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Master's Dissertation

The impact of pharmacist's involvement in healthcare sustainability: A combined research of literature review and pharmacist's opinions

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Contents

Abstract

Introduction: National healthcare systems face ongoing financial challenges that considerably impact the quality of care provided. The COVID-19 pandemic has further exacerbated this health crisis by limiting essential resources and preventing high-risk patients to access the required services. Previous research suggested that pharmacist's role is associated with minimisation of healthcare costs and optimisation of healthcare outcomes. The purpose of this study was to investigate this association further by taking into account specific advanced services that might be implemented by pharmacists. These practises include pharmacy prescribing practise, vaccinations, chronic disease management and medication use review.

Literature Review: Several studies conducted in different countries, including the UK and US, have shown that the pharmacist's job significantly impacts healthcare system sustainability and patient health by implementing these practices. Promising conclusions have been revealed from all studies analysed these specific practises, such as, medication adherence, improved patient outcomes and reduction of hospitalisation. Based on these favourable findings regarding the effectiveness of these practises, this study hypothesised that all these practises positively impact the sustainability of the national healthcare system in Cyprus.

Methods: A combination of literature review and survey research was conducted to assess the impact of these advanced services. Whilst literature review provided favourable outcomes regarding the potential impact of pharmacists through advanced services, the survey aimed to investigate their potential by asking specific closed-ended questions. Pharmacists were invited through their local associations and electronically to respond to this survey. Exclusion criteria included retired and newly graduated pharmacists. Dependent variable was defined as the national healthcare sustainability, whereas independent variable was defined as the specific services evaluated. Moderate variables were defined as the job satisfaction and compensation. Both descriptive statistics and interfacial statistics were utilised to measure and evaluate the association between the services under investigation and their impact to the national healthcare sustainability.

Results: Overall, 80 pharmacists responded to this survey and thereafter their demographic characteristics were analysed. The majority of respondents were women (67.5%), aged between 35-64 (51%), and pharmacy owners (56%). Most of pharmacists participated in this study support the implementation of all practises evaluated, as well as they believe they might positively contribute to the national healthcare sustainability. In addition, a large proportion of participants indicated a level of dissatisfaction with their current role in the national healthcare system and in fact support the evolution of their job. They were predominately dissatisfied with their current compensation, and they believe they should be reimbursed additionally whether they offer advanced services.

Conclusion: In summary, a strong association between the implementation of the practises analysed and healthcare sustainability has been identified in this research. Several demographic variables might contribute to this association, such as age, working experience and educational background. Whilst this was a survey study with a relatively small sample size, further research is essential, such as observational studies with larger sample sizes and studies that conduct pharmacoeconomic measure to evaluate the cost-effectiveness of these practises directly.

Key words: Pharmacist's role, Healthcare Sustainability, Survey, Job Evolution

Chapter 1
Introduction

1.1 Topic Background

Upon the introduction and implementation of national healthcare systems, several inequalities between wealthy and poor individuals have been resolved, for instance, access to healthcare facilities and arrangement of medical operations. However, excessive expenditure by every government for public health has led to a healthcare crisis in various countries. This crisis is defined as the inability to reimburse the relevant healthcare services when needed and unequal access to these services. Lack of resources, inadequate infrastructure, understaffed healthcare facilities, and elevated healthcare costs comprise this healthcare emergency's aspects (Debie et al., 2022). Financial forecasting estimated the global health expenditure to surpass US$24 trillion by 2040. (Chen et al., 2021)

The COVID-19 pandemic has had an impact on worldwide healthcare systems, aggravating current issues and introducing new ones. The pandemic has significantly constrained healthcare resources, including medical personnel, equipment, and facilities. In addition, it has exposed the disparities in healthcare access and outcomes between different populations. (Filip et al., 2022). Likewise, the COVID-19 outbreak led to a considerable amount of people who are unable to access essential health services (Soussand et al., 2022). This limited access might have devastating consequences for every healthcare system, whilst several medical conditions remained undiagnosed during the pandemic. Thus, when physicians diagnose these diseases, they might reach a more progressive stage, requiring more specialized and expensive treatments.

Pharmacists play a crucial role in reducing healthcare costs and improving the sustainability of healthcare systems. Numerous studies have shown that their job is essential to ensure patients' health and well-being, and they can apply several practices that significantly minimize unnecessary healthcare expenditures (Snoswell et al., 2022). Example of these practises include the management of chronic diseases, such as diabetes and cardiovascular disease, through medication therapy management and disease state management programs (Dalton & Byrne,

2017). Nevertheless, additional research is required to investigate the exact methods that pharmacists might implement to minimize healthcare costs. Previous research has explored how a pharmacist's job might contribute to the most cost-effective results for healthcare systems (Tonin et al., 2021). This research provides promising results regarding how pharmacists might utilize their clinical knowledge and judgement to improve patients' health and reduce unnecessary healthcare expenditure. They also play a crucial role in lowering medication-related adverse events and promoting the appropriate use of medications, which can reduce healthcare costs and improve patient outcomes. In addition, according to this study pharmacists can contribute to cost savings by improving medication use and reducing medication-related adverse events.

These promising results were the main reason to further investigate the association between advanced pharmacist's practises and reduced healthcare and to analyse some aspects that have yet to be reviewed in previous studies. Furthermore, most of these studies assess only some practices that pharmacists could apply or have already been implemented in some countries. Therefore, this study aims to examine the effectiveness of these services from a pharmacist's perspective by interviewing them regarding their opinion of these services and how they could be implemented in Cyprus to improve patients' health and job quality. After that, based on the outcomes of their answers, it will be apparent whether they are willing to develop further their daily tasks, and under which conditions they might be eager to offer additional services. This also a debate whether pharmacists should be reimbursed extra, or these tasks should be included in their daily responsibilities.

1.2 Aims and Objectives

The predominant aim of this study was to provide the significance of a pharmacist's job for a sustainable healthcare system and how patients might be benefited by consulting them regarding appropriate drug usage. In addition, this study aimed to provide which practise shows the most substantial effect in reducing healthcare costs and whether it's feasible to implement within Cyprus pharmacy premises. Furthermore, this research intended to prove how essential a pharmacist's job is within the entire healthcare chain, including doctors, nurses, physiotherapists, and several other healthcare professionals. Unfortunately, there are occasions when a pharmacist's job is misunderstood and underestimated by society (Tait et al., 2020);

hence, this study was carried out to express that a pharmacist's job is more than preparing and endorsing medical prescriptions.

The main objective of this research is to further support previous findings, which show a positive correlation between pharmacist's job and minimisation of public healthcare expenditure. Moreover, a stronger link between these two parameters is intended to be identified during this study. Another objective of this study is to provide possible explanations for past research outcomes that proved to be inconsistent or contradictory. For instance, studies that showed additional pharmacy services do not considerably benefit healthcare systems and patients.

1.3 Importance and Significance of research

Nowadays, healthcare systems face several challenges they cannot deal with. Examples include the ageing population, novel expensive medical technologies and rising long-term conditions. Additionally, due to the increased workload, various issues related to the quality of care remain a significant burden, such as misdiagnosis and medical errors (Kruk et al., 2018). These issues are unlikely to disappear entirely; nevertheless, they might be limited to a certain extent. Optimising pharmacy services might contribute to reducing unnecessary medical interventions, avoiding expensive medical therapies and, in some cases, hospital admission. This might be achieved by informing patients how they might recognise alarm symptoms, referring them to their doctors for medical examinations, and offering the appropriate treatment when needed. Thus, this research will provide additional insights regarding enhancing pharmacists' jobs for patients and healthcare system benefits.

Upon completing this research, career prospects for pharmacists might arise. For example, whether authorised public health contractors might review this study, the pharmacist's job might be further developed, and perhaps it might be more respectable by society. In addition, whether pharmacists provide additional services by receiving extra compensation, they will be incentivised to perform more efficiently; hence, quality of care might be optimised, and medication-related mistakes will be minimised.

By evaluating the opinion of pharmacists regarding their contribution to the national healthcare system, as well as reviewing past research which shows positive outcomes regarding this issue, there will be an expansion of the current literature on how to reduce unnecessary healthcare expenditure. Furthermore, this study shows various practises that community pharmacists

might perform, awakening them and making them realise how valuable and essential their job is for society.

In general, this research presents aspects of a pharmacist's job that might not be considered so far, and whether a pharmacist's job is progressed, all parties of the healthcare chain will be benefited. In particular, the healthcare system might avoid elevated charges, which positively impacted its sustainability and liquidity. Furthermore, patients are also benefited whilst they receive an enhanced quality of care from the most accessible healthcare providers, and pharmacists offer a substantial contribution to the future health and well-being of patients.

Chapter 2
Literature review

2.1 Evaluation of previous studies

As mentioned above, several studies that have been conducted recently concluded that pharmacist's job has a considerable impact for the sustainability of every healthcare system, as well as for patients' health (Kehrer et al., 2013). These studies took place in various countries across the globe, such as United Kingdom and United States, where a substantial number of participants included. These huge amounts of participants make the findings of these studies more representative and encourage researchers to investigate this topic further. The authors of these studies examine several practises that pharmacists could implement for the reduction of healthcare costs. These practises include medical prescribing, medication management, management of chronic diseases, vaccinations and medicines use review. An overview of each study findings is presented as follows:

<u>Prescribing</u>

A decision-analytic model was conducted to review the financial benefits of pharmacy prescribing of hormonal contraceptives (HC) (Rodriguez et al., 2019). The main purpose of this study was to estimate whether this practise is associated with averted unanticipated pregnancies. Costs and quality-adjusted life years (QALYs) were measured as secondary outcomes. The study found that pharmacist prescribing of HC was associated with a lower rate of unintended pregnancies compared with physician prescribing. Specifically, 51 unintended

pregnancies were averted, and $1.6 million dollars were saved. The study concluded that pharmacist prescribing of HC was associated with lower medicated costs for contraceptive services compared with physician prescribing, thus, considered as a cost-effective service. Even though this study assessed a large sample size and real-world data were also utilised, a control group for direct comparison was missing, which will also allow the authors to evaluate certain confounding variables.

Another study, which also used a decision-tree model, assessed and the cost-effectiveness of physician-pharmacist collaborating prescribing (base-case scenario) against standard care prescribing (alternative scenario) for Venous Thromboembolism Prophylaxis (VTE) in high-risk patients who will undertake a surgery (Hale et al., 2018). Benefits in terms of cost to the healthcare system and quality adjusted life years (QALYs) of patients were also measured. Decreased incidences of VTE in both scenarios were detected, however, cost-savings were higher in doctor-pharmacist collaboration group. Hence, this study concluded that a collaborative prescribing scheme between pharmacists and physicians is associated with fewer VTE cases and minimised expenditure for healthcare system. In contrast with the forementioned study, this research compares a control group as well, hence, several parameters were evaluated prior to any conclusion. On the other hand, these parameters sometimes influence the final outcomes of the study undertaken, which might not benefit the authors to achieve their objectives.

The RxEACH randomized trial reviewed the financial impact of pharmacist prescribing and care for patients with Cardiovascular (CV) risk reduction in Canadian settings (Al Hamarneh et al., 2019). A cost-effectiveness tool was utilised to measure the reduction of chronic CV events, by comparing a pharmacist-prescribing group and a conventional physician-prescribing group. The study found that the pharmacist-led intervention resulted in a substantial reduction in cardiovascular risk compared to the control group. Moreover, the study estimated that the intervention group is also more cost-effective and Canadian healthcare system would save approximately 4.4 billion dollars over three decades, whether pharmacists care intervention was exploited by eligible patients. A key strength of this study is arguably its reliable cost-effectiveness tool, which indicates the accuracy of study's findings, however, they might not applicable and representative for the general population, whilst it was performed in Canadian settings.

Vaccinations

A study conducted in USA to evaluate the impact of exploiting community pharmacies, complementary to conventional healthcare settings, for influenza vaccinations during epidemic seasons. An agent-based model was used to measure clinical and financial outcomes (Bartsch et al., 2018). This model was classified in four categories: susceptible, exposed, infected, and recovered. The key findings of this study outlined that adding pharmacies to receive flu jabs during an epidemic, significantly reduce symptomatic influenza cases (approximately 12 million cases averted), a reduction of nearly 75% of flu-related deaths and up to 50 billion overall costs. Therefore, the study concluded that vaccinations against influenza in pharmacies lead to elevated vaccinations rates, minimised symptomatic flu-related incidences and predominately contributes to cost-savings for medical insurance providers. During an influenza outbreak, the researchers employed a detailed modelling approach to quantify the epidemiologic and economic implications of pharmacy-based immunization. However, pharmacy-based vaccination programs in USA were only examined and, they did not consider the obstacles for pharmacy-based vaccinations, for instance, additional reimbursement for this service provision.

A retrospective study was performed in USA to evaluate the influence of a newly applied pharmacist-based pneumococcal vaccination program (Goldsworthy et al., 2021). This was a pilot vaccination scheme performed in two primary care centres. Upon the implementation of this vaccination program, pneumococcal vaccination coverage was significantly increased, resulted in increased compliance with current national recommendations. In contrast with the above study, the authors measure the practicality for the desired vaccination rates, common obstacles, as well as concurrent administration with flu vaccine. Limitations of this study might consider the fact that vaccine administrations have been undertaking outside the pharmacy premises and the small sample size (398 patients). Overall, this study aimed to highlight the importance of vaccination against pneumococcal infection, especially high risk and elderly patients, who are more susceptible to severely get sick and they are more likely to admitted to hospitals. To avoid these devastating consequences, pharmacists might significantly contribute to avoid these incidences.

Chronic Disease Management

A systematic review that analysed various research published within a decade (2007-2017), synopsised sources related to community pharmacy management of chronic illnesses and their

contribution to health and economic outcomes (Newman et al., 2020). Several long-term conditions have been evaluated, for instance, asthma, diabetes, hypercholesteremia and Chronic Obstructive Pulmonary Disease (COPD). This review findings suggest that pharmacist's impact to manage chronic diseases is favourable for both healthcare system and patients. Reduced blood glucose levels and blood pressure, as well as minimised cholesterol levels involved some of the key findings of this study, in terms of the group of patients assessed in this study. Therefore, this study concluded that pharmacists might optimise clinical outcome in broad spectrum of common long-term conditions. A key strength of this study is the ten-year time span of studies published, which indicates that pharmacist's impact on public health remains a crucial parameter for the sustainability of national healthcare systems, regardless of the issues that their profession might face due to the global financial recession. Moreover, this review investigated studies that performed in several countries, which enhance the applicability and generalisability of their outcomes. Although 2296 studies were initially identified, only 27 fulfilled this review's criteria, thus, more robust research might be performed to include more studies.

