in non-adherence to therapy are:

i) the short contact time between patients and doctors or pharmacists, often not enough clarify doubts about the prescription;

ii) the non-reinforcing of how to take the medication and the potential side effects when the physicians and pharmacists are dealing with a patient who already takes that specific medication;

iii) the non-inclusion of the patient in the treatment's decision making;

iv) the patient's resistance to follow the physician plan, mostly as a result of forgetfulness, lack of discipline, and the schedule to take the medication.

v) the non-cooperation between physicians and pharmacists when both identifies a non-adherence behavior (e.g. self-medication, not taking the medicines as explained by the healthcare professionals, etc.);

These kinds of obstacles can easily lead to non-adherence to therapy. The Drug Administration Aids Service is presented as a possible solution and improvement to those issues (mainly i, ii, and iv), and all the healthcare professionals interviewed acknowledge the service as a valid tool both for patients and caregivers.

One of today's pharmacist's missions is to promote adherence to therapy and the rational use of medicine. For this purpose, new projects and services have been introduced by community pharmacies, highlighting Dose Administration Aids. Thus, *Farmácia Ondalux* implemented it to promote compliance with the therapeutic regimen, as it is the pharmacist who handles the prescription and prepares the disposable blisters on a weekly basis, where the drugs are arranged according to the day and period of usage.

After taking the appropriate actions to successfully implement the service, it reflects a customized monitoring for each patient and is considered a competent and distinctive service that improves patient proximity and loyalty. A therapeutic review is a key point in the service since it fosters the

pharmacist/patient connection, personalizes it, and facilitates future processes in therapy management.

Throughout the patients' interview it was possible to confirm their willingness to pay for this service, from 3€ up to 7€. It highlights an opportunity to set a different status quo, where pharmacy services are paid, moving from a model where only medication can be charged. However, the population seems to be more willing to pay for this kind of service. Pharmacists must present them this service in terms of convenience, comfort, and personalization and not only as a basic need.

Concluding, further research would be needed to demonstrate its value as a differentiating service to promote adherence to therapy and to measure the cost reductions on hospitalization and medicines' waste. However, it's undeniable the services generate health gains among all players.

Moreover, due to confidentiality constraints, it was not possible to observe the service's presentation at the time of the first interview between the customer and the pharmacist, which might provide valuable inputs about how communication affects the outcomes. Also, due to time constraints, it was not possible to test the DAA service's effectiveness and monitor the patient after its acquisition.

To further extend this work, it would be interesting to perform a prospective study with patients of *Farmácia Ondalux*. Comparing two groups of participants: the intervention group, that would be subject to a weekly distribution of the therapeutic using the DAA service, and the group without the intervention, on their own volition. This will allow us to understand if the service is a safe and effective method for improving therapy adherence.

