PHARMACIST-LED DISCHARGE SERVICE

AT MATER DEI HOSPITAL

A thesis submitted in partial fulfilment

of the requirements for the award of

Doctorate in Pharmacy

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Dedicated to Mum, Dad and Julian who always provided me with love and support.

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ABSTRACT

The provision of a transitional care service enhances the safe transition of patients across various healthcare settings. The aim of this research was to develop and implement a novel, patient-focused, pharmacist delivered transitional care service at the Hospitality Lounge at Mater Dei Hospital. The methodology adopted consisted of a mixed methods approach with concurrent triangulation. Phase I involved an observational phase to familiarise with the activities carried out within the setting. Phase II was characterised by the provision of tailored pharmaceutical services for discharged patients flagged by healthcare professionals to the researcher pharmacist. Phase III piloted an innovative medication reconciliation-based service on a selected patient cohort. A qualitative study using semi-structured interviews gauging the perception of healthcare professionals on the provision of the medication reconciliation service was performed during Phase IV. Ten hours per week for a total of eight weeks of direct observational visits were performed using reflective journaling during Phase I. Three Plan-Do-Study-Act cycles were run to test the framework for the development of the pharmacist-led discharge service provided in Phase II. During 12 months of provision of the discharge service, the pharmacist was contacted 247 times and 679 patients were referred for pharmacist intervention. The pharmacist's interventions involved ensuring access to medication supply (n=642); tailored patient counselling (n=525) and validation of discharge information by providing a clinical check (n=672). The medication reconciliation service was tested for implementation using a prospective observational study in Phase III. A statistically significant increase in the time taken to obtain the best possible medication discharge list in the study group was observed when the Mann-Whitney test was applied (*p*-value <0.001). Qualitative data obtained through thematic analysis of interview data with 20

healthcare professionals revealed the barriers and challenges towards formal implementation of medication reconciliation services within the setting. The global findings of this research illustrated that interventions which facilitate seamless care provision ensure safe patient transitions. The successful implementation of the proposed discharge service has highlighted leadership roles pharmacists can take in ensuring holistic patient care.

Keywords: transitional care, discharge service, medication reconciliation, patient safety

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GLOSSARY

Adverse Drug Reaction	An unwanted or unexpected event occurring resulting from drug use
Best Possible Medication Discharge List	An exact list of medications taken by a patient at discharge from hospital
Coding	The process of gathering and assigning a descriptive label to qualitative data
Documented Intentional Discrepancy	A deliberate change to a medication which is clearly documented by a prescriber
Error	An action not completed as intended
Hospital Discharge	Conclusion of a period of hospitalisation
Medication Error	An error leading to inappropriate medication use
Medication Omission	Failure to prescribe or administer a required medication
Near Miss Event	A medication error that was detected and corrected before it reached a patient
Patient Harm	The unintended injury to a patient following medical care
Purposive Sampling	A non-random method of selection of participants depending on their baseline characteristics

Random Sampling	A method of statistical sampling whereby every subject has a probability of being selected
Reflective Journaling	The personal reflections of a researcher during observation of a phenomenon
Thematic Analysis	A categorizing strategy to analyse patterns for qualitative data
Theme	An interpretive concept describing qualitative data
Transcript	A word for word account of a verbal interaction
Undocumented Intentional Discrepancies	A deliberate choice to change a medication which is not clearly documented by a prescriber
Unintentional Discrepancies	An unintended change by a prescriber to the medication that the patient was taking

LIST OF ABBREVIATIONS

ADR	Adverse Drug Reaction
AHRQ	Agency for Healthcare Research and Quality
BPMDL	Best Possible Medication Discharge List
BPMH	Best Possible Medication History
CDSS	Clinical Decision Support System
CPOE	Computerised Physician Order Entry
DRP	Drug-related problems
EU	European Union
IHI	Institute for Healthcare Improvement
IT	Information Technology
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
PDSA	Plan-Do-Study Act
PINCER	Pharmacist-Led Information Technology Intervention for Medication Errors
SD	Standard Deviation
TCPs	Transitional Care Pharmacists
WHO	World Health Organisation

CHAPTER 1

INTRODUCTION

1.1 Background

Transitional care relies on the provision of a supportive process for the safe passage of patients along different levels of healthcare (Naylor et al., 2011). Care transition interventions involve supporting the reviewing of the information of patients, the arrangement of resources and the seamless delivery of the required level of care. This is made possible by multidisciplinary communication and shared accountability during all points of transition (Chough et al., 2009; Cawthon et al., 2012). Transitional care is still fraught with many distinct challenges leading to fragmentation of care (Ferner and Aronson, 2010; Mansukhani et al., 2015).