Another review conducted in the UK to evaluate the usefulness of the Pharmacy Minor Ailment Service (PMAS) in paediatric population (Benzaken et al., 2021). This service was initially implemented in London in 2013. The authors gathered information from 33 pharmacists and 38 GPs. This service has been proved to be a very effective, whilst most of the children benefited from their consultation, without waiting for a delayed GP appointment. In addition, this type of consultation's benefits seems to outweigh its cost, as 111,612 net savings have been reported for the British National Healthcare System. Therefore, PMAS has been demonstrated to be a highly cost-effective, accessible, and acceptable service for the paediatric population with moderately severe illnesses. During this study, 6974 children have been consulted over a 12-month period, which is a relatively large sample and satisfactory chronological interval. The majority of the medical conditions assessed in this study were common ailments, such as, fever, allergic rhinitis and sore throat. Nevertheless, this study was solely focused on children, hence, the outcomes might not be applicable for adults. Additionally, community pharmacies from the UK were also examined, which limits its applicability to other countries.

A randomised controlled trial took place in Australia to evaluate the cost-effectiveness of minor ailments scheme in adults, comparing with conventional care (Dineen-Griffin et al., 2020). In total, 892 adult patients were recruited and more than 80% of them follow-up during this study. This trial's findings suggested that MAS is more costly than usual care but more cost-effective.

Consequently, this study concluded that MAS might be a successful service within the Australian borders. As opposed to the above study, a comparison between a particular service with a usual care service was reviewed, which indicates MAS superiority and efficiency. In addition, this study might be more applicable for the public, whilst adult population accounts for a higher percentage comparing with children. Reliable economical tools were utilised to assess the financial aspect of this service, such as, decision-tree model and sensitivity analysis, which proves the accuracy of the economic outcomes.

Medication review

A single group intervention study was developed to investigate the impact of medication usage review in polypharmacy patients (Wuyts et al., 2018). This study performed in three three regions of Belgium (Flanders, Brussels and Wallonia), where 75 community pharmacies have been recruited, consisted of 12 patients each. The primary objective was to determine the type and amount of drug-related problems and related interventions, whereas the secondary objective was to measure the impact of the medication use review on compliance. Overall, this study provided useful insights regarding the fast-growing role in community pharmacists to review patient's medications. Additionally, this study presents insightful data, in terms of which kind of patients might be benefited from medication review consultations. Several strengths of this study are worth mentioned, for instance, the random selection of patients, which reduces the likelihood of bias, as well as the study conducted by appropriately trained pharmacy staff. In addition, patients' views, and experiences have been also measured, which enhances the objectivity of study's outcomes. In contrast to other similar research, the absence of a control group that did not receive this type of service does not allow the authors to conclude that medication review provides significant benefits in terms of health and financial results. Furthermore, the study follow-up was only 3 months, hence, this study do not provide useful insights for this service effectiveness in the long-term.

A meta-analysis of randomized trials was conducted using numerous well-known scientific databases (PubMed, Embase, and OpenGrey) to assess the impact of medication reviews administered by community pharmacists on the elderly population receiving multiple medications (Tasai et al., 2019). Totally, 3634 articles examined, and four studies were shortlisted. Eventually, 4633 patients were reviewed. Key study findings suggested that medication review services by community pharmacists might minimize visits in hospital emergency departments, as well as hospital admissions. It also concluded that this practise

might be an advantageous area, where pharmacist might reassure patient's health and safety. One of the study's strengths is the sizeable amount of participants, which enhances the precision and generalizability of the findings. Besides, taking into account it was a meta-analysis of randomised control trials, the statistical power and generalizability of the results is also amplified. Nonetheless, the accuracy and applicability of the results might be impacted due to the lack of homogeneity between the studies assessed, whilst some of them might have different design, sample size, and outcomes measured.

2.2 Theoretical Framework

The role of pharmacists in healthcare provision has been extensive researched and debated. As extremely qualified experts in medication, pharmacists are essential in improving patient outcomes and ensuring the long-term sustainability of healthcare systems. The theory that pharmacists' interventions can positively impact the sustainability of healthcare systems is supported by various research and academic works.

The Health Care Sustainability Framework shows a strong theoretical foundation for this study. The framework emphasizes the significance of developing sustainable healthcare systems that fulfil the needs of present and future generations (AlJaberi et al., 2017). It recognizes the significance of balancing financial, social, and environmental factors in healthcare decisions, and it emphasizes the role that pharmacists can play in improving sustainable healthcare through their contributions to medication management, patient disease-related awareness, and disease prevention.

This framework is based on a comprehensive review of literature related to pharmacy practice and healthcare sustainability, consisting of studies that have reviewed the contribution of several pharmacy services on healthcare outcomes and costs. Through the Health Care Sustainability Framework, this study aims to evaluate the potential impact of these pharmacy services on the sustainability of national healthcare systems, as well as the moderating effects of pharmacists' views and opinions on their role in healthcare. By supporting the development of sustainable healthcare practices, this framework has the potential to contribute to the long-term viability of the healthcare system and to the health and well-being of both present and future generations.

2.3 Conceptual Framework

The conceptual framework for this research assumes that pharmacists' job contribution is essential in ensuring the sustainability of the healthcare system. The framework comprises the following components:
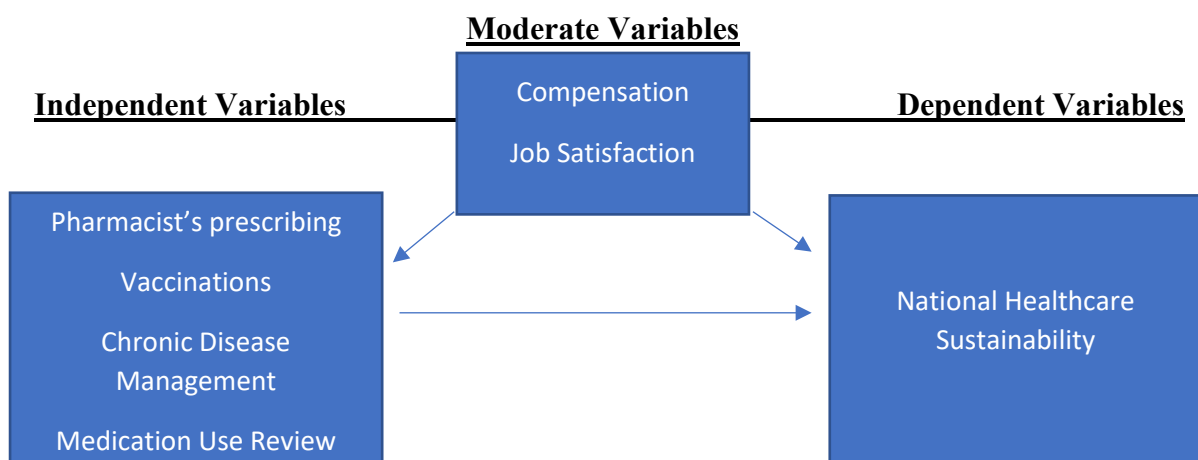
<u>Independent Variable</u>

This is defined as the favourable pharmacists' job contribution to the sustainability of the national healthcare system. Specifically, it refers to the various services that pharmacists might optimize healthcare provision, including prescribing practise, vaccinations, chronic disease management and medication use review.

<u>Moderate Variables</u>

This is defined as the factors that do not directly impact healthcare sustainability; however, they could influence the extent of the practises under investigation might impact healthcare sustainability. In particular, compensation and job satisfaction are considered moderating variables as they can impact the relationship between pharmacists' job contribution and the sustainability of the healthcare system.

<u>Dependent Variable</u>

This is defined as the Sustainability of the Healthcare System. It is also defined as the capability of the healthcare system to fulfil the long-term requirements of patients, considering the financial, social, and environmental aspects that might influence the quality of care.

The above diagram demonstrates the relationship between the independent variables and the dependent variable. The arrow pointing from Pharmacists' Job Contribution to the Sustainability of the Healthcare System represents the association between the two variables. It indicates that pharmacists' job contribution has an immediate impact on safeguarding the sustainability of the healthcare system.

The framework highlights the interdependence between pharmacists' job contribution and the sustainability of the healthcare system, as well as how their interrelationship is influenced by compensation and job satisfaction. It guides readers in understanding the relationship between these variables and serves as a foundation for the research design and analysis of the study. Each practice within the scope of the study can be presented within the revised framework as follows:

Independent Prescribing by Pharmacists

The conceptual framework for this practice includes considerations such as the purpose of the practice, patient safety, and the need for pharmacists to be adequately trained and possess relevant skills. It also emphasizes the importance of clinical governance, evidence-based practice, and the necessity for monitoring and follow-up care to ensure patient safety and optimal health outcomes.

Management of Chronic Diseases

The conceptual framework for this practice encompasses elements such as evaluating patient needs, providing appropriate education and consultation, monitoring patients' progress, and collaborating with other healthcare providers as needed. It underscores the significance of pharmacists having a comprehensive understanding of patients' medical history, lifestyle, and medication regimen. Continuous education, consultation, and routine monitoring are essential to optimize treatment outcomes and identify potential adverse reactions.

Vaccinations

The conceptual framework for this practice involves understanding the prevalence of infectious diseases, identifying high-risk patients, providing education and consultation, and ensuring vaccine safety and efficacy. Pharmacists play a crucial role in administering vaccinations, educating patients about the benefits and risks, adhering to established protocols for storage and administration, and reporting adverse effects. Their knowledge and adherence to best practices are vital for maintaining vaccine safety and promoting immunization.

Medicines Use Review

The conceptual framework for this practice includes evaluating patients' medication needs, identifying potential medication-related problems, providing education and counseling, and promoting medication compliance. Pharmacists must possess a thorough understanding of patients' medical history, medication regimen, and potential drug interactions. They should educate patients about appropriate medication use, inform them about potential side effects, and emphasize the importance of adherence to treatment. Encouraging medication compliance is crucial for ensuring treatment safety, efficacy, and avoiding potential adverse events.

Compensation

This variable represents the level of financial remuneration and benefits provided to pharmacists. Higher compensation can contribute to increased motivation and job satisfaction among pharmacists, potentially leading to more significant job contributions. Adequate compensation may attract and retain skilled pharmacists, positively impacting the sustainability of the healthcare system.

Job Satisfaction

This variable reflects pharmacists' contentment with their work environment, responsibilities, and professional growth opportunities. Higher job satisfaction can enhance pharmacists' engagement and commitment to their roles, potentially resulting in greater dedication to optimizing healthcare provision. Satisfied pharmacists may be more likely to actively contribute to the sustainability of the healthcare system through their job-related efforts.

2.4 Research Hypothesis

Hypothesis

Pharmacists' active recruitment on performing advanced services positively impacts the sustainability of healthcare systems and reduces unnecessary healthcare expenditure by the government. This hypothesis suggests that by engaging pharmacists in performing specific practises, healthcare systems might achieve greater sustainability and minimise unnecessary healthcare costs. Pharmacists' role in educating patients about appropriate medication use and providing comprehensive patient care is anticipated to lead to improved health outcomes, potentially reducing the financial burdens on public health. The hypothesis estimates that

increased pharmacist involvement might contribute to cost savings by promoting the appropriate use of medicines and reducing healthcare utilization. To examine this hypothesis, various research methods, including surveys, interviews, and reviewing observational studies, were employed to evaluate the potential impact of pharmacist participation on the sustainability of national healthcare systems.

Research Hypotheses for Specific Practices and for moderate variables

Independent prescribing

The research hypothesis for this practice is that independent prescribing by pharmacists positively contributes to the sustainability of healthcare systems and reduces healthcare costs. Independent prescribing has been shown to optimize treatment efficacy, reduce the need for referrals to other healthcare providers, and enhance medication compliance (Tsuyuki et al., 2015). By enabling pharmacists to prescribe medications independently, this practice might potentially streamline patient care, improve medication management, and decrease excessive healthcare expenditures.

Management of chronic diseases

The research hypothesis for this practice is that pharmacist management of chronic diseases considerably impacts healthcare sustainability and diminishes healthcare costs. Pharmacists' involvement in managing chronic diseases has been proven to enhance treatment efficacy, minimize hospitalisations, and resolve medication-related issues (Nuffer et al., 2019). Through their expertise in medication management and patient awareness, pharmacists could contribute to beneficially manage long-term illnesses, reduce healthcare utilization, and potentially minimise healthcare costs associated with these conditions.

Vaccinations

The research hypothesis for this practice is that pharmacist-led immunization positively contributes to healthcare sustainability and reduces healthcare costs. Pharmacist-led immunization has demonstrated substantially increased immunization rates, improved access to vaccines, and reduced the prevalence of highly infectious diseases that could be prevented by vaccinations (Le et al., 2022). By expanding the role of pharmacists in offering immunizations, the national healthcare system might enhance population health, prevent disease outbreaks, and most likely reduce the burden on healthcare facilities.

Medicines use review

The research hypothesis for this practice is that pharmacist-initiated reviews of drug use positively impact healthcare sustainability and reduce healthcare costs. Pharmacist reviews of drug use have been shown to optimize medication adherence, minimize medication-related issues, and reduce hospital admissions (Blenkinsopp et al., 2012). By conducting medicines use reviews, pharmacists might detect and address potential medication-related problems, promote compliance to prescribed therapies, and potentially reduce healthcare utilization, leading to cost savings.

Compensation

It is hypothesised that a sufficient level of compensation provided to pharmacists positively influences their job impact to healthcare sustainability. Higher compensation may attract and retain skilled pharmacists, leading to increased job contribution in optimizing healthcare provision (Nguyen et al., 2021). Therefore, higher compensation moderates the association between pharmacists' job contribution and the sustainability of the healthcare system, which is likely to result in reduced unnecessary healthcare expenditure.