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Appendix

Appendix A: First physicians' interview

Médico	
Especialidade	Medicina Geral e Familiar
Local de Trabalho	Centro de Saúde
Localização	Coimbra
Em média quantas consultas realiza por dia?	1 em cada 30 min (1h de almoço) 8 horas/dia
Em média qual o tempo destacado para cada consulta?	20 minutos, após esse tempo são penalizados pelo estado
O tempo varia consoante o utente?	Sim
Ambiente de 1º consulta com doente crónico	
Em média quanto tempo demora a consulta?	20 a 30 minutos por paciente
Caso o utente tenha uma doença crónica, como comunica a toma da medicação, pela 1º vez?	Comunica oralmente, e ao prescrever a receita coloca todas as indicações de como deve ser realizada a toma dos medicamentos
Explica a importância da toma às horas/períodos do dia certos?	Sim
Explica as consequências caso o utente se esqueça de tomar os medicamentos?	Sim
Explica os possíveis efeitos secundários?	Sim
No fim da consulta	
Relembra como é feita a toma dos medicamentos?	Sim
Agenda com o utente uma futura consulta de follow-up, ou deixa ao encargo do utente?	Depende, em caso de ser um doente hipertenso e seja necessário realizar uma série de medições à tensão, durante um determinado período de tempo em diferentes horas do dia, o médico agenda a próxima consulta - sendo nestes casos obrigatório; caso o utente tenha apenas uma dor no joelho (por exemplo), após a toma do medicamento, o utente só marca a consulta caso a dor continue; no caso do doente crónico, também é o próximo a marcar, uma vez que para receitar os medicamentos, não é necessário haver consulta, apenas se o utente sentir necessidade.
Consulta de follow-up	
Com que frequência os utentes marcam as consultas?	semestralmente - Para doentes crónicos é obrigatório realizar uma consulta de 6 em 6 meses; no entanto a prescrição da medicação crónica não necessita de consulta
Com que frequência os utentes vão apenas à 1º consulta?	Depende do público, no caso dos médicos de família, normalmente são mais procurados por pessoas com uma faixa etária mais avançada ou que se encontrei na zona geográfica menos desenvolvida; No caso da população que vive na cidade, esta dirige-se automaticamente ao hospital. Outro dos fatores que influencia é o facto do consumidor ser informado ou não
Ambiente de 2º consulta com doente crónico:	
Durante a consulta, tem acesso ao histórico do utente?	Sempre, há exceção e quando não há registos médicos. Em primeira consulta normalmente recolhem os dados pessoais e ainda as alergias, medicamentos que já tenham tomado (caso não haja registo), entre outras coisas. Normalmente quando o utente vai ao privado por recomendação do médico de família, a uma determinada consulta, o médico de família não tem acesso aos medicamentos receitados e na maioria das vezes os utentes não se recordam do nome dos medicamentos e não levam consigo a caixa.
"Tem tomado todos os comprimidos?" é uma pergunta que costuma fazer com frequência?	Claro que sim. Muitas das vezes conseguem perceber se o utente tomou os comprimidos receitados, pois têm acesso à informação se o utente na farmácia aviou todos os medicamentos receitados pelo médico.
No doente crónico, como avalia a evolução da doença?	Analiticamente; Clinicamente e através de queixas provenientes do utente. Caso o utente seja do estilo queixoso, existem métodos para dar a volta e retirar a informação verdadeira.
Quando prescreve ao utente os mesmos medicamentos, pela segunda vez, menciona novamente como deve ser realizada a toma dos mesmo?	Não, com exceção se o médico se aperceber analiticamente e clinicamente que o utente não está a tomar corretamente toda a medicação recomendada. Muitos dos problemas na adesão à terapêutica por parte dos utentes advém de situações económicas, do utente não aceitar que tem que tomar determinados medicamentos, da situação em que o utente ao ler a bula começa a ter efeitos adversos que o leva a deixar de tomar o medicamento sem consultar o médico, entre outros.
Costuma aconselhar os utentes com alguns "truques" para que façam corretamente a toma dos medicamentos?	Sim
Qual/Quais?	Pedir na farmácia que insiram na caixa do medicamento a toma correta, colocar lembretes no telemóvel
Que sistemas conhece e recomendaria para facilitar/melhorar a toma correta dos medicamentos?	i. Particularmente não conhece nenhum, mas seria interessante que a aplicação do estado onde estão inseridas as prescrições realizadas pelo médico criassem automaticamente lembretes para facilitar a toma do medicamento; ii. Algo que poderia facilitar era uma aplicação que a partir do momento que o médico receitasse determinados medicamentos, essa lista ficasse disponível para qualquer médico, por favor a que não houvesse "falha" de informação do paciente quando este transita do público para o privado ou vice-versa; iii. Deveria haver estratégias de incentivo à adesão à terapêutica uma vez que a responsabilidade da toma do medicamento é única e exclusiva do paciente,
Observações	
Alertar apenas para o fator económico, pois muitas vezes os médicos querem acrescentar um medicamento à lista dos que o paciente já toma, por ser algo complementar, onde as melhorias seriam mais significativas, mas o utente não tem capacidade financeira; e o mesmo acontece com o medicamento genérico e não genérico, por vezes o genérico não é tão eficaz que o não genérico mas devido ao facto do utente não ter capacidade financeira o médico é "obrigado" a receitar o genérico;	
Relativamente aos doentes crónicos, não é necessário agendar consulta para serem receitados os medicamentos - sendo esta uma falha grande, que não deveria acontecer;	
Um dos fatores que leva o utente a faltar às consultas é o facto de muitas vezes é necessário fazer determinadas análise com um espaço temporal de 15 dias, na maioria das vezes o utente esquece-se de realizar as análise de pois não comparece à consulta - seria interessante que nestas situações a app pudesse avisar 15 dias antes, para o utente ir realizar as análises e desta forma comparecer à consulta agendada.	

Appendix B: First pharmacists' interview

Farmacêutico	
Anos de Experiência	12 anos
Local de Trabalho	Farmácia Comuitária
Localização	Abrantes
Em média quantas pessoas atende por dia?	40 pessoas
Em média quanto tempo demora um atendimento, de uma receita?	+/- 10 minutos
Ao aviar a receita compara os medicamentos que o cliente leva, com compras anteriores?	Sim
Quando realiza esta comparação o que pretende analisar?	Laboratórios, se é medicação habitual
Tem por hábito verificar se o cliente sabe tomar corretamente a medicação receitada?	Digo como toma e coloco uma etiqueta ou escrevo na caixa
Explica a importância da toma às horas/períodos do dia certos?	Comunica oralmente, e ao prescrever a receita coloca todas as indicações de como deve ser realizada a toma dos medicamentos
Explica a importância da toma às horas/períodos do dia certos?	Sim
Explicar as consequências caso o cliente se esqueça de tomar os medicamentos?	Sim
Explicar os possíveis efeitos secundários?	Depende dos medicamentos
Costuma aconselhar os utentes com alguns "truques" para que façam corretamente a toma dos medicamentos?	Não
Que sistemas conhece e recomendaria para facilitar/melhorar a toma correta dos medicamentos?	Zebra; PIM - preparação individualizada de medicamentos, aplicações com lembretes no tlm
Ambiente de Novo cliente	
É criada ficha de cliente?	Depende se for cliente habitual
que tipo de dados recolhe?	nome, NIF, morada e contacto
Questiona se os medicamentos são para o próprio ou para outra pessoa?	Sim
Questiona o cliente que outro tipo de medicação realiza?	Sim
Questiona se é a 1ª vez que o cliente toma a medicação dispensada?	Sim
Caso a resposta seja afirmativa e o cliente esteja pela 1ª vez a realizar a medicação, explica como deve ser feita a toma dos medicamentos? De que forma?	sim, explicando verbalmente e depois colocar etiqueta ou escrever na caixa
Explica a importância da toma às horas/períodos do dia certos?	Sim
Explica as consequências caso o cliente se esqueça de tomar os medicamentos?	Se pertinente
Explica os possíveis efeitos secundários?	Depende dos medicamentos
Perante a sua experiência, qual a sua opinião sobre o papel do farmacêutico perante os clientes, e como se tem vindo a desenvolver?	cada vez mais está a ser desvalorizado; o farmacêutico tem um papel fundamental no circuito do medicamento e é um agente de saúde pública subvalorizado pelo sistema de saúde; é extremamente importante, até quando falha a comunicação com o médico;
Que tipo de sistemas/serviços seriam uma mais valia para a farmácia e para o utente, na sua opinião?	PIM; SFVETi; Reconciliação Terapêutica (em casos particulares); monitorização do utente com presença mais regular