1.2 Fragmentation of Care

The discharge phase is a vulnerable transition for patients who are at risk of harm due to medication errors. This occurrence has been widely and persistently described to occur along the last two decades (Bates et al., 1998; Classen et al., 1997; Coleman and Boult, 2003; Forster et al., 2003; Coleman et al., 2005; Fertleman et al., 2005; Jencks et al., 2009; Unroe et al., 2010; Ali et al., 2017). Medication errors in the treatment of patients following discharge from hospital may lead to patient harm and possible hospital readmission (Forster et al., 2003; Coleman et al., 2005; Ali et al., 2017). A joint paper issued by the American Pharmacists Association and the American Society of Health System Pharmacists in 2013 estimated that approximately one fourth of all hospital discharged patients suffered an adverse drug reaction (ADR). At transitions of care, communication breakdown contributes to medication errors (White, 2006). The Institute

of Healthcare Improvement[1] (IHI) has directed that poor communication at clinical handoffs account for the largest majority of ADRs and medication errors experienced by patients. Documentation of medical information is usually undertaken by junior doctors who have limited experience in the medication-use processes. This may contribute to errors during transitions of care (Fertleman et al., 2005). The information available at hospital discharge is dependent on the information taken throughout the patient's stay at hospital. Errors introduced at any stage would in turn be propagated if not intercepted (Cornu et al., 2012; Hellstrom et al., 2012). Targeting preventable errors to reduce the rate of rehospitalization is a concept explored by many policy makers in order to reduce the ever-growing costs of healthcare (Bates et al., 1997; Classen et al., 1997; Jencks et al., 2009). Many interventions have been described to design transitional care programs to improve the patients' quality of care and diminish fragmentation (Bond et al., 2002; Naylor et al., 2011). Discharge planning has been one such strategy adopted by many institutions to ensure the provision of adequate patient support (Katikireddi and Cloud, 2008; Lin et al., 2012) during hospital discharge.

[1] Institute for Healthcare Improvement [Internet]. How-to-guide: prevent adverse drug events by implementing medicines reconciliation. [cited 14 October 2017]. Available from: http://www.ihi.org/topics/adesmedicationreconciliation/pages/default.aspx.

1.3 Discharge Planning

Discharge planning allows for a holistic, interdisciplinary approach towards ensuring continuity of care and reducing the occurrence of medication errors during transitions of care. This enables the tailoring of treatment plans which support the patient-centred approach in healthcare delivery (Lin et al., 2012). Discharge planning is also one key aspect to improve patient safety (Hesselink et al., 2014). Transitional care can be facilitated by reshaping the hospitalisation process to include pharmacists' interventions earlier in the medication use process, especially during discharge planning (Abdel-Qader et al., 2010). These interventions can avoid patient harm by preventing medication errors which consequently results in better interdisciplinary collaboration, cost-avoidance on the institution and a decrease in hospital readmissions (Sebaaly et al., 2015). The Agency for Healthcare Research and Quality[2] (AHRQ) advocates that medication reviews discussing the purpose of the prescribed medications with patients and relatives should be performed during the hospitalisation phase to engage patients and families in preparing the hospital discharge of a patient. In 2012, the American Society of Health System Pharmacists recommended pharmacists to take leadership positions in the development of medication reconciliation services with policies targeted towards implementing discharge planning and improving patient safety.

[2] Agency for Healthcare Research and Quality [Internet]. Strategy 4: Care transitions from hospital to home: IDEAL discharge planning [cited 14 October 2017]. Available from: https://www.ahrq.gov/professionals/systems/hospital/engagingfamilies/guide.html

1.4 Patient Safety and Transitional Care

The World Health Organisation (WHO) defines patient safety as "the prevention of errors and adverse effects to patients associated with healthcare"[3]. The healthcare environment should be designed in a manner to avoid unintended or unexpected harm at every transition. In the United Kingdom, the National Health Services (NHS) Improvement, was established to ensure that its operating bodies provide consistent care and advocates patient safety. This entity publishes on a quarterly basis accounts of voluntary incident reporting[4] and it has consistently described along the years that the third commonest type of incident relating to patient safety occurs during medication use.

The European Union (EU) Directive 2011/24/EU binds member states to "ensure that mechanisms for the protection of patients and for seeking remedies in the event of harm are in place for healthcare provided." Expanding clinical pharmacy services can be one such mechanism. The provision of clinical pharmacist services improves health outcomes of hospital in-patients, especially in roles concerning medication reconciliation and patient counselling (Kaboli et al., 2006). A medication history elicited by a pharmacist is more accurate when compared to those taken by other professionals during medication

[3] World Health Organisation [Internet]. Patient Safety Health Topics 2017 [cited 14 October 2017]. Available from: http://www.euro.who.int/en/health-topics/health-systems/patient-safety.