Job Satisfaction

Job satisfaction is considered a significant factor influencing pharmacists' engagement and commitment to their roles. It is assumed that higher levels of job satisfaction led to increased motivation and job performance among pharmacists. Satisfied pharmacists are more likely to actively contribute to the sustainability of the healthcare system through their job-related efforts, including medication management, patient education, and disease prevention (Lam et al., 2023). Therefore, job satisfaction moderates the relationship between pharmacists' job contribution and the sustainability of the healthcare system, potentially reducing unnecessary healthcare expenditure.

Chapter 3
Research Design and Methodology

3.1 Study Design

The research methodology for this research consisted of two main elements: a literature review and a survey of pharmacists in Cyprus. The purpose of this research was to investigate the impact of pharmacist involvement on healthcare sustainability, concentrating on job satisfaction and opinions of the need for job evolution. The research questions arising from this study were: What is the overall contribution of pharmacist's job on healthcare system sustainability, as highlighted in the literature? What is pharmacists' perception regarding their job satisfaction and the need for job development in Cyprus? What is the association between pharmacists' involvement and healthcare sustainability, as described by pharmacists in Cyprus?

The literature review outlined a thorough analysis of past research on the topic. As previously analysed, a review of both qualitative and quantitative studies examined the role of pharmacists in healthcare sustainability, as well as studies explored the relationship between pharmacist job satisfaction and healthcare outcomes. The review also identifies any gaps in the current research and provide suggestions for future investigations. For the literature review, a detailed search was performed by exploiting scientific databases such as PubMed, Lancet, and Science Direct. The search approach included keywords such as "pharmacist," "healthcare sustainability," and "impact." Relevant studies were appraised taking into account their title, abstract, and full text, and the included studies were synthesized using a narrative approach. Overall, the literature review concluded that pharmacist's job might substantially contribute to national healthcare sustainability by improving patient outcomes, minimising healthcare costs, and optimising the quality of care. The most popular topics identified were medication therapy management, patient education, and chronic disease management. In addition, the literature suggested that pharmacists' involvement in healthcare sustainability might be facilitated by expanding their duties and responsibilities.

In terms of the survey, it was conducted using a self-administered questionnaire that was distributed to a sample of pharmacists in Cyprus. The questionnaire included only open-ended questions to gather data on the participants' demographics, job satisfaction, and perceptions of

the need for job development. The survey was anonymous to encourage participants to be honest in their responses. This survey consisted of closed-ended questions for several reasons. Data collected are more precise and they are more easily analysed, quantified, and interpreted. Furthermore, they can be statistically compared to identify possible correlations. They are less time-consuming than open-ended, whilst respondents can choose a given answer without thinking very deeply. Additionally, due to pharmacist's increased workload, this type of survey might have higher response rate, as questions are more easily answered, and they do not require significant effort. And lastly, objectivity is another factor of choosing this type of questions, because the answers are predefined, thus bias is less likely (Story & Tait, 2019).

3.2 Study population

In this research, the study population were pharmacists and other pharmacy professionals who are dynamically involved in the healthcare provision. To reach a representative sample, the entire population was drawn from several regions of Cyprus. Therefore, study participants, who work in different healthcare settings, such as, community pharmacists, hospitals, and clinics, were recruited by being invited electronically to answer the relevant questionnaire. To achieve diversity in this sample, the study aimed to recruit pharmacists with various demographic characteristics, such as age groups, genders, education level and working experience.

Inclusion and exclusion criteria were completely straight-forward. Pharmacists included should be both registered and trained professionals who are currently working in any of the forementioned settings. Whether a pharmacist was willing to sacrifice a few minutes to complete the questionnaire, their response would be considered for the data collection process. On the other hand, pharmacy students and retired pharmacists did not participate in this study, whilst they would not provide objective arguments, in terms of the level of job satisfaction and how their profession might be evolved.

An invitation letter was sent to potential participants through their professional associations and organizations, to reach study participants. The letter provided data regarding the study's purpose, objectives, and it also ensured the confidentiality and anonymity of their responses. Participants who agreed to participate were provided with a link to the online questionnaire, which was hosted on a secure private website. Overall, a sample size of 80 pharmacists was achieved, which is considered sufficient, taking the number of registered pharmacists in Cyprus.

3.3 Data collection

Pharmacists who eventually responded to this survey, were required to answer specific questions. The first questions requested to provide their demographic characteristics. This included gender, age ranges, years of working experience, current occupation, employment type, educational background, country of study, practising abroad. These characteristics were further analysed to assessed whether they might provide insights regarding participants responses. Thereafter, they should indicate their level of satisfaction regarding their current role in the recently introduced national healthcare system and their reimbursement as healthcare providers. They should also indicate their level of agreement regarding the need for job evolution. Afterwards, they should indicate their willingness and agreement rate regarding the incorporation of additional services to their daily duties and responsibilities, their level of confidence and familiarity with these practises and whether they believe these practises might enhance healthcare sustainability. Finally, they should provide whether implementation of these services should be reimbursed extra.

The inclusion of scales and level of agreement questions in this survey facilitated standardized measurement of respondents' perceptions and attitudes (DeCastellarnau, 2017). By providing a range of scales options, a quantifiable analysis and direct comparison of the results was achieved. These scales ensured consistency, assisted data analysis, and provided valuable insights into the respondents' opinions and experiences. Data collected from the survey have been evaluated thoroughly by implementing both descriptive and inferential statistics. Descriptive statistics, such as mean, median, and standard deviation, were utilised to summarize the general characteristics of the study participants, as well as their job satisfaction and views on their contribution to the national healthcare system. Inferential statistics, including and regression analyses, were used to investigate the association between pharmacist involvement and healthcare sustainability, and to review the predictors of job satisfaction among pharmacists.

3.3 Data Analysis

The data collected for this study were analysed using both qualitative and quantitative methods. The qualitative analysis involved reviewing the literature to identify the themes related to pharmacists' involvement in healthcare sustainability. The quantitative analysis involved analysing the survey data collected from pharmacists in Cyprus to identify their opinions about their job satisfaction and the evolution of their role. The literature review suggested that pharmacists might positively impact healthcare sustainability by optimising health outcomes, minimising healthcare costs, and improving the quality of care. The most popular practises identified were medication therapy management, patient education, and chronic disease management. In addition, the literature revealed that pharmacists' involvement in healthcare sustainability can be enhanced by developing their roles and responsibilities.

Regarding the survey completed by participants, descriptive statistics have been used for the analysis of study findings. The amount of the entire sample was provided, as well as the proportion of pharmacists in each group and sub-groups, such as, age, gender, working experience and educational background. The mean job satisfaction was also obtained, including standard deviation (SD), as well as the proportion of pharmacists who believe that their job should progressed. Mean average age range and job satisfaction was also measured and reported. Dependent and independent variables have been both considered. As mentioned above, dependent variable is defined as the likelihood of an outcome, in this case, the sustainability of the national healthcare system, whereas independent variables are the factors that might interfere with the probability of an outcome.

To investigate the association between independent and dependent variables, ANOVA and regression analysis were used. The regression model's significance was determined using ANOVA. It was also used to see if there was a statistically significant difference between the regression model and a null model, which assumed no association between the dependent and independent variables. In this research, whether there is either strong or weak or no association at all regarding the practises under investigation and healthcare sustainability, F- value and p-value provided by ANOVA have been considered. These measures also assisted to determine the significance of regression model. Regression analysis was also utilized to determine the strength and direction of the relationship between two continuous variables, namely job satisfaction and compensation, with healthcare sustainability. Both statistical techniques

provided valuable insights into the research questions and helped to identify the factors that influence healthcare sustainability.

Chapter 4
Presentation of Results and Analysis

Table 1

Demographic Variable	Frequency	Percentage (%)
Gender		
Men	25	31.25
Women	54	67.5
Prefer not to say	1	1.25
Age range		
<23	0	0
23-34	33	41.25
35-49	19	23.75
50-64	24	30
65>	4	5
Current Occupation		
Pharmacy Owner	45	56.25
Pharmacy Employee	24	30
Hospital Pharmacist	5	6.25
Industry Pharmacist	1	1.25
Governmental Pharmacist	4	5
Other	1	6.25
City of Practicing		
Nicosia	34	42.5
Larnaca	10	12.5
Limassol	22	27.5
Paphos	9	11.25
Famagusta	5	6.25
Years of Experience		

0-4	18	22.5
5-9	14	18.5
10-19	18	22.5
>20	30	37.5
Employment type		
Full-time	76	95
Part-time	4	5
Higher Education Level		
Bachelor's degree	37	46.25
Master's degree	40	50
Phd	3	3.75
Ethnicity		
Cypriot	67	83.75
Greek	12	15
Other	1	1.25
Country of Study		
Cyprus	19	23.75
Greece	30	37.5
United Kingdom	8	10
Other European Country	17	21.25
Country outside of Europe	6	7.5
Practising Abroad		
Yes	42	52.5
No	38	47.5

Table 1 presents the demographic characteristics of the participants. In total, 80 pharmacists in Cyprus completed the questionnaire. More than half of the respondents were female, with 31.25% identifying as male, and only one respondent did not disclose their gender. The majority were in the age range of 23-34 (41.3%), followed by 50-64 (30.0%), 35-49 (23.8%), and older than 65 (5.0%) (Mean = 41.1, SD = 14.6, Median = 38, CI = 36.5-47.7). The majority of the participants (56.25%) reported being pharmacy owners, while 30% were pharmacy employees, and a small proportion worked as hospital pharmacists (6.25%) or governmental pharmacists (5%). Only one participant worked in the industry, and one chose "other" as their current occupation. These findings highlight the predominance of private pharmacy ownership in the sample, which is consistent with the structure of the pharmacy sector in Cyprus.

Most of the participants (42.5%) worked in Nicosia, followed by Limassol (27.5%), Larnaca (12.5%), Paphos (11.25%) and Famagusta (6.25%). These findings suggest that most of the participants were in Nicosia, which could have an impact on the generalizability of the results to other regions of Cyprus. In terms of years of working experience, 18 (22.5%) had 0-4 years of experience, 14 (17.5%) had 5-9 years of experience, 18 (22.5%) had 10-19 years of experience, and 30 (37.5%) had more than 20 years of experience. Regarding their employment contract, nearly all participants work full-time, whilst only four respondents choose to work part-time. Considering the educational background of this study's participants, half of them hold a postgraduate degree, 46.2% have a bachelor's degree and only 3.8% had a PhD.

Regarding nationality, most respondents (83.75%) were Cypriot, only 15% were Greek, and 1.25% indicated another nationality. It is worth noting that the sample size for non-Cypriot respondents was relatively small. Hence, the conclusions drawn from this research might not represent foreign employees in Cyprus. In terms of the countries where the participants studied, the majority studied in Greece (37.5%), followed by Cyprus (23.75%), other European countries (21.25%), the UK (10%), and other countries outside of Europe (7.5%). These results suggest that most participants studied in Greece or Cyprus, with a significant number studying in other European countries—a relatively small number of participants studied in the UK or outside of Europe. Overall, the results suggest diverse educational backgrounds and experiences among the participants. One prominent finding from this research is that the proportion of pharmacists practicing abroad (52.5%) is similar to that of those who do not (47.5%). These results might suggest there is no significant preference among pharmacists to practice abroad and may reflect the high demand for pharmacy professionals locally.

Prescribing Practice

Table 2

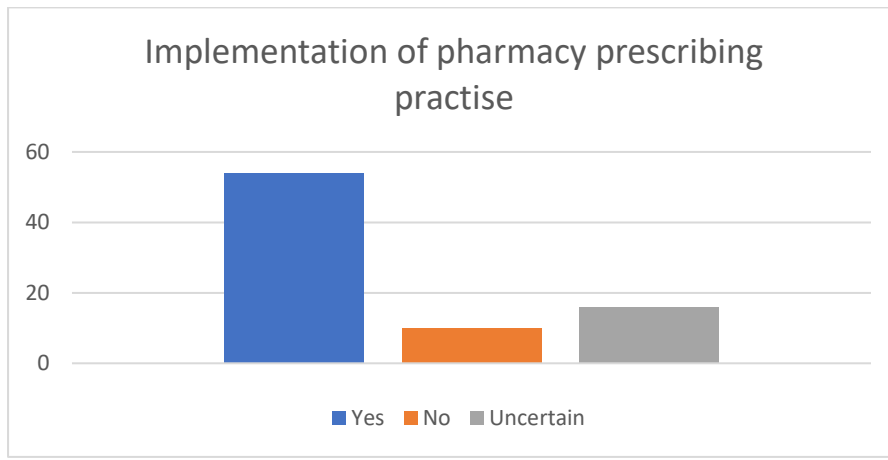Implementation of pharmacy prescribing practise

Table 2 provides the results of the responses to the survey question regarding the implementation of independent prescribing practice by pharmacists in Cyprus. In total, 67.5% of respondents agreed with the implementation of prescribing practice by pharmacists, whereas the one eighth of respondents answered disagree. 25% of total respondents are uncertain regarding the performance of this practice (Mean = 2.55, Median = 3, SD = 0.7, CI 2.4 – 2.7).