Appendix C: First patients' interview

Doente	
Sexo	feminino
Diagnóstico	Feminino
Idade	74
Com que frequência vai a uma consulta médica	Quando sinto necessidade de medicação, ou necessito de alterar a medicação

Última ida ao médico	
Onde realizou a sua consulta?	Hospital Privado
O que achou do médico? Acha que teve a atenção devida/ necessária?	Sim
Foi a 1ª consulta?	Sim
O médico receitou-lhe algum medicamento?	Sim
Percebeu todas as indicações de como tomar corretamente o medicamento?	Já sabia
Tem horas para tomar? Explicou-lhe a importância de tomar às horas certas?	Apenas quando iniciei a toma ou troquei de medicação
Explicou-lhe a importância de não se esquecer de tomar o medicamento?	Sim, reforça todas as consultas
Explicou-lhe os possíveis efeitos secundários do medicamento?	Não, eu é que normalmente vou ver
Toma mais alguma medicação para além da que o médico prescreveu na consulta?	Sim, para a hipertensão
O médico teve em atenção de perguntar que outra medicação toma?	Sim, na 1ª consulta
No fim da consulta	
Agendou uma nova consulta?	Não
Como classifica a sua experiência na consulta?	Foi boa, senti-me confortável. Fui apenas perceber qual era o meu estado e perceber o que poderia fazer às dores que tenho no corpo.
Após Consulta	
onde se dirigiu? Foi aviar a receita?	Sim
Na farmácia, questionou sobre a toma do medicamento?	Não
Na farmácia, deram-lhe indicações de como tomar corretamente o(s) medicamento(s)?	Sim, imprimiram uma etiqueta correspondente à toma de cada medicamento e colar nas caixas
Quantos medicamentos toma por dia?	7
Com que frequência vai à Farmácia?	1 vez por mês
Tem tendência para se esquecer?	Sim
Considera-se uma pessoa organizada?	Antes era mais organizada, agora já tenho algumas dificuldades
Alguma vez se esqueceu de tomar a medicação? ou de tomar as horas corretas indicadas pelo médico?	Sim
Como costuma organizar a sua medicação?	numa caixinha semanal, com os períodos do dia. Mas agora já não faço tanto isso, tomo diretamente da caixa
Quais os truques que utiliza para saber que medicamentos tem que tomar no dia e à hora certa?	Coloco um lembrete no telemóvel
Que sistemas gostaria de ter em casa para o ajudar na toma dos medicamentos?	nenhum, sou eu que sei e organizo
Tem por hábito ler a bula dos medicamentos onde são explicados os efeitos adversos?	Sim
Alguma vez deixou de tomar um medicamento devido aos efeitos adversos descritos na bula?	Sim
Sentiu, alguma vez, um efeito adverso ao tomar um determinado medicamento?	Sim
Após esse episódio deixou de tomar o medicamento?	Sim
Procurou o médico para receitar outro?	Sim

Appendix D: Script for Physicians' Interview

Para começar

1. **Onde realiza consultas?**
   - Clinica/Hospital Privado
   - Hospital Público/ Centro de Saúde
   - Público e Privado
2. **Em média quanto tempo demora a 1a consulta com um doente?**
   - < 10 minutos
   - 10 a 15 minutos
   - 16 a 20 minutos
   - 21 a 30 minutos
   - 31 a 40 minutos
   - > 40 minutos
3. **Em média quanto tempo demora uma consulta de follow-up?**
   - < 10 minutos
   - 10 a 15 minutos
   - 16 a 20 minutos
   - 21 a 30 minutos
   - 31 a 40 minutos
   - > 40 minutos
4. **Em média, qual a faixa etária dos seus doentes?**
   - <=16
   - 17 a 24
   - 25 a 34
   - 35 a 44
   - 45 a 54
   - 55 a 64
   - >= 65

Na consulta

5. **Durante a consulta…**
   - …conseguiu dedicar o tempo necessário para resolver o motivo da consulta …tratou o doente com empatia
   - …respondeu a todas as questões que preocupavam o doente
   - …procurou conhecer o histórico de consultas anteriores
   - …explicou de uma forma clara os objetivos dos medicamentos prescritos
   - …teve em conta a opinião do doente relativamente à globalidade do tratamento
   - …nos casos em que eram posíveis diferentes abordagens, procurou perceber qual a mais conveniente para o doente
   - …procurou saber se o tratamento prescrito seria difícil de seguir …motivou o doente a seguir o tratamento
6. **Validou se o doente estava a fazer outra medicação?**
   - Sempre, em todas as consultas
   - Apenas quando altera a medicação
   - Ocasionalmente, apenas em ambiente de 1o consulta
   - Nunca
7. **Na primeira prescrição falou com o doente sobre:**
   - A importância de tomar a medicação exatamente como planeado (horários, doses, etc)
   - O plano detalhado da forma como deve tomar os medicamentos (horários, doses, etc)
   - Os potenciais efeitos secundários e soluções para os minimizar
   - O que fazer se falhar uma toma da medicação