Further data analysis showed that among the uncertain respondents, those who did not practice pharmacy abroad show higher percentage of uncertainty regarding the implementation of prescribing by pharmacists (nearly 30%). Unanticipatedly, pharmacists who studied abroad indicated higher percentages of disagreement in terms of pharmacy prescribing practice, in comparison with those who only practice pharmacy locally.
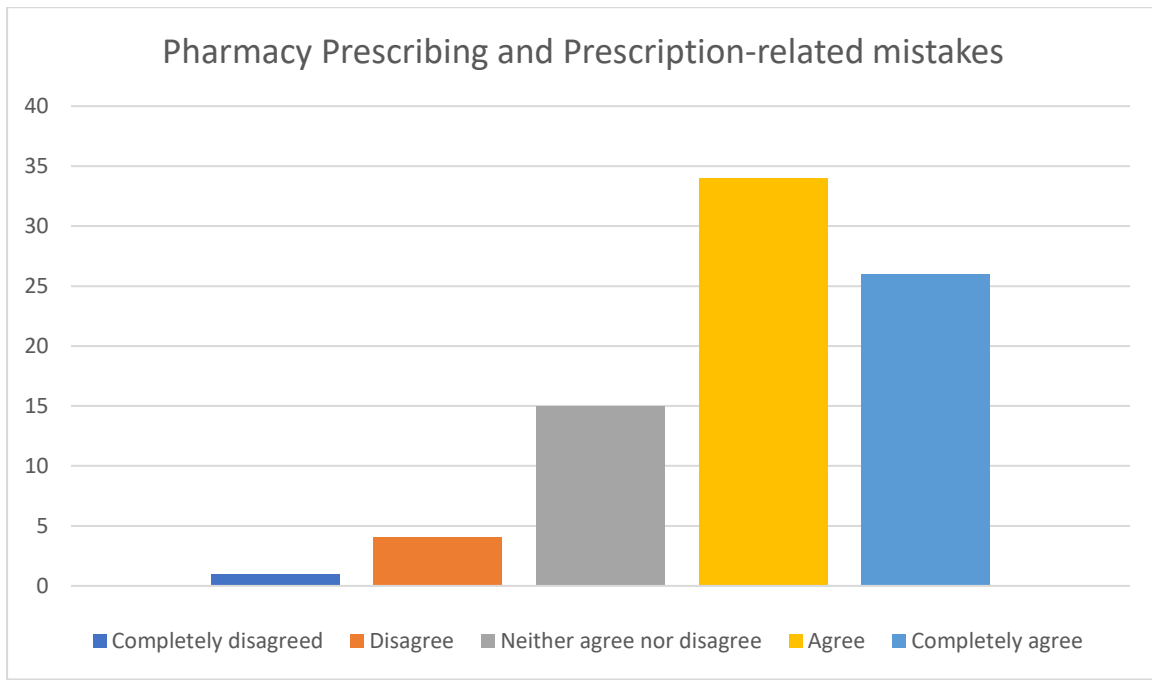
Table 3

Table 3 provides the results of the responses regarding the question, "Do you believe this practice might contribute to reducing prescription-related mistakes by physicians?". Of these, 5% totally disagreed, 3% disagreed, 19% neither disagreed nor agreed, 43% agreed, and 32% agreed (Mean = 4, Median = 4, SD = 0.9, CI 3.81-4.19). In addition, a higher proportion of participants who neither disagreed nor agreed studied in Greece (47%) compared to participants who agreed (33%) and those who totally agreed (38%). Additionally, a higher proportion of participants who totally agreed studied in Greece (38%) compared to those who agreed (25%).
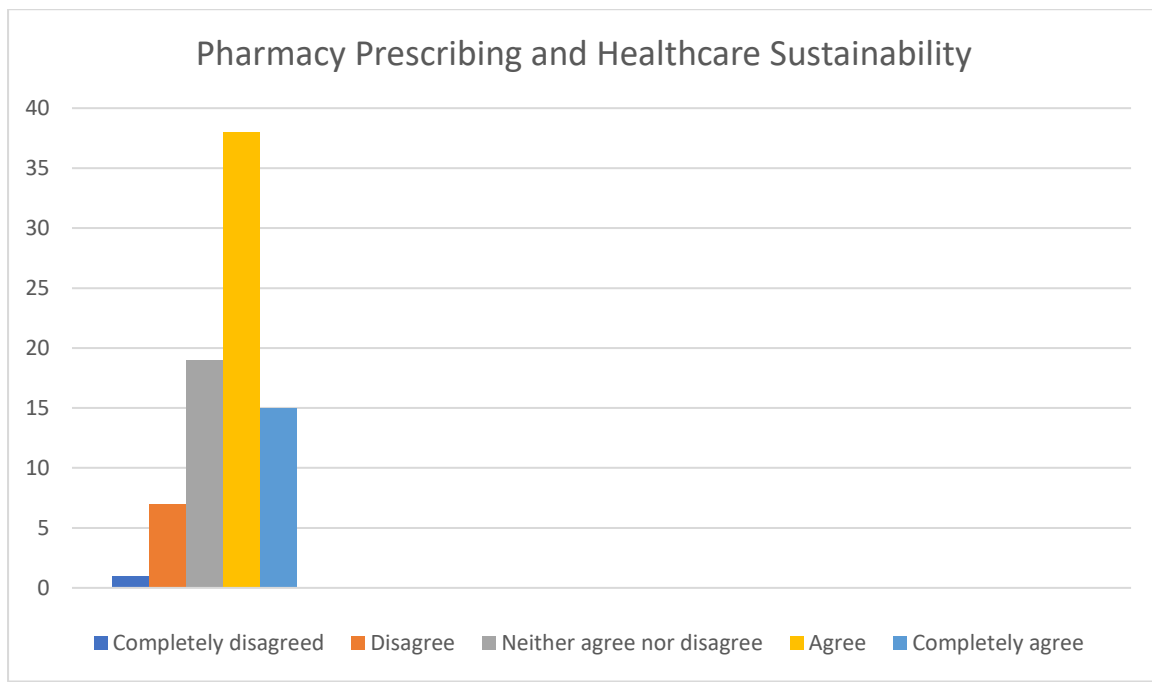
Table 4

Table 4 provides the results of the question regarding the impact of independent prescribing practice implemented by pharmacists on the sustainability of the national healthcare system. The results showed that 53.75% of the respondents agreed or totally agreed that such a practice might enhance sustainability. However, 8 out of 80 respondents (10%) disagreed or totally disagreed with this statement (Mean = 3.73, Median = 4, SD = 0.9, CI 3.54 – 3.92). Further analysis revealed that among the 15 respondents who totally agreed with the statement, 9 of them (60%) practiced pharmacy abroad. Additionally, among the 38 respondents who agreed with the statement, 19 of them (50%) studied abroad. On the other hand, among the 19 respondents who neither agreed nor disagreed with the statement, 12 of them (63.2%) studied abroad.

Regression analysis of pharmacists independent prescribing and healthcare sustainability

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.087164425							
R Square	0.007597637							
Adjusted R Square	-0.00512547							
Standard Error	0.912800353							
Observations	80							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	0.497550251	0.49755	0.597153	0.442001873			
Residual	78	64.98994975	0.833204					
Total	79	65.4875						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	4.022613065	0.382810008	10.50812	1.34E-16	3.260496883	4.784729248	3.260496883	4.784729248
X Variable 1	-0.111809045	0.144688583	-0.77276	0.442002	-0.399861886	0.176243796	-0.399861886	0.176243796

The results of the regression analysis indicate a negative and non-significant relationship between the prescribing practice rating and the healthcare sustainability rating in Cyprus. The correlation coefficient (Multiple R) is 0.087, which suggests a weak positive correlation between the two variables. Nonetheless, the R-squared value of 0.008 indicates that only a minimal percentage (0.8%) of the variation in the healthcare sustainability rating might be explained by the prescribing practice rating. The ANOVA table displays that the regression model is not statistically significant (F-statistic = 0.597, p-value = 0.442), suggesting that the addition of the independent variable (prescribing practice rating) does not considerably improve the model's ability to explain the variation in the healthcare sustainability rating. The coefficients table shows that the intercept is statistically significant (t-statistic = 10.508, p-value = 1.34E-16), while the coefficient for the prescribing practice rating is not statistically significant (t-statistic = -0.773, p-value = 0.442). These results might indicate that the prescribing practice rating may not be a strong predictor of healthcare sustainability in Cyprus, and that several other factors may affect healthcare sustainability. Therefore, it might be essential to investigate other factors that might affect healthcare sustainability in Cyprus.

Vaccinations

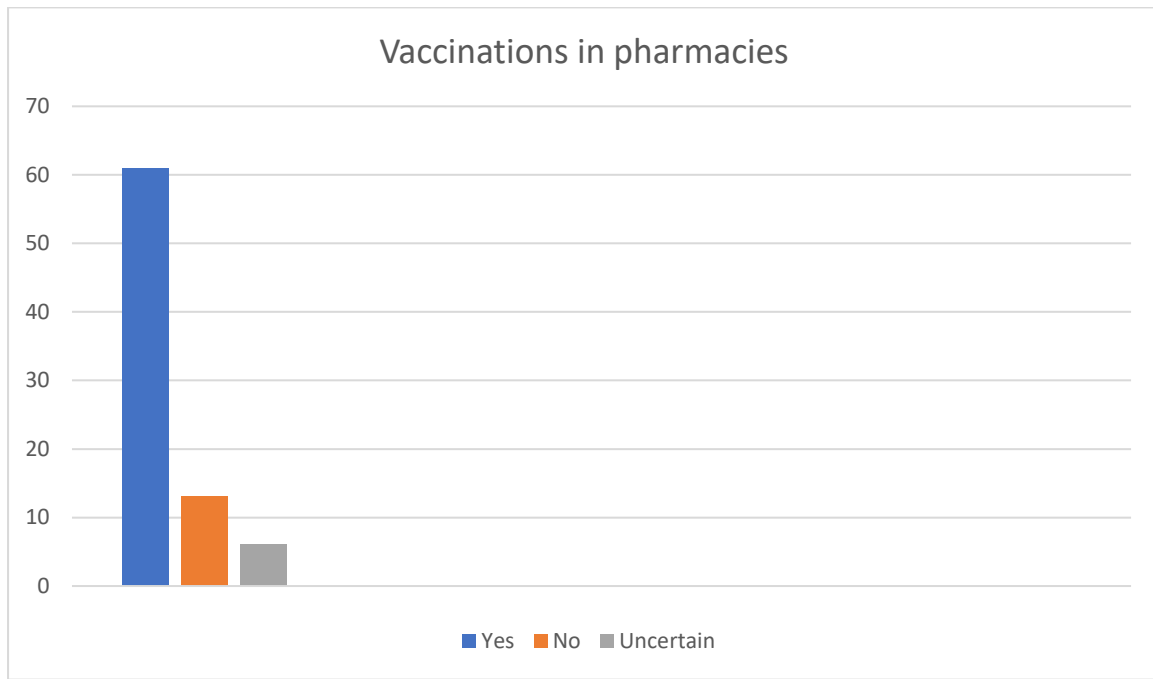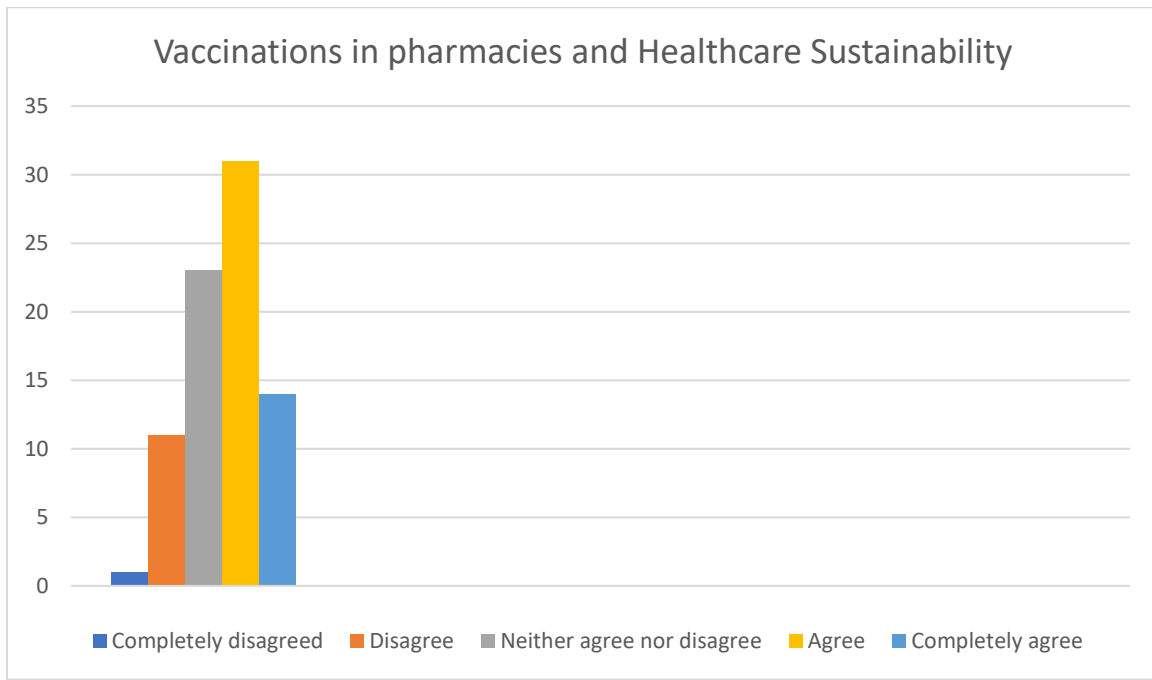**Table 5**

Vaccinations in pharmacies

Table 5 presents the results regarding the question of the implementation of vaccinations in pharmacies, 61 (76.25%) answered positively, 6 (7.5%) were uncertain, and 13 (16.25%) answered negatively (Mean = 2.6, Median = 3, SD = 0.75, CI 2.44 – 2.76). Among the 6 respondents who were uncertain, 5 did not practice pharmacy abroad, while among the 61 respondents who answered positively, 32 practiced abroad and 10 were of Cypriot nationality. On the other hand, among the 13 respondents who answered negatively, 9 practiced abroad. Moreover, a higher proportion of respondents who answered "yes" to the question of whether vaccinations might be implemented in pharmacies also reported practicing pharmacy abroad (52.5%) compared to those who answered "no" (30.0%) or "uncertain" (16.7%). Additionally, a higher proportion of those who answered "no" to the question of whether vaccinations might be implemented in pharmacies reported practicing pharmacy abroad (69.2%) compared to those who answered "yes" (31.1%) or "uncertain" (0%).

Table 6

Vaccinations in pharmacies and Healthcare Sustainability

Legend: ■ Completely disagreed ■ Disagree ■ Neither agree nor disagree ■ Agree ■ Completely agree

Overall, 56,25% of the total respondents agreed with the statement that vaccinations in pharmacies might reduce prevalence of common infections, thus, facilitate the sustainability of the national healthcare system. In contrast, 15% of the participants indicated a certain rate of disagreement (Mean = 3.5, Median = 4, SD = 0.9, CI 3.3 – 3.7). Approximately the one third of the respondents provided a neutral position with the statement. Similar proportion of Greeks and Cypriots supported this theory (7/12 and 37/67 respectively), as well as the percentages of disagreement between the two nationalities are similar (13% and 16% respectively).