Consulta de follow-up

8. **Com que frequência costuma agendar a consulta de follow-up do doente?**
   - Quinzenalmente
   - Mensalmente
   - Trimestralmente
   - Semestralmente
   - Anualmente
   - A cada 2 anos
   - Aguarda que seja o doente a marcar
9. **Com que frequência os doentes comparecem à consulta de follow-up?**
   - Sempre
   - Frequentemente
   - Ocasionalmente
   - Raramente
   - Nunca
10. **Para fazer renovação de prescrição a doentes frequentes, exige marcação de consulta?**
    - Sim
    - Não
11. **Num cenário de renovação de prescrição, quais os aspetos que reforça?**
    - A importância de tomar a medicação exatamente como planeado (horários, doses, etc)
    - O plano detalhado da forma como deve tomar os medicamentos (horários, doses, etc)
    - Os potenciais efeitos secundários e soluções para os minimizar
    - O que fazer se falhar uma toma da medicação
    - Nenhum dos anteriores

Alteração da terapêutica

12. **Que razões levam à alteração da terapêutica do doente?**
    - Fatores económicos
    - Evolução positiva ou negativa da doença
    - Aparecimento de efeitos secundários
    - Fortes crenças religiosas ou culturais
    - Recusa da toma por parte do doente
    - A pedido do doente
    - Nível baixo de escolaridade
    - Rotina do doente
13. **Em que medida considera a opinião do doente na mudança de terapêutica?**
    - Sempre
    - Ocasionalmente
    - Nunca
14. **Num cenário de alteração ou ajuste da terapêutica, quais os aspetos que reforça?**
    - A importância de tomar a medicação exatamente como planeado (horários, doses, etc)
    - O plano detalhado da forma como deve tomar os medicamentos (horários, doses, etc)
    - Os potenciais efeitos secundários e soluções para os minimizar
    - O que fazer se falhar uma toma da medicação
    - Nenhum dos anteriores
15. **Na sua opinião, quais são as principais razões para a não adesão à terapêutica por parte do doente?**
    - Esquecimento
    - Adormecer antes do horário de toma
    - Falta de disciplina
    - Falta de instrução/Conhecimento
    - Falta de planeamento
    - Mudanças de rotina
    - Ritmo acelerado e falta de tempo
    - Incapacidade de adquirir os medicamentos prescritos (condições socio-económicas)
    - Fortes crenças religiosas e/ou culturais
    - Negação face à doença e/ou baixas expectativas de resolução
    - Aversão à toma de medicamentos
    - Falta de apoio emocional
16. **Considerando a faixa etária dos seus doentes qual é, na sua opinião, a melhor estratégia para promover a adesão terapêutica?**
    - Registar lembretes no dispositivo móvel
    - Utilizar uma aplicação para a monitorização da toma dos medicamentos
    - Ser um cuidador a gerir as tomas
    - Garantir a telemonitorização
    - Recorrer a um serviço de preparação individualizada de medicamentos (disponível em algumas farmácias)
17. **Tem conhecimento do serviço farmacêutico PIM (Preparação Individualizada de medicamentos)?**
    - Sim
    - Não

PIM

18. **Concorda com a prestação deste serviço?**
19. **Qual a utilidade deste serviço para os seus doentes?**
20. **Recomendaria este serviço aos seus doentes?**
21. **Conhece outras ferramentas inovadoras para promover a adesão à terapêutica?**
    - Sim
    - Não

Dados Demográficos

22. **Género?**
23. **Especialidade?**
24. **Anos de experiência?**

Appendix E: Script for Pharmacists' Interview

Para começar

1. **Em média, quanto tempo demora o atendimento de um cliente novo?**
   - < 10 minutos
   - 10 a 15 minutos
   - 16 a 20 minutos
   - 21 a 30 minutos
   - 31 a 40 minutos
   - > 40 minutos
2. **Em média quanto tempo demora o atendimento de um cliente frequente?**
   - < 10 minutos
   - 10 a 15 minutos
   - 16 a 20 minutos
   - 21 a 30 minutos
   - 31 a 40 minutos
   - > 40 minutos
3. **Em média, qual a faixa etária dos clientes (Diabéticos e Hipertensos)?**
   - <=16
   - 17 a 24
   - 25 a 34
   - 35 a 44
   - 45 a 54
   - 55 a 64
   - >= 65