Table 7

Familiarity with Vaccinations by pharmacists
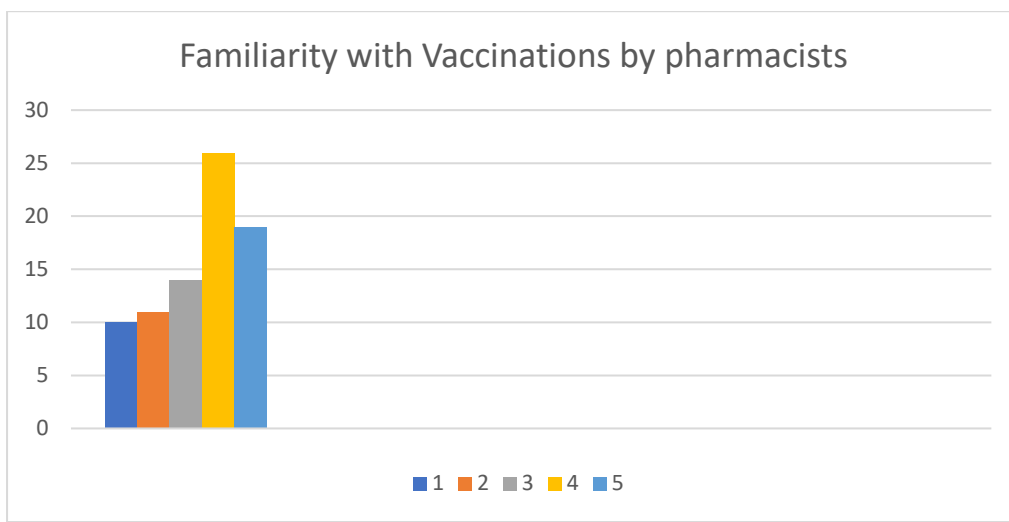
Legend: ■ 1 ■ 2 ■ 3 ■ 4 ■ 5

Table 7 provides the level of familiarity of pharmacists to undertake vaccinations. The majority of the 80 respondents (65%) rated their familiarity as 4 or 5, indicating a high level of familiarity (Mean = 3.4, Median = 4, SD = 1.3 CI 3.2 – 3.6). Interestingly, gender appears to be associated with responses, with women being more likely to rate their familiarity as 1 or 2 compared to men. Specifically, all 10 respondents who rated their familiarity as 1 were women, and 8 out of 11 respondents who rated their familiarity as 2 were women. Among those who rated their familiarity as 4, the majority (17 out of 26) were women, and most of them were in the age group of 23-34. Finally, among those who rated their familiarity as 5, 11 out of 19 were women, with 6 of them falling into the age group of 23-34.

SUMMARY OUTPUT

Regression Statistics					
Multiple R	0.472305095				
R Square	0.223072103				
Adjusted R Squar	0.213111488				
Standard Error	0.867481638				
Observations	80				

ANOVA

	df	SS	MS	F	Significance F
Regression	1	16.85309735	16.85309735	22.39541668	9.72517E-06
Residual	78	58.69690265	0.752524393		
Total	79	75.55			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	5.162610619	0.349216607	14.78340525	2.50485E-24	4.467373761	5.857847478	4.467373761	5.857847478
X Variable 1	-0.610619469	0.129030112	-4.7323796	9.72517E-06	-0.867498689	-0.353740249	-0.867498689	-0.353740249

The results of the regression analysis suggest a moderate positive correlation between the belief that vaccinations might be undertaken in pharmacies and the belief that this might contribute to the sustainability of the healthcare system. The correlation coefficient (Multiple R) is 0.47, indicating a moderate positive correlation between the two variables. The R-squared value of 0.22 suggests that 22% of the variation in the belief that vaccinations might contribute to healthcare sustainability can be explained by the belief that vaccinations might be undertaken in pharmacies. The ANOVA table shows that the regression model is statistically significant (F-statistic = 22.4, p-value = 9.7E-06), indicating that the addition of the independent variable (belief that vaccinations might be undertaken in pharmacies) significantly improves the model's ability to explain the variation in the belief that vaccinations might contribute to healthcare sustainability. The coefficients table shows that the intercept is statistically significant (t-statistic = 14.8, p-value = 2.5E-24), while the coefficient for the belief that vaccinations might be undertaken in pharmacies is also statistically significant (t-statistic = -4.7, p-value = 9.7E-

06), indicating that this belief is a significant predictor of the belief that vaccinations might contribute to healthcare sustainability. These findings suggest that providing vaccination services in pharmacies might contribute to enhancing the sustainability of the healthcare system.

Chronic Disease Management

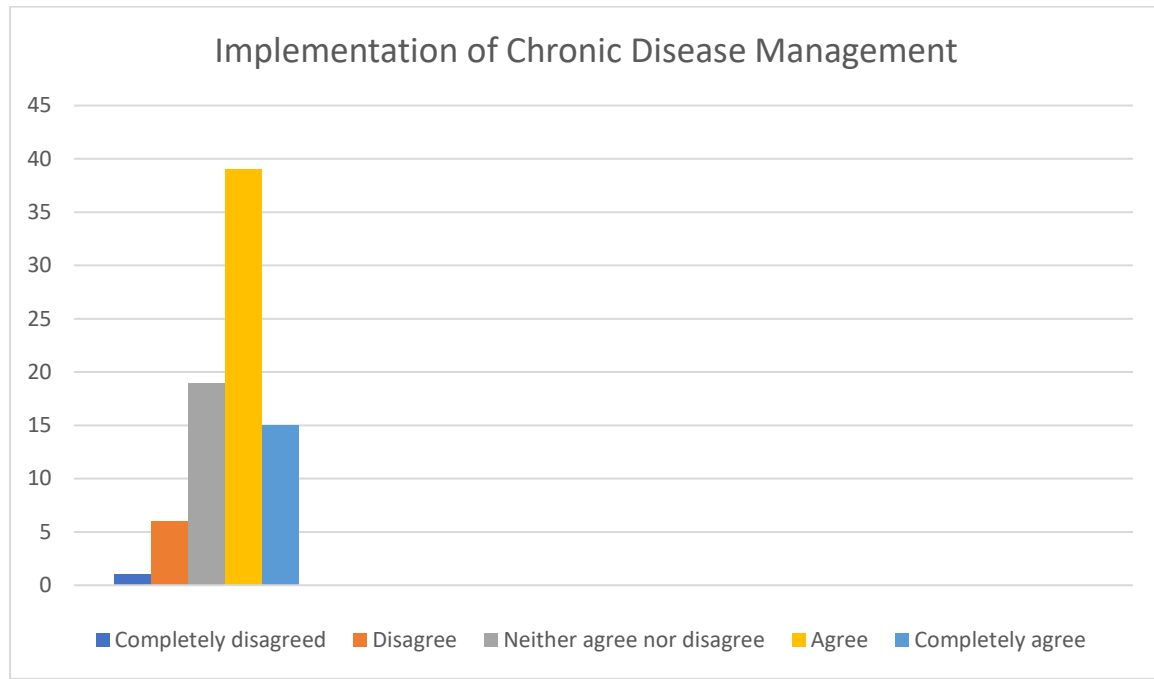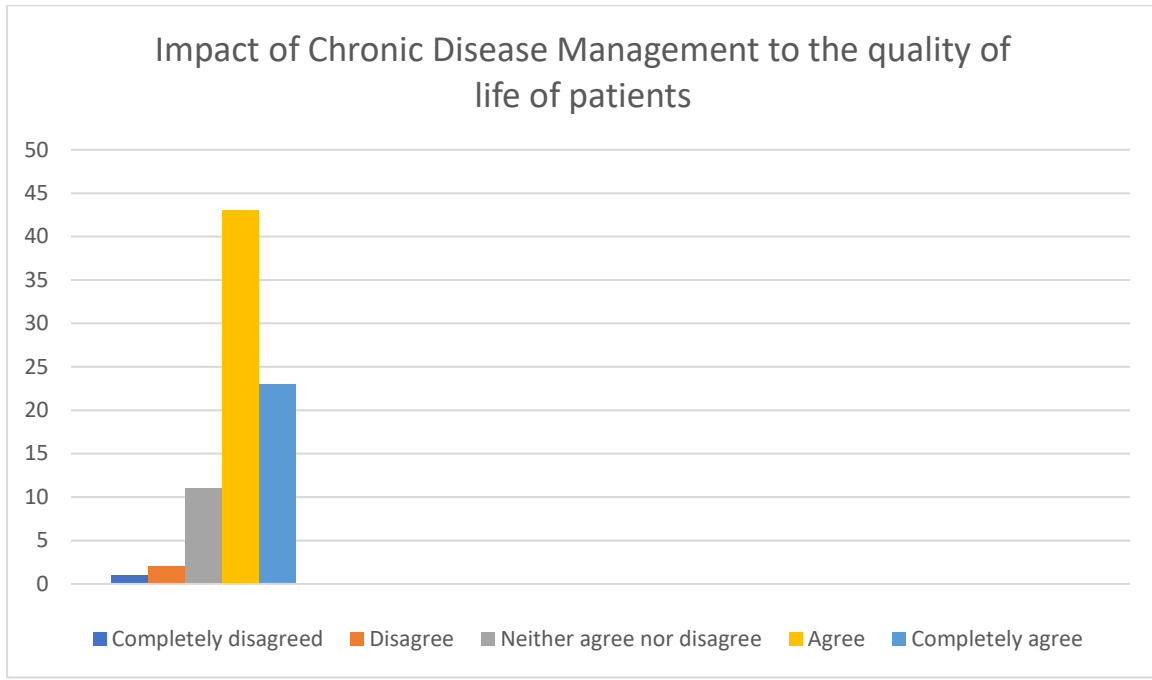## Table 8

Implementation of Chronic Disease Management

Table 8 provides the responses to the question regarding the agreement on the implementation of chronic disease management. Overall, 6/80 (7.5%) disagreed, 1/80 (1.25%) totally disagreed, 19/80 (23.75%) neither agreed nor disagreed, 39/80 (48.75%) agreed, and 15/80 (18.75%) totally agreed (Mean = 3.7, Median = 4, SD = 0.8, CI 3.5 – 3.9). Further analysis of these responses revealed that 6/19 of those neither agreed nor disagreed were between the age of 23-34. Similarly, out of the 39 participants who agreed, 50% (19/39) were aged 23-34. However, it is noteworthy that a relatively large proportion of those who neither agreed nor disagreed were in the age group of 23-34, which suggests a need for further investigation.

Table 9

Impact of Chronic Disease Management to the quality of life of patients

Based on the responses to the question on whether the implementation of chronic disease management practice might improve the quality of life of patients, it can be observed that most of the participants agreed or totally agreed with the statement. Specifically, 43 out of 80 participants agreed, while 23 participants totally agreed. On the other hand, only 3 participants disagreed or totally disagreed with the statement (Mean = 4, Median = 4, SD = 0.79, CI 3.83 – 4.17). Further analysis of the responses revealed interesting patterns. Of the 23 participants who totally agreed with the statement, 7 were men and 4 of them were pharmacy owners. Among the 16 female participants who totally agreed, 9 were aged between 23-34. Meanwhile, of the 43 participants who agreed with the statement, 14 were women aged 23-34 as well.

Table 10

Impact of Chronic Disease Management to the quality of life of patients
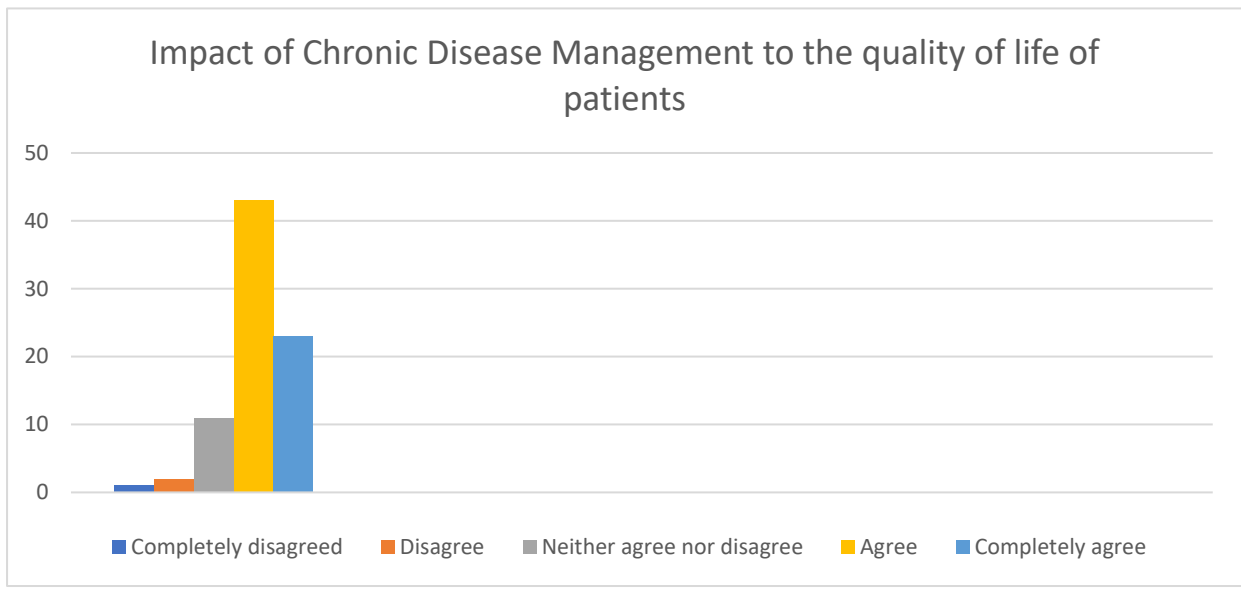
Regarding the belief of pharmacists whether chronic disease management practice might enhance healthcare sustainability, 1 respondent disagreed, 2 respondents totally disagreed, 23 respondents neither agreeing nor disagreed, 43 respondents agreeing, and 11 respondents totally agreeing (Mean = 3.76, Median = 4, SD = 0.76, CI 3.60 – 3.92). Among the 11 respondents who totally agreed, 3 were male, pharmacy owners, and aged between 50-64 years old. Additionally, among the 43 respondents who agreed, 15 were female aged between 23-34, and 4 were male aged 23-34. On the other hand, among the 23 respondents who neither agreed nor disagreed, 4 were male aged 35-49.

Regression analysis of chronic disease management and healthcare sustainability

SUMMARY OUTPUT

	Regression Statistics
Multiple R	0.929848408
R Square	0.864618063
Adjusted R Square	0.862882397
Standard Error	0.354458055
Observations	80

ANOVA

	df	SS	MS	F	Significance F
Regression	1	62.58754001	62.58754001	498.1477603	1.31E-35
Residual	78	9.799959992	0.125640513		
Total	79	72.3875			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-0.053010602	0.17330346	-0.305883114	0.760508552	-0.398031288	0.292010084	-0.398031288	0.292010084
X Variable 1	1.00080016	0.044840276	22.31922401	1.3065E-35	0.911530028	1.090070292	0.911530028	1.090070292

The results of the regression analysis show a strong positive correlation between the chronic disease management rating and the healthcare sustainability rating in Cyprus. The correlation coefficient (Multiple R) is 0.93, indicating a strong positive correlation between the two

variables. The R-squared value of 0.86 suggests that the majority (86%) of the variation in the healthcare sustainability rating can be explained by the chronic disease management rating. The ANOVA table shows that the regression model is highly statistically significant (F-statistic = 498.15, p-value = 1.31E-35), indicating that the addition of the independent variable (chronic disease management rating) significantly improves the model's ability to explain the variation in the healthcare sustainability rating. The coefficients table shows that the intercept is not statistically significant (t-statistic = -0.306, p-value = 0.761), while the coefficient for the chronic disease management rating is highly statistically significant (t-statistic = 22.32, p-value = 1.31E-35), indicating that chronic disease management is a strong predictor of healthcare sustainability in Cyprus. These results suggest that chronic disease management can significantly contribute to improving healthcare sustainability in Cyprus. Therefore, it may be beneficial to further explore the potential benefits and challenges of implementing chronic disease management programs in Cyprus.

Medicines Use Review

Table 11
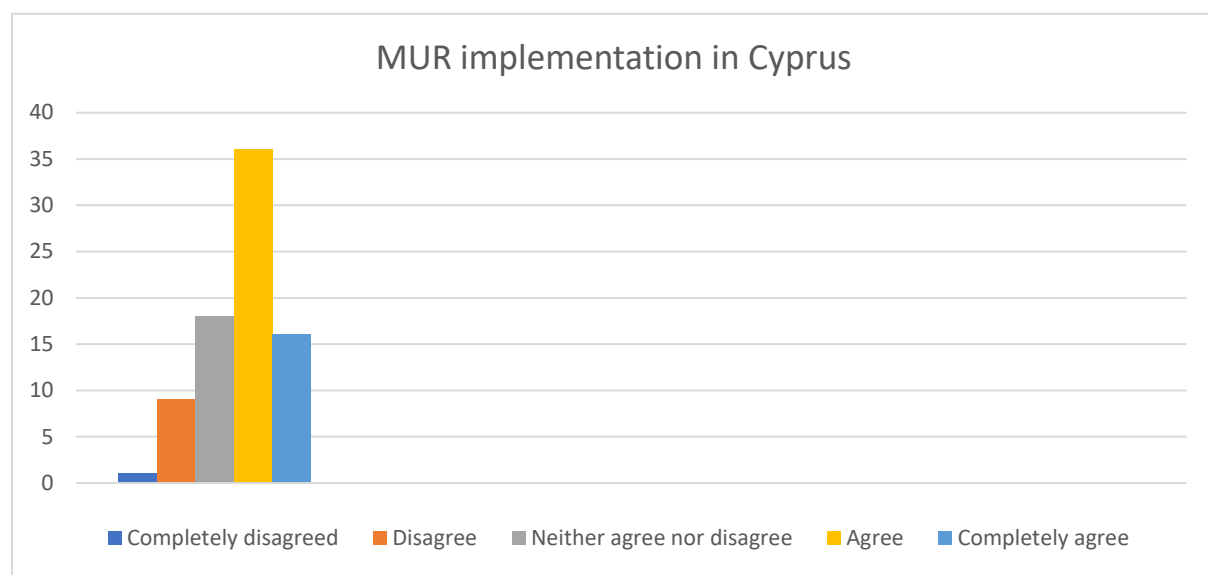
In this study, respondents were asked whether they believed Medicines Use Review (MUR) could be implemented in Cyprus. The results showed that 9 out of 80 respondents disagreed, with 7 of them being women aged between 23-34 (Mean = 3.71, Median = 4, SD = 0.95, CI 3.51 – 3.91). One respondent totally disagreed, and 18 respondents neither agreed nor disagreed, with 6 of them being women aged between 23-34. In contrast, 36 respondents agreed, and 12 of them were women aged between 23-34. Additionally, 16 respondents totally

agreed, with 4 of them being men who were pharmacy owners and aged between 50-64, and 5 of them were women aged between 23-34.

Moreover, the association between age and response was also explored. Among the respondents who disagreed, 7 were women aged between 23-34. Similarly, among those who neither agreed nor disagreed, 6 were women aged between 23-34. For those who agreed, 12 were women aged between 23-34. Lastly, among those who totally agreed, 5 were women aged between 23-34, and 4 were men who were pharmacy owners and aged between 50-64. These findings suggest that age may also play a role in the respondents' beliefs about the implementation of MUR.

Table 12
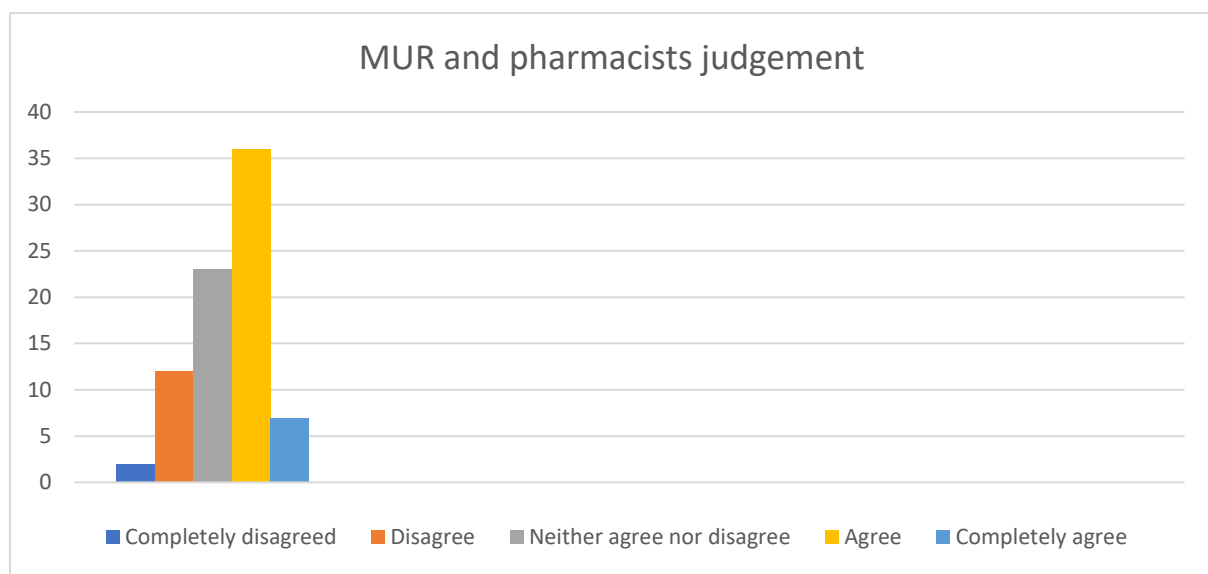
The question "Do you believe pharmacist is the most appropriate healthcare professional to judge whether a particular treatment is effective?" was answered by 12/80 respondents as disagree, 2/80 as totally disagree, 23/80 as neither agree nor disagree, 36/80 as agree, and 7/80 as totally agree (Mean = 3.4, Median = 4, SD = 0.93, CI 3.2 – 3.6). It is worth noting that 15/36 of those who agreed were women aged 23-34. Further analysis reveals that among those who disagreed, 4/12 were women aged 23-34. Among those who totally disagreed, 2/2 did not practice pharmacy abroad. Among those who neither agreed nor disagreed, 4/23 were men who are pharmacy owners. Among those who agreed, 2/36 were men aged 50-64, and among those who totally agreed, 2/7 were men aged 50-64.

Regression Analysis of MUR and Healthcare Sustainability

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.842440483
R Square	0.709705968
Adjusted R Squ	0.70598425
Standard Error	0.508768623
Observations	80

ANOVA

	df	SS	MS	F	Significance F
Regression	1	49.36005008	49.3600501	190.693088	1.19524E-22
Residual	78	20.18994992	0.25884551		
Total	79	69.55			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0.359350717	0.229172483	1.56803606	0.12092088	-0.09689665	0.815598083	-0.09689665	0.815598083
X Variable 1	0.825764117	0.059798258	13.8091668	1.1952E-22	0.706714931	0.944813303	0.706714931	0.944813303

Based on the results of the regression analysis, it was found that there was a significant positive relationship between the agreement of implementing medicines use review in Cyprus and the belief that its implementation would enhance healthcare sustainability. The multiple R value of 0.84 suggests a strong positive correlation between the two variables. The ANOVA table indicated that the regression model was statistically significant, with a very low p-value of 1.19524E-22, which suggests that the model is a good fit for the data. The coefficients table showed that the intercept value was not statistically significant, with a p-value of 0.12092088, while the coefficient for the X variable 1 was highly significant with a p-value of 1.19524E-22. This indicates that the belief that medicines use review might enhance healthcare sustainability is positively associated with the agreement that it might be implemented in Cyprus. Therefore, it can be concluded that implementing medicines use review in Cyprus has the potential to enhance healthcare sustainability.

Table 13
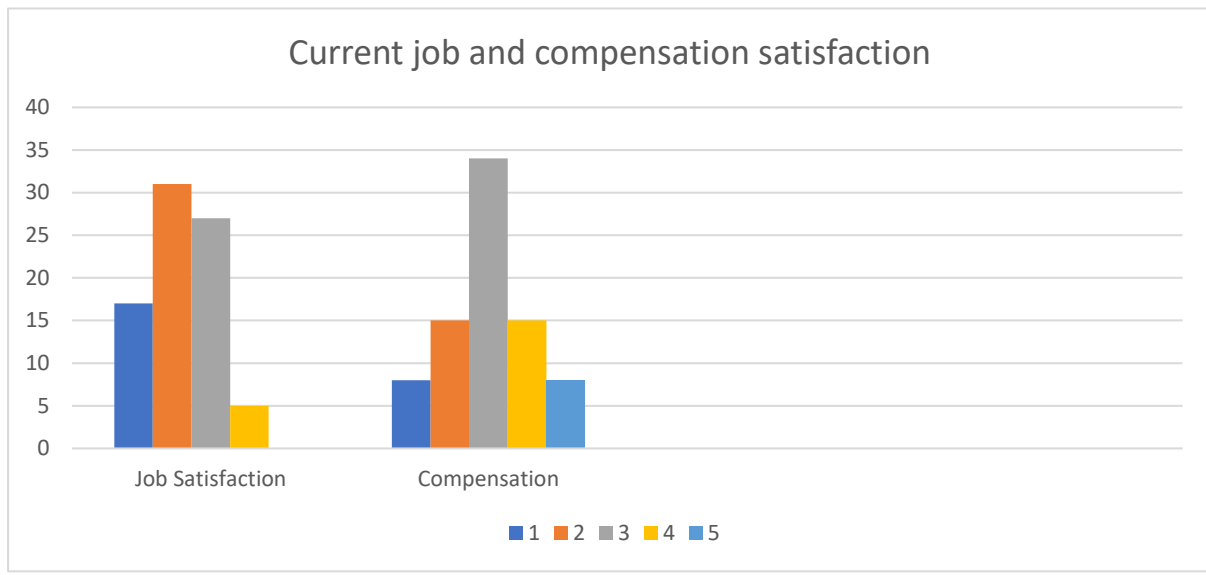
Overall, the results of the survey showed that nearly the one third of respondents seem to be dissatisfied with their salary (28.75%), whereas a similar proportion indicated a certain level of satisfaction (28.7%) (Mean = 3, Median = 3, SD = 1.08, CI = 2.8 – 3.2). In terms of job satisfaction, 60% of participants revealed dissatisfied regarding their current job, whereas only 5/80 of the respondents indicated a certain level of job satisfaction. (Mean = 2.25, Median = 2, SD = 0.86, CI = 2.09- 2.41). Rate of salary satisfaction might be correlated with ethnicity. Surprisingly, a 30% of Cypriot participants indicated a level of dissatisfaction, in contrast with Greek participants who showed a 50% satisfaction with their salary. Job satisfaction might be correlated with the country of study. 60% of those studied in another European country indicated dissatisfied and a 30% of those who studied in Greece showed satisfied with their current role. Regarding their perceptions whether their current role contributes to the national healthcare sustainability, nearly 25% seemed to be uncertain (23/80), 33 out of 80 pharmacists answered, 'Yes' and 26 pharmacists answered 'No'.

Regression Analysis of Job Satisfaction and Healthcare Sustainability

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.285383504
R Square	0.081443744
Adjusted R Squ	0.069667382
Standard Error	0.829211886
Observations	80

ANOVA

	df	SS	MS	F	Significance F
Regression	1	4.75529661	4.75529661	6.915866068	0.010288625
Residual	78	53.63220339	0.687592351		
Total	79	58.3875			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	2.726271186	0.259988123	10.4861374	1.48036E-16	2.208674593	3.24386778	2.208674593	3.24386778
X Variable 1	-0.283898305	0.107954192	-2.629803428	0.010288625	-0.498818592	-0.068978018	-0.498818592	-0.068978018

Based on the regression analysis performed on the two questions related to job satisfaction and healthcare sustainability, the results show that there is a strong negative association between job satisfaction and healthcare sustainability. The coefficient for the variable measuring job satisfaction was negative (-0.28), indicating that as job satisfaction decreases, the belief in the role's contribution to healthcare sustainability increases. The ANOVA results revealed that the regression model was statistically significant (F=6.92, p=0.01), suggesting that the model sufficiently justifies the relationship between the two variables. These findings suggest that addressing job satisfaction may positively impact healthcare sustainability.