No atendimento

4. **Normalmente, o cliente leva a medicação para quanto tempo?**
   - < 1 mês
   - 1 mês
   - 2 meses
   - 3 meses
   - 6 meses
   - > 6meses
5. **Durante o atendimento…**
   - …respondeu a todas as questões que preocupavam o cliente
   - …explicou de uma forma clara os objetivos dos medicamentos prescritos pelo médico
   - …procurou saber se o tratamento prescrito seria difícil de seguir
   - …motivou o cliente a seguir o tratamento
   - …teve a preocupação de verificar o histórico de medicamentos de vendas anteriores
   - Nenhuma das anteriores
6. **Verificou se o cliente estava a fazer outra medicação?**
   - Sempre, em todas as visitas do cliente
   - Apenas quando o cliente altera a medicação
   - Apenas a primeira vez que o cliente vai à farmácia
   - Nunca
7. **No atendimento com um novo cliente, fala sobre**
   - A importância de tomar a medicação exatamente como planeado (horários, doses, etc)
   - O plano detalhado da forma como deve tomar os medicamentos (horários, doses, etc)
   - Os potenciais efeitos secundários e soluções para os minimizar
   - O que fazer se falhar uma toma da medicação
8. **No atendimento com um cliente frequente, fala sobre:**
   - A importância de tomar a medicação exatamente como planeado (horários, doses, etc)
   - O plano detalhado da forma como deve tomar os medicamentos (horários, doses, etc)
   - Os potenciais efeitos secundários e soluções para os minimizar
   - O que fazer se falhar uma toma da medicação
   - O cliente
9. **No caso do cliente não se recordar como deve tomar a medicação, como comunica essa informação?**
   - Devolve a guia de tratamento com a posologia ao cliente
   - Escreve à mão na caixa do medicamento que o cliente leva
   - Apenas comunica verbalmente
   - Utiliza as etiquetas com posologia e coloca na caixa do medicamento
10. **Na sua opinião, quais são as principais razões para a não adesão à terapêutica por parte do cliente?**
    - Esquecimento
    - Adormecer antes do horário de toma
    - Falta de disciplina
    - Falta de instrução/Conhecimento
    - Falta de planeamento
    - Mudanças de rotina
    - Ritmo acelerado e falta de tempo
    - Incapacidade de adquirir os medicamentos prescritos (condições socio-económicas)
    - Fortes crenças religiosas e/ou culturais
    - Negação face à doença e/ou baixas expectativas de resolução
    - Aversão à toma de medicamentos
    - Falta de apoio emocional

No atendimento

11. **Caso verifique que o cliente não cumpre corretamente a toma da medicação prescrita pelo médico, costuma comunicar com o médico do cliente?**
    - Sim
    - Não
12. **Das seguintes soluções quais promovem uma melhor adesão à terapêutica, tendo em conta a faixa etária dos clientes (Diabéticos ou Hipertensos)?**
    - Registar lembretes no dispositivo móvel
    - Utilizar uma aplicação para a monitorização da toma dos medicamentos
    - Ser um cuidador a gerir as tomas
    - Garantir a telemonitorização
    - Recorrer a um serviço de preparação individualizada de medicamentos (disponível em algumas farmácias)
13. **Tem conhecimento do serviço farmacêutico PIM (Preparação Individualizada de medicamentos)?**
    - Sim
    - Não
14. **Disponibiliza este serviço na farmácia?**
    - Sim
    - Não

PIM

15. **Quais os principais obstáculos na implementação do serviço?**
16. **Quais as maiores vantagens na utilização do PIM para a Farmácia?**
    - Proximidade com o cliente
    - Fidelização do cliente
    - Valorização do papel do farmacêutico
    - Vantagem competitiva
    - Fator diferenciador
    - Promoção à adesão ao tratamento e cumprimento da terapêutica
17. **Considera o PIM uma mais valia para promover a adesão à terapêutica?**
    - Sim
    - Não
18. **Quais os principais clientes do PIM?**
    - Clientes individuais polimedicados
    - Lares
    - Casas de acolhimento
    - Associações de voluntariado
19. **Qual o preço que pratica na venda do serviço PIM?**
    - Gratuito
    - < 2,5€
    - 2,5€ a 5€
    - 5€ a 7€
    - 7€ a 10€
    - >10€
20. **Concorda com a prestação deste serviço?**
21. **Qual a utilidade deste serviço para os seus Clientes?**
22. **Qual o valor justo na venda deste serviço?**
    - Gratuito
    - < 2,5€
    - 2,5€ a 5€
    - 5€ a 7€
    - 7€ a 10€
    - >10€
23. **Conhece outras ferramentas inovadoras para promover a adesão à terapêutica?**
    - Sim
    - Não

Dados Demográficos

24. **Género?**
25. **Função?**
26. **Anos de experiência?**

Appendix F: Script for Patients' Interview

Na consulta

1. **Com que frequência vai ao médico?**
   - Quinzenalmente (15 em 15 dias)
   - Trimestralmente (3 em 3 meses)
   - Semestralmente (6 em 6 meses)
   - Anualmente (1 ano em 1 ano)
   - Consoante necessidade
2. **Durante a consulta, o médico explicou-lhe a importância de tomar a medicação exatamente como planeado (horários, doses, etc)?**
   - Sim
   - Não
3. **Esclareceu todas as dúvidas com o médico sobre a medicação?** *
   - Sim
   - Não
   - Não teve dúvidas
4. **Sabe qual o objetivo de cada medicamento que toma?**
   - Sim
   - Não
5. **Sabe como deve tomar os medicamentos (horários, doses, etc.)?**
   - Sim
   - Não
6. **Sabe o que deve fazer se falhar uma toma da medicação?**
   - Sim
   - Não
7. **O médico validou se estava a fazer outra medicação?**
   - Sempre, em todas as consultas
   - Apenas quando altera a medicação
   - Ocasionalmente, quando realizou a 1o consulta
   - Nunca