Regression Analysis regarding Pharmacists' Views on Healthcare Sustainability, Additional Services, and Compensation

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.229469545
R Square	0.052656272
Adjusted R Squar	0.04051084
Standard Error	0.842105358
Observations	80

ANOVA

	df	SS	MS	F	Significance F
Regression	1	3.074468085	3.074468	4.335479	0.040604643
Residual	78	55.31303191	0.709141		
Total	79	58.3875			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	2.630053191	0.277057374	9.492811	1.2E-14	2.078474331	3.181632052	2.078474331	3.181632052
X Variable 1	-0.180851064	0.086856536	-2.08218	0.040605	-0.353769144	-0.007932984	-0.353769144	-0.007932984

The above regression analysis measures the potential impact of compensation (moderate variable) to healthcare sustainability (dependent variable). Regression analysis was performed on the responses obtained from the survey questionnaire. The results showed a statistically significant negative relationship between compensation and healthcare sustainability (β = -

0.180, p = 0.041). The regression model accounted for 5.3% of the total variance in healthcare sustainability (R^2 = 0.053). The ANOVA table indicated that the regression model was significant (F $(1, 78)$ = 4.34, p = 0.041), indicating that compensation significantly predicted healthcare sustainability. The adjusted R^2 value of 0.041 indicates that 4.1% of the variance in healthcare sustainability can be explained by the independent variable of compensation. In summary, the findings suggest that lower levels of compensation are associated with lower levels of healthcare sustainability.

Chapter 5
Discussion of Findings

5.1 Overview of current research's findings and comparison with previous studies

The results of the current study suggested that a large proportion of pharmacists in Cyprus are eager on expanding their roles and taking on advanced responsibilities beyond the traditional dispensing of medications. The majority of pharmacists surveyed expressed a strong belief that they should implement additional services and practices that benefit both patients and the healthcare system as a whole. This indicates that pharmacists are willing to evolve their current job to meet the changing needs of healthcare delivery. It is crucial to acknowledge this sentiment and explore ways in which pharmacists can be integrated more effectively into the healthcare team. Such integration would lead to the development of more patient-centered care models and ultimately improve health outcomes. Overall, these findings provide important insights into the attitudes and opinions of pharmacists towards their evolving role within the healthcare system.

The findings of this study suggest that those who have studied abroad have a strong belief in the potential of independent prescribing and vaccinations. In addition, the study highlights a correlation between the responses regarding Medicines Use Review Service and Chronic Disease Management, and gender, current occupation, and age. Women aged 23-34 expressed a higher degree of agreement with the implementation of chronic disease management and

medicines use review, while men aged 35-49 who are pharmacy owners also showed agreement. These results provide valuable insights into the opinions and attitudes of different demographic groups towards healthcare services.

The results of this study suggest that the vast majority of respondents (approximately 7 out of 10) agreed with the implementation of all healthcare services and recognized their potential to assist in healthcare sustainability. However, the study also revealed lower levels of agreement regarding Medicines Use Review (MUR) services, indicating that current job working conditions may not allow pharmacists to effectively evaluate the level of treatment effectiveness. In addition, respondents expressed slightly lower levels of agreement regarding vaccinations and familiarity, indicating that additional training might be essential to improve pharmacists' competences regarding these services.

The results of this study suggest that pharmacists are generally dissatisfied with their current salary, indicating that they believe they should be reimbursed higher salaries for their work. Furthermore, the majority of pharmacists expressed that they would only be willing to perform additional services if they receive additional compensation, which highlights the importance of financial incentives in driving behavioural change. The study also found that pharmacists are not satisfied with their current role and do not believe that their current job significantly contributes to healthcare sustainability. This may explain the high level of agreement among pharmacists in their responses regarding the implementation of additional services. These findings underscore the significance of recognizing and addressing the factors that impact job satisfaction and the willingness to perform additional services. Evaluating compensation packages and restructuring job roles might assist to maximise job satisfaction, which might lead to improved service delivery and ultimately, better health and financial outcomes. Overall, the current's study's findings are consistent to previous studies that endeavour to assess the impact of the practises to both patient outcomes and healthcare systems and their comparison is presented as follows:

Opinions regarding prescribing by pharmacists

A study published by the International Journal of Pharmacy Practice found that pharmacists in the United Kingdom were supportive on prescribing responsibilities and in fact, pharmacists recruited to this research believe that this practise might optimise patient care (Deslandes et al., 2022). Similarly, a study conducted in Scotland, which included telephone interviews of nine pharmacist prescribers, eight doctors and eighteen patients. This study suggests that

pharmacists, doctors and patients agreed with the implementation of pharmacist supplementary prescribing, even though some doctors were uncertain regarding the competence of pharmacists to prescribe specific medications. Both of these studies utilised a qualitative method to collect data regarding the views of pharmacists for this practise, which allow participants to express their thoughts and suggestions, whereas, current research intended to collect data through quantitative methods. Furthermore, the study conducted in Scotland considered the opinions of patients and doctors, which might provide a more subjective perspective regarding the implementation of prescribing practise.

While these studies were conducted in countries other than Cyprus, their conclusions shows that there is a growing interest among pharmacists in taking on prescribing responsibilities. This is a crucial trend that might be taken into account, as the role of pharmacists continues to evolve in many healthcare systems around the world. Based on the results of the current study and the findings of these previous studies, it appears that there is a growing consensus among pharmacists that prescribing could be a valuable addition to their role in patient care. However, there are still many questions and challenges to be addressed before independent prescribing by pharmacists can be implemented in Cyprus or other countries. For example, it will be important to ensure that pharmacists have the necessary training and support to take on these responsibilities safely and effectively (Birt et al., 2022). Additionally, regulatory and legal frameworks will need to be developed to enable pharmacists to prescribe independently while also ensuring patient safety and quality of care.

Overall, the current study provides important insights into the attitudes and beliefs of pharmacists in Cyprus regarding prescribing and highlights the need for further research and development in this area. The comparison of these findings with previous studies might contribute to a growing body of evidence that might also support the development of policies and practices related to pharmacist prescribing around the world.

Prescribing related errors

Likewise, a study conducted in the United Kingdom found that pharmacists made significantly fewer prescribing errors (Turner et al., 2021). During this study, authors collected data from prescriptions derived by pharmacists and physicians working for the National Healthcare System. Another study that has been undertaken within sixteen hospitals of the UK, suggested pharmacist-led prescribing feedback has the potential to reduce prescribing errors and improve prescribing outcomes and patient safety (Lloyd et al., 2021).

Both studies evaluated a relatively large sample of prescriptions (5840 and 5191prescription items), which enhance the generalisability of their findings to the entire population of the UK. These findings suggest that pharmacists have the potential to play an important role in reducing prescribing errors and improving patient safety. By taking on prescribing responsibilities, pharmacists might assist to the identification and avoidance of prescribing-related errors before they reach the patient. However, it is important to consider that the implementation of pharmacist prescribing will not completely disappear prescribing errors. Communication breakdowns, incomplete patient information, and insufficient training or resources consist of some key aspects that might be considered, whilst they might contribute to mistakes in the prescribing process (Bannan et al., 2019). On the other hand, further investigation regarding the potential benefits of pharmacist prescribing is significant and should be undertaken.

Healthcare sustainability

One recent article published on the Encyclopaedia of Evidence in Pharmaceutical Public Health and Health Services Research in Pharmacy highlights the potential benefits of pharmacist prescribing, including improved patient outcomes and reduced healthcare costs (Al Hamarneh, 2023). The article notes that pharmacists are uniquely positioned to identify and address medication-related issues, and that their involvement in prescribing could lead to more effective and efficient healthcare delivery. Similarly, other studies have found that pharmacist prescribing can lead to improved medication management and reduced healthcare costs. For example, a study conducted in Ireland and published by the British Medical Journal revealed that pharmacists prescribing was associated with €1252 monthly savings, whilst they conducted a deprescribing process, which involved dose reductions and adjustments, as well as cease of unnecessary therapies (Ó Ciardha et al., 2022).

These findings suggest that pharmacist prescribing has the potential to enhance healthcare sustainability by improving patient outcomes and reducing healthcare costs. By taking on prescribing responsibilities, pharmacists can help to optimize medication use and reduce the risk of adverse drug events, which can lead to improved health outcomes and reduced healthcare spending. However, it is important to note that the implementation of pharmacist prescribing will require significant resources and infrastructure to support training, regulatory oversight, and collaborative practice models (Tsao et al., 2020). Additionally, the potential benefits of pharmacist prescribing may vary depending on the specific context and population being served. Nonetheless, the potential benefits of pharmacist prescribing are clear and should

be explored further. By comparing these findings with the literature on the subject, a growing understanding of the potential role of pharmacists in enhancing healthcare sustainability might be arisen. Moving forward, it will be important to continue to evaluate the impact of pharmacist prescribing on healthcare outcomes and to develop effective strategies for implementing this practice in a safe and effective manner.

Vaccinations

The first study, conducted in Malaysia, suggested that community pharmacists show eagerness to offer vaccination services to the public (Ang. et al 2022). The study also revealed that most respondents believe by offering this additional service, pharmacists might assist to maximise the overall vaccination coverage rate. Similarly, a study conducted in Lebanon investigated the eagerness of pharmacists to provide vaccination services as well (Youseff et al, 2021). The study found that the majority of pharmacists expressed support for providing vaccination services in pharmacies, with more than 70% of respondents indicating willingness to offer these services. Both studies highlight the significance of several contributing factors that might enhance the provision of vaccinations in pharmacies, such as training, reimbursement, and public awareness.

Overall, the results of the current and previous studies suggest that there is a growing acknowledgement of the potential role of pharmacists in expanding access to vaccination services. In addition, several other factors might be considered to encourage vaccinations in pharmacies, such as convenient location, professional staff, and public awareness are important in promoting the provision of vaccination services by pharmacists (Bach & Goad, 2015). By addressing the factors that might affect the delivery of these services, such as training, compensation, and public awareness, policymakers and healthcare professionals might collaborate to optimise access to essential healthcare services and ultimately improve health outcomes.

Vaccinations in Pharmacies and Prevalence of common infections

The perceptions collected from this study aligns with the results of a study conducted in the United States, which utilised an agent-based model of the US and a clinical and economics outcomes model to estimate the impact of different influenza epidemics and the impact of exploiting pharmacies in addition to traditional facilities found that the provision of influenza vaccinations in pharmacies led to a reduction in influenza cases(Czech et al., 2020). The study

found that in states with higher rates of pharmacist-provided influenza vaccinations, there were lower rates of influenza cases. The study concluded that pharmacist-provided vaccinations can play a significant role in reducing the incidence of influenza and optimising public health. Nevertheless, it might be considered that pharmacists in the United States might be already equipped with all the relevant resources and equipment to offer vaccinations and also, it might be infeasible to schedule a timely appointment with the doctor for annual jabs.

Similarly, the results of this study suggest that the provision of vaccination services in pharmacies could lead to a minimisation in the prevalence of certain common infections. This finding has important implications for healthcare legislators and professionals in designing and implementing effective vaccination programs. By maximising access to vaccination services through pharmacies, healthcare systems can improve public health outcomes and reduce the burden of infectious diseases. Nonetheless, the successful implementation of pharmacy-based vaccination services requires careful consideration of several factors, including the training and competence of pharmacists, the availability of appropriate vaccines, and the financial sustainability of such services (Jarab et al., 2022). Addressing these challenges will be critical in promoting the widespread adoption of pharmacy-based vaccination services and maximizing their potential impact on public health.

Chronic Disease Management

On the other hand, a systematic review, which collected data from various scientific sources, such as, MEDLINE, Cochrane Library, CINAHL suggested inconsistent findings with the current study (Green, N *et al*, 2016). In particular, this systematic review, found that pharmacist-led chronic disease management services showed no significant improvement for patients compared to usual care. The study assessed the impact of a pharmacist-led intervention on clinical outcomes, healthcare utilization, and medication adherence in individuals with chronic diseases. The study found that the intervention did not significantly optimise clinical outcomes or healthcare utilization compared to usual care.

The inconsistent conclusions between the current research and this systematic review may be derived due to several factors. For instance, differences in study design, patient population, and intervention characteristics. Despite of the insignificant improvement observed in the systematic review mentioned earlier, it is important to recognize that chronic disease management services provided by pharmacists in this study led to improved glycaemic control, reduced blood pressure and attainment of lipid levels. Therefore, this service may still have

potential benefits, such as improved patient education, medication management, and medication-related adherence. Overall, the results of this study provide important insights into the beliefs and attitudes of pharmacists towards chronic disease management services, and it is crucial to consider the inconsistent findings from other studies when designing and implementing chronic disease management services.

Chronic Disease Management and Quality of Life

A systematic review conducted by evaluating 19 research articles found that chronic disease management services led to improvements in patient outcomes, including quality of life (Ahmed *et. al*, 2022). In addition, this study found that clinical pharmacists can play a critical role in the delivery of chronic disease management services, particularly through collaboration with other healthcare providers. The study highlighted the potential benefits of pharmacist-led interventions, such as improved medication adherence, patient education, and self-management skills, in improving patient outcomes and quality of life. However, it is worth mentioning that this study evaluated the contribution of clinical pharmacists, therefore, the results might not be applicable to community pharmacists.

The findings of the current study are consistent with the potential benefits of pharmacist-led chronic disease management services identified in this review. By recognizing the potential role of pharmacists in the delivery of high-quality, patient-centred care for individuals with chronic diseases, patients might. However, it is important to acknowledge the potential challenges associated with the implementation of chronic disease management services, such as limited resources, lack of reimbursement, and competing demands on healthcare professionals (Puspitasari et al., 2015). Addressing these challenges will be critical in promoting the widespread adoption of chronic disease management services and maximizing their potential impact on patient outcomes.

Chronic Disease Management and Healthcare Sustainability

A study that took place in Canada evaluated the effects of chronic disease management services on healthcare system and its cost-effectiveness over a 10-year period (Lopez & Nuffer, 2021). The study found that the provision of chronic disease management services was correlated with considerable reductions in healthcare costs and improvements in patient outcomes, such as reduced hospitalizations and emergency department visits. The results of this study might be considered as reliable and representative, whilst authors attained to investigate the long-term

effects of this service, which in turn provides insightful points regarding the potential benefits of managing patients with chronic illnesses by pharmacists. The findings of the current study suggest that chronic disease management services can have a positive impact on healthcare sustainability, by promoting the delivery of high-quality, patient-centred care and reducing the burden of chronic diseases on the healthcare system. However, the successful implementation of chronic disease management services requires careful consideration of several factors, such as the availability of resources, the involvement of multidisciplinary healthcare teams, and the need for ongoing evaluation and monitoring of patient outcomes. Addressing these challenges will be critical in promoting the widespread adoption of chronic disease management services and maximizing their potential impact on healthcare sustainability.