Na farmácia

8. **Onde costuma ir ao médico?**
   - Centro de Saúde
   - Clinica/Hospital Privado
   - Clinica/Hospital Público
9. **Qual a doença crónica?**
   - Hipertenso
   - Diabético
10. **Leva medicação para quanto tempo?**
    - < 1 mês
    - 1 mês
    - 2 meses
    - 3 meses
    - 6 meses
    - > 6meses
11. **Durante o atendimento, o farmacêutico falou sobre:**
    - A importância de tomar a medicação exatamente como planeado (horários, doses, etc)
    - O plano detalhado da forma como deve tomar os medicamentos (horários, doses, etc)
    - Os potenciais efeitos secundários e soluções para os minimizar
    - O que fazer se falhar uma toma da medicação

Sobre o cliente

12. **Quantos medicamentos toma diariamente?**
    - 3a4
    - >5
13. **Com que frequência segue as indicações dadas pelo médico relativamente à toma da medicação?**
    - Nunca
    - Raramente
    - Ocasionalmente
    - Frequentemente
    - Sempre
14. **Alguma vez não realizou a toma da medicação como o médico recomendou?**
    - Sim
    - Não
15. **Escolha as razões que o levaram a não tomar os medicamentos exatamente como foram prescritos pelo médico:**
    - Esquecimento
    - Falta de organização
    - Adormecer antes das horas em que deve tomar a medicação Efeitos secundários
    - Ter demasiados medicamentos para tomar
    - Horários das tomas
    - Não querer misturar com álcool
    - Duvidar das eficácia da medicação
    - Não saber o que deve tomar e como tomar
    - Dificuldades em moldar o tratamento à rotina
    - Sentir-se melhor após algumas tomas
16. **Tem o hábito ler a bula dos medicamentos?**
    - Sim
    - Não
17. **Alguma vez deixou de tomar a medicação após ler a bula?**
    - Sim
    - Não
18. **Tem conhecimento dos serviços farmacêuticos que a farmácia tem?**
    - Sim
    - Não

Serviços Farmacêuticos

19. **Com que frequência costuma usufruir dos serviços farmacêuticos?**
    - Sempre
    - Com frequência
    - Ocasionalmente
    - Raramente
    - Nunca
20. **Quanto costuma pagar pelos serviços que usufrui?**
    - Não usufrui Gratuito
    - 1€ a 10€
    - 10€ a 20€
    - > 20€

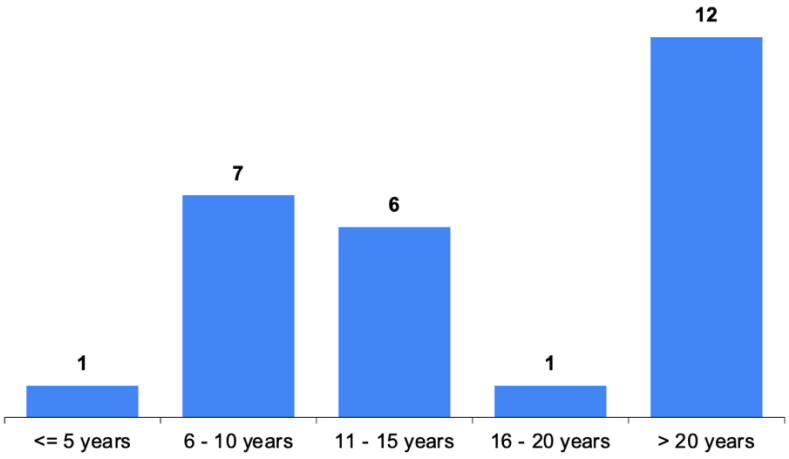
PIM

21. **Tem conhecimento do serviço farmacêutico PIM?**
    - Sim
    - Não
22. **Qual o seu interesse em experimentar este serviço?**
23. **Quanto estaria disposto a pagar por este serviço, semanalmente?**
    - 3€ a 5€
    - 5€ a 7€
    - 7€ a 10€

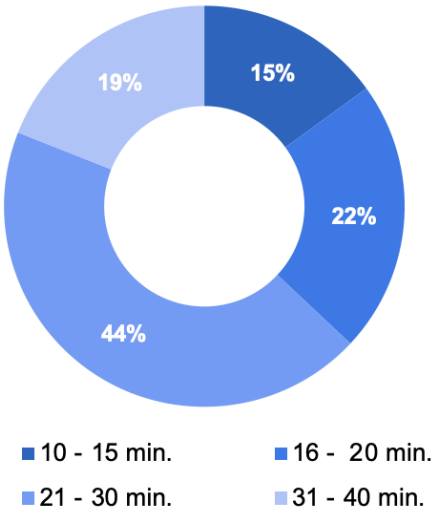
Dados demográficos

24. **Idade?**
25. **Género?**
26. **Nível de escolaridade?**

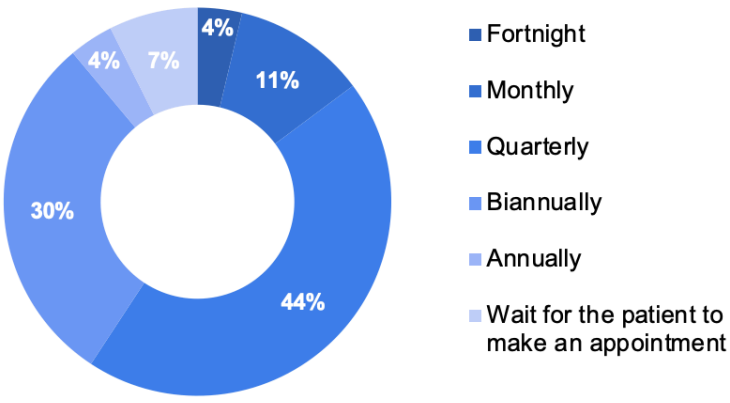
Appendix G: Physicians' Years of Experience



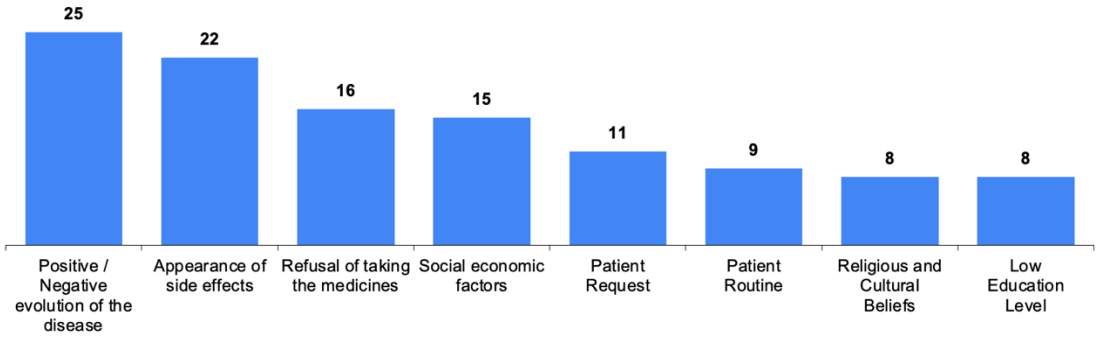
Appendix H: Physicians _ Average Time spent with the patient in the first medical appointment



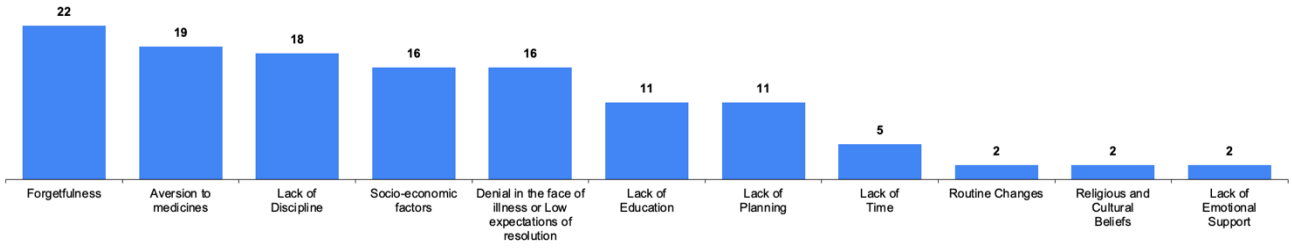
Appendix I: Physicians _ Schedule of patients' follow-up appointment



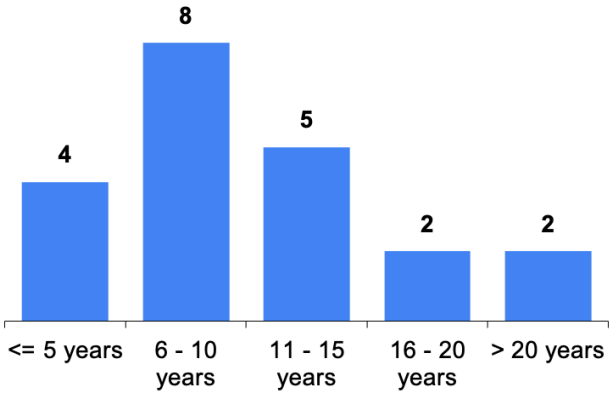
Appendix J: Physicians _ Reasons to change patients' therapy



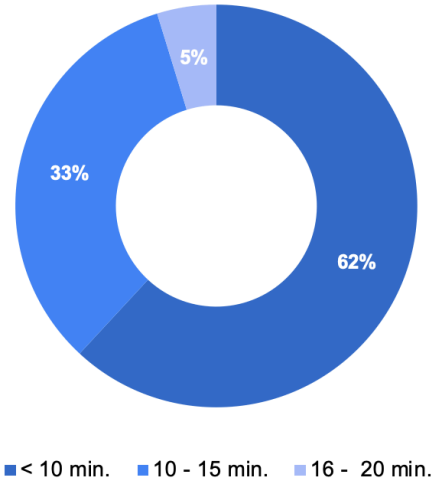
Appendix K: Physicians _ Reasons that may lead to patients' non-adherence to therapy



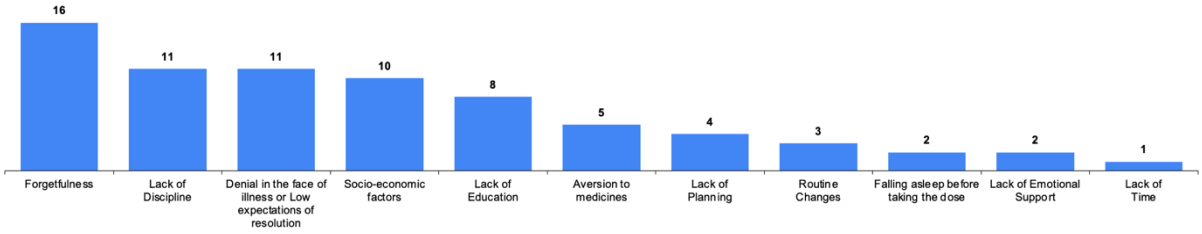
Appendix L: Pharmacists' Years of Experience