The potential benefits of chronic disease management service are also supported by another study, which revealed that this practise is not widely implemented in low-medium income countries due to the lack of recognition of pharmacists as primary healthcare providers (Okoro & Nduaguba, 2021). This highlights the significance for health regulations amendments and education initiatives to increase the recognition and utilization of pharmacists in the delivery of chronic disease management services in these countries. Even though, these countries might constantly face economic recessions, investing in their national health might positively contribute to the reduction of their financial issues.

MUR Implementation

A cross-sectional multicentre study was conducted in Spain, including sixty-four community pharmacies evaluated the effectiveness of MUR services in improving patient outcomes and satisfaction with pharmacy services (García-Agua Soler et al., 2021). The study found that MUR services led to significant improvements in patient outcomes, such as increased medication adherence and reduced medication-related problems. In addition, the study found that patients were willing to pay for MUR services, indicating the potential financial sustainability of these services.

Similarly, a study performed in Slovenia evaluated the experiences of pharmacists in the implementation and provision of MUR services (Nabergoj, et al, 2018). The study found that pharmacists had positive experiences with the provision of MUR services and identified the significance of these services for their professional development. The study highlighted the potential benefits of MUR services for improving medication safety and reducing healthcare costs.

The findings of the current study, as well those compared above, provide significant insights into the potential benefits of MUR practise for patients and pharmacists. By promoting the implementation and provision of MUR services, patients might achieve higher levels of treatment effectiveness, as well as healthcare provision satisfaction and healthcare systems might avoid unnecessary expenditure that might be arisen by inappropriate medicines usage. However, it is important to address the potential challenges associated with the implementation of MUR services, such as the need for appropriate training and support for pharmacists, as well as changes in reimbursement policies and public awareness campaigns to increase demand for these services (Latif, 2018).

MUR and pharmacist judgement

A study performed in Iban, Nigeria found that while the quality of counselling provided by pharmacists was satisfactory, the quality of counselling received by pharmacy customers was unsatisfactory (Showande, et al, 2022). This study conducted by utilising a cross-sectional questionnaire-guided survey filled by 125 community pharmacists and 612 pharmacy customers. The conclusions drawn by this research may explain the lower percentages of agreement observed in the current study regarding certain questions related to the implementation of pharmacy services. Several factors might justify the consistent findings of the current the comparator study, such as, high volumes of customers waiting to be served and current regulations that disallow pharmacists to leverage their full potential and clinical judgement. In terms of the study conducted in Nigeria, reimbursement issues might contribute to the unsatisfactory consulting received by customers, whilst wages in these countries are relatively low.

Overall, the results of this study support the potential role of pharmacists in improving patient outcomes through their expertise in judging the effectiveness of treatment schemes. However, addressing the challenges associated with the quality of counselling provided by pharmacists and received by pharmacy customers is critical to promoting the successful implementation of MUR and increasing the potential benefits that might offer to both patients and healthcare system.

Job satisfaction

A cross-sectional study conducted in Cyprus in 2020, which endeavour to collect data regarding pharmacist's job satisfaction and perceived stress level (Stavrou et al., 2022). In total,

419 pharmacists participated. The findings of this study revealed that pharmacists in private sector showed higher levels of job satisfaction compared to those work in the public sector. However, stress level in the private sector was estimated to be higher. The results of this study do not align with the findings of the current study, where current job satisfaction was estimated to be relatively low. However, this study's sample size was approximately five times larger compared to the current study, which might influence the final outcomes. In addition, this study measures several other variables that might affect the respondents rate of satisfaction, such as, pay and promotion, whereas the current study solely focuses on the national healthcare system and how pharmacist's role might be progressed.

Another cross-sectional study conducted in Saud Arabia, where 325 pharmacists were recruited, which also attempt to investigate the level of satisfaction among community pharmacists (Al-Muallem & Al-Surimi, 2019). Even though the majority of respondents showed a high level of job satisfaction, they indicated intention to leave their jobs. This intention might be arisen by several factors, such as, age, income and current position. Similarly, this study entirely concentrated on job satisfaction and its findings might not be generalised to the pharmacists in Cyprus. Moreover, its sample size might not be applicable to the proportion of pharmacists in Saudi Arabia, hence, the results of this study might be further explored.

Compensation

No studies have been found to directly measure the level of satisfaction with their salary, however, it was identified that salary considerably affect their rate of job satisfaction. In particular, a study conducted in Ethiopia investigated possible reasons that might affect pharmacist job satisfaction. Among 65 out of 85 participants in this study revealed dissatisfied with their salary (Berassa et al., 2021). Several other factors are estimated to impact the results of this study, such as elevated workload, unpleasant working condition, as well as insufficient career prospects and opportunities. Another study that took place in Sudan, which had a similar approach with the current research, initially evaluated previous literature and then recruited local pharmacists to answer a questionnaire, which involved questions related with their job satisfaction (Tahir et al., 2019). Predictors of dissatisfaction seem to be the reduction of salaries, which led to aversion of pharmacists in different fields in the pharmaceutical industry. Even though both studies had different aims and objectives, their findings suggests that compensation is a great concern for most pharmacy workers, even in developed countries.

These conclusions underscore the necessity of evaluating the aspects related with pharmacists' compensation by healthcare regulators, whilst dissatisfaction with their income might lead to diminished productivity and inadequate healthcare provision.

5.2 Strengths

One of the primary strengths of this research is the combined use of literature review and pharmacists' opinions (Wasti et al., 2022). This approach allows for a more comprehensive understanding of the impact of pharmacists on healthcare sustainability, as it draws on both theoretical and practical perspectives. By synthesizing information from multiple sources, a thorough analysis of the subject matter is provided. Another strength is the focus on specific pharmacy services. By evaluating particular services, such as medication therapy management or immunization programs, where targeted recommendations for how pharmacists can contribute to healthcare sustainability are also provided. This specificity facilitates the applicability of this research's findings, as stakeholders might easily identify which services to prioritize. The evaluation of responses based on demographic variables is also a strength of this research (Jones et al., 2020). By identifying potential differences in opinions and attitudes towards implementing these services, recommendations to different groups of pharmacists might be tailored. This approach recognizes the importance of diversity within the pharmacy profession and highlights the need for targeted interventions. The inclusion of moderate variables such as job satisfaction and compensation satisfaction comprise another strength of this research. These variables can provide additional insights for understanding pharmacists' opinions and attitudes towards implementing these services. Comprehending the factors that influence pharmacists' decisions can help inform strategies for increasing their engagement and familiarity.

5.3 Limitations

Regardless of its strengths, this study also has some limitations that should be considered when interpreting the findings. One limitation is the relatively small sample size, which may limit the generalizability of your results to a broader population of pharmacists (Faber & Fonseca, 2014). Additionally, the opinions and experiences of pharmacists who choose to participate in the survey may not be representative of all pharmacists work for the national healthcare system. Another limitation is the lack of open-ended questions in the survey (Weller et al., 2018). This

may limit the depth of information that might be obtained from respondents and may prevent from fully capturing their attitudes and emotions. Additionally, there may be other pharmacy practices beyond the ones that have been assessed in this research, which could impact pharmacists' opinions and attitudes towards healthcare sustainability. The self-reported nature of the data is another limitation of this study (Althubaiti, 2016). Survey responses are based on self-reported data, which can be subject to bias and may not accurately reflect pharmacists' actual behaviour. Furthermore, the lack of a comparison group is another potential limitation (Paulus et al., 2013). Without a comparison group, it may be difficult to determine whether the opinions and attitudes of pharmacists in this study are unique or representative of pharmacists more broadly. This could limit the generalizability of these findings. Finally, there may be potential confounding variables that could impact pharmacists' opinions and attitudes towards implementing these services, such as cultural or organizational factors (Skelly et al., 2012). These factors were not captured in the survey and might have an impact on the interpretation of the final outcomes of this study.

Chapter 6
Conclusion

In conclusion, the present study highlights the potential feasibility of evolving the role of community pharmacists to avoid unnecessary expenditure by the national healthcare system. Previous literature reviews have demonstrated the applicability and cost-effectiveness of such practices, and the current survey's respondents predominantly agree with their implementation. Moreover, they support the positive impact of these practices on the sustainability of the national healthcare system. It is important to note that the respondents' attitudes and perceptions might have been influenced by certain demographic factors such as age, gender, current occupation, and working background. Therefore, these variables should be carefully considered when interpreting the results and developing suggestions for healthcare policymakers. Additionally, the formation of individuals' attitudes and expectations regarding their present and future roles is substantially impacted by their personal experiences and perceptions. Therefore, understanding how these factors shape role expectations is fundamental for providing targeted recommendations to relevant policymakers and stakeholders. This observational study thoroughly evaluated previous literature and obtained views and attitudes

from pharmacy professionals regarding specific practices. While the study provides possible hypotheses regarding the favourable impact of these services on patients and the national healthcare system, further research is required to support these findings. Future studies could conduct pharmacoeconomic analyses to assess the direct economic benefit of these practices and provide more vigorous evidence for their cost-effectiveness. Furthermore, studies could explore the effect of these practices on patient outcomes, including access to care, adherence to medications, and overall health outcomes. Overall, the importance of pharmacists' roles in supporting the sustainability of national healthcare systems has been widely recognized. However, additional research is necessary to fully understand the potential impact of evolving the role of community pharmacists and to inform effective policymaking in this field.

Chapter 7
Acknowledgments

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Appendices
A. Survey Questions

1. What's your gender?
   a. Male
   b. Female
   c. Prefer not to say
2. What is your age range?
   a. <23
   b. 23-34
   c. 35-49
   d. 50-64

e. 65>

3. What's your current occupation?

   a. Pharmacy Owner

   b. Pharmacy Employee

   c. Hospital Pharmacist

   d. Governmental Pharmacist

   e. Industrial Pharmacist

   f. Other

4. Which city are you currently working in?

   a. Nicosia

   b. Larnaca

   c. Limassol

   d. Paphos

   e. Famagusta

5. How many years of working experience do you have? Please select the appropriate range

   a. 0-4

   b. 5-9

   c. 10-19

   d. >20

6. What is your current employment status?

   a. Full-time

   b. Part-time

7. What's your highest level of education?

   a. Undergraduate degree

   b. Postgraduate degree

   c. Doctor of Philosophy (Phd)

8. What's your ethnicity?

   a. Cypriot

   b. Greek

   c. Other

9. Which is the country of your studies?

a. Cyprus

b. Greece

c. United Kingdom

d. Another European Country

e. Another country outside Europe

10. Have you practised pharmacy abroad?

a. Yes

b. No

11. On a scale 1-5, how respectable and appreciated do you believe is the job of pharmacist for the society?

1- Not respectable at all

2- Somewhat disrespectable

3- Neither respectable nor disrespected

4- Respectable

5- Completely respectable

12. On a scale 1-5, to what extent do you believe your pharmaceutical knowledge and clinical judgement are applied in your daily routine as a pharmacist?

1- Not at all

6- Very much

13. On a scale 1-5, what's your level of satisfaction regarding your current role as healthcare provider for the national healthcare system?

1- Very dissatisfied

2- Dissatisfied

3- Neither satisfied nor dissatisfied

4- Satisfied

5- Very satisfied

14. Do you believe that your current role contributes to the sustainability of the national healthcare system?

1. Yes

2. No

3. Uncertain

15. What's your level of satisfaction regarding your salary as a pharmacist?

a. Very dissatisfied

b. Dissatisfied

c. Neither satisfied nor dissatisfied

d. Satisfied

e. Very satisfied

16. Do you believe that the role of pharmacist should be evolved by providing more advanced services?

a. Yes

b. No

c. Uncertain

17. In some countries in Europe, pharmacists are authorized to diagnose certain conditions and prescribe certain medicines after completing a few months of specific training. Do you think that such a practice could also be applied in Cyprus?

a. Yes

b. No

c. Uncertain

18. Do you believe that a prescribing practice by pharmacists might reduce medical errors and contribute to the quality of patient treatment?

a. Completely disagree

b. Disagree

c. Neither agree nor disagree

d. Agree

e. Completely agree

19. Do you believe that whether certain drugs did not require a prescription and pharmacists were authorized as health professionals to recommend them to their patients, the health system would be more sustainable?

a. Completely disagree

b. Disagree

c. Neither agree nor disagree

d. Agree

e. Completely agree

20. Do you believe that some vaccinations might be undertaken in pharmacies?

a. Yes

b. No

c. Uncertain

21. If some vaccinations are established to be carried out in pharmacies in the future, do you believe that more patients will be vaccinated, and the incidence of serious infections will be significantly reduced?

a.   Completely disagree

b.   Disagree

c.   Neither agree nor disagree

d.   Agree

e.   Completely agree

23. On a scale 1-5, please show your current familiarity level with vaccinations in pharmacies.

1- Not familiar at all, 5- very familiar

22. In some countries inside and outside Europe, pharmacists offer chronic disease management services. Do you think that such a service could also be implemented in the private pharmacies of Cyprus?

a.   Completely disagree

b.   Disagree

c.   Neither agree nor disagree

d.   Agree

e.   Completely agree

23. Do you think that this service could contribute to a better quality of life for patients with chronic diseases?

a.   Completely disagree

b.   Disagree

c.   Neither agree nor disagree

d.   Agree

e.   Completely agree

24. Do you think that this service could contribute to the sustainability of the national healthcare system?

a.   Completely disagree

b.   Disagree

c.   Neither agree nor disagree

d.   Agree

e.   Completely agree

25. In some countries inside and outside Europe, pharmacists offer treatment evaluation services to patients with various chronic diseases (medication use review). Do you think such a service could be implemented in Cyprus?

a.   Completely disagree

b.   Disagree

c.   Neither agree nor disagree

d.   Agree

e.   Completely agree

26. Do you think that the pharmacist is the most suitable health professional, who could judge and evaluate whether a certain treatment is effective?

a.   Completely disagree

b.   Disagree

c.   Neither agree nor disagree

d.   Agree

e.   Completely agree

27. Regarding the aforementioned services, do you think that pharmacist should be additionally compensated by the national healthcare system, in order to provide them?

a. Yes

b. No

c. Uncertain

28. Do you think that by implementation the above services, pharmacist's profession might be developed and become more appreciated by patients?

a.   Completely disagree

b.   Disagree

c.   Neither agree nor disagree

d.   Agree

e.   Completely agree

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