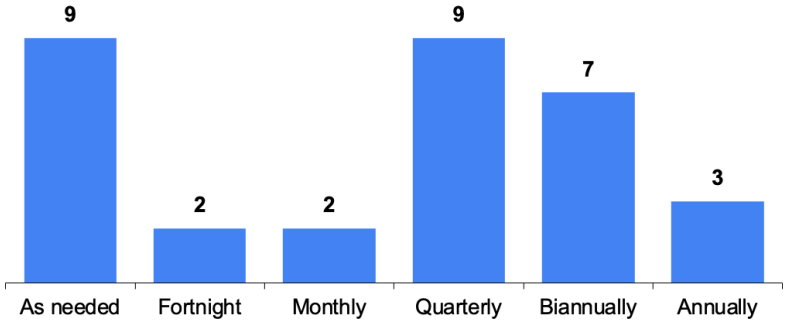
Appendix M: Pharmacists _ Average time spent with a new customer



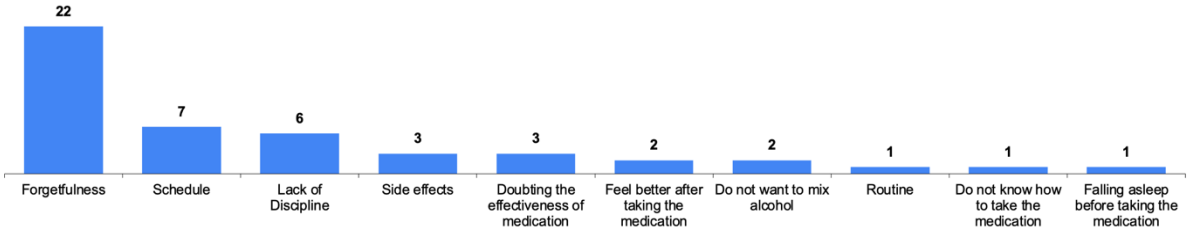
Appendix N: Pharmacists _ Reasons that may lead to customers' non-adherence to therapy



Appendix O: Patients _ How often patients go to the doctor?



Appendix P: Patients _ Reasons for non-adherence to therapy



Appendix Q: Time Average of first visit and follow-up appointment – Comparison between physicians and pharmacists

	Time spent with the patient			
	First Appointment		Follow-up appointment	
	Physicians	Pharmacists	Physicians	Pharmacists
< 10 min	0	8	1	13
10 to 15 min	4	7	8	7
16 to 20 min	6	4	13	1
21 to 30 min	12	2	5	0
31 to 40 min	5	0	0	0
> 40 min	0	0	0	0

Appendix R: Discussed topics while with the patient

	While with the patient			
	Physicians		Pharmacists	
	Yes	No	Yes	No
All the questions that worried the patient/customer were answered	20	7	19	2
The objectives of the drugs prescribed were clearly explained	24	3	16	5
Tried to find out if the prescribed treatment would be difficult to follow	17	10	6	15
The patiente/customer were motivated to follow the treatment	26	1	18	3
The patient' medical history was checked	25	2	16	5
Took into account the patients opinion regarding the chosen tratment	18	9	n.a.	n.a.

Appendix S: Communication gap between healthcare professionals and patients

	While with the patient			
	Physicians		Pharmacists	
	Yes	No	Yes	No
Highlighted the importance of taking the medication exactly as planned (schedules, doses, etc.)	28	4	30	2
Explain the detailed plan of how the patient should take their own medications (schedules, doses, etc.)	31	1	19	13
Mention the potential side effects and solutions to minimize them	21	11	13	19
Explain the procedure in case of missing the medication	16	16	18	14

Appendix T: Performance pf physicians on patients' follow-up appointment

	While with the Patient the following topics were reffered?							
	First Appointment				Follow-up appointment			
	Physicians		Pharmacists		Physicians		Pharmacists	
	Yes	No	Yes	No	Yes	No	Yes	No
Highlighted the importance of taking the medication exactly as planned (schedules, doses, etc.)	23	4	18	3	22	5	13	8
Explained the detailed plan of how the patient should take their own medications (schedules, doses, etc.)	24	3	18	3	17	10	13	8
Mentioned the potential side effects and solutions to minimize them	16	11	12	9	10	17	9	12
Explained the procedure in case of missing the medication	10	17	14	7	4	23	12	9

Appendix U: Physicians' performance while adjusting patients' medication comparing with the other two scenarios (first appointment and follow-up appointment)

	While with the patient the following topics were reffered?					
	Physicians					
	First Appointment		Follow-up appointment		Therapy Review appointment	
	Yes	No	Yes	No	Yes	No
Highlighted the importance of taking the medication exactly as planned (schedules, doses, etc.)	23	4	22	5	24	3
Explained the detailed plan of how the patient should take their own medications (schedules, doses, etc.)	24	3	17	10	20	7
Mentioned the potential side effects and solutions to minimize them	16	11	10	17	17	10
Explained the procedure in case of missing the medication	10	17	4	23	7	20

Appendix V: Knowledge of DAA existence