[4] National Health System Improvements. National quarterly data on patient safety incident reports: December 2016 [Internet]. NHS Choices; UK [cited 2018 May 27]. Available from: https://improvement.nhs.uk/resources/national-quarterly-data-patient-safety-incident-reports-march-2017/.

reconciliation (Nester and Hale, 2002; Strunk et al., 2008; Quennery et al., 2011), creating a niche for transitional care pharmacists (TCPs) to evolve.

The documentation of medications taken by patients while at hospital is often not exhaustive and lacks accuracy (Collins et al., 2004). When patients are discharged from hospital, a medicines list may not be made available. This results in communication deficits with follow-up providers and the occurrence of medication discrepancies (Ferner and Aronson, 2006; Mueller et al., 2012). The most commonly cited discrepancy in the study by Mueller et al., in 2012, was that of unintentional omissions. This accounted for 42% of all the discrepancies encountered. Another patient safety issue highlighted in the Mueller study was that a significant discrepancy existed between actual drug taking by the patient and the treatment prescribed by the clinician. Patient understanding may often not reflect the information being relayed by the discharging team (Kriplani et al., 2007) and patient interviewing during the discharge process is an essential step to gather insight on medication taking patterns of patients (Nester and Hale, 2002).

Studies have sought to quantify the occurrence of medication discrepancies causing moderate to serious patient harm and this has often been reported to occur in the ranges between 10-50% depending on: the research setting, the methodology adopted, and the definition used to classify a medication discrepancy (McMillan et al., 2006; Grimes et al., 2008; Wong et al., 2008). Medication discrepancies may also cause hospital readmissions and create ambiguity in medication prescribing (van Walraven et al., 2002; Grimes et al., 2008; Hume and Tomsik, 2014). Illegibility of documents can also compromise the effectiveness of clinical handovers, especially when patients are being reviewed by multiple specialities simultaneously (Scullard et al., 2007).

1.4.1 The Pharmacist as a Patient Safety Advocate

There is a niche for pharmacists providing a local pharmaceutical care service to discharged patients (Sebaaly et al., 2015). Patient safety can be safeguarded by providing an opportunity for the identification and correction of medication errors by pharmacists (Abdel-Qader et al., 2010). Pre-discharge interventions by pharmacists can ensure continuity of treatment (Hansen et al., 2011). Information sharing prevents unintentional treatment changes and every opportunity should be taken for multidisciplinary collaboration to be strengthened to facilitate transitions of care (White, 2006).

The availability of computerised physician order entry (CPOE) with embedded clinical decision support systems (CDSS) promote continuity of care interventions. Several studies have found that CPOE incorporating CDSS reduce medication errors, with one study citing a reduction of 55% of serious medication errors and a reduction of 84% of potential ADRs (Bates et al., 1998). The cluster randomised trial entitled "Pharmacist-Led Information Technology Intervention for Medication Errors" (PINCER) focused on methods to reduce medication errors when using computerised patient records. It recommended that organisations and healthcare professionals can reduce the occurrence of medication related patient harm by having information technology (IT) alongside dedicated pharmacist support (Avery et al., 2012). The provision of a discharge pharmacist service enhances the safe transition of patients across the various healthcare settings. A medication review service consisting of a series of pharmaceutical care interventions offers the opportunity to facilitate seamless care and discourages fragmentation of care (Boockvar and Lacorte, 2006; Kriplani et al., 2007). The National Institute for Health and Care Excellence (NICE) in 2015 recommended that discharge

information is critically analysed by the general physician and incorporated in the documentation of patients to ensure seamless care provision. The lack of documentation creates ambiguity in subsequent treatment provision and follow-up providers can find increased difficulty in ensuring continuity of care. The completion of medication reconciliation can offset the inefficient communication barriers between the different healthcare professionals partaking in patient care (Mueller et al., 2012).

1.5 Medication Reconciliation

Medication reconciliation is the expected standard of care of many institutions worldwide in view of the well-established benefits, including: the managing of patients' own medication; switching drug formulations to enhance medication compliance; improving quality of life and optimising medication therapy leading to cost savings (Stowasser et al., 2002; Bolas et al 2004; Karnon et al., 2009; Fernandes and Shojania, 2012; van Sluisveld et al., 2012). Patient safety is the incentive for performing medication reconciliation since the accurate recording of medication changes has a direct impact on patient care (Kwan et al., 2013; van Walraven et al., 2010; Sebaaly et al., 2015). Medication reconciliation is a process to attain the most factual medication list for a patient by comparing it to the most recently available information. This includes documentation of any discrepancies, changes, omissions, deletions and additions to the treatment of a patient. Figure 1.1 outlines the difference in the terminology of medication discrepancies used in this study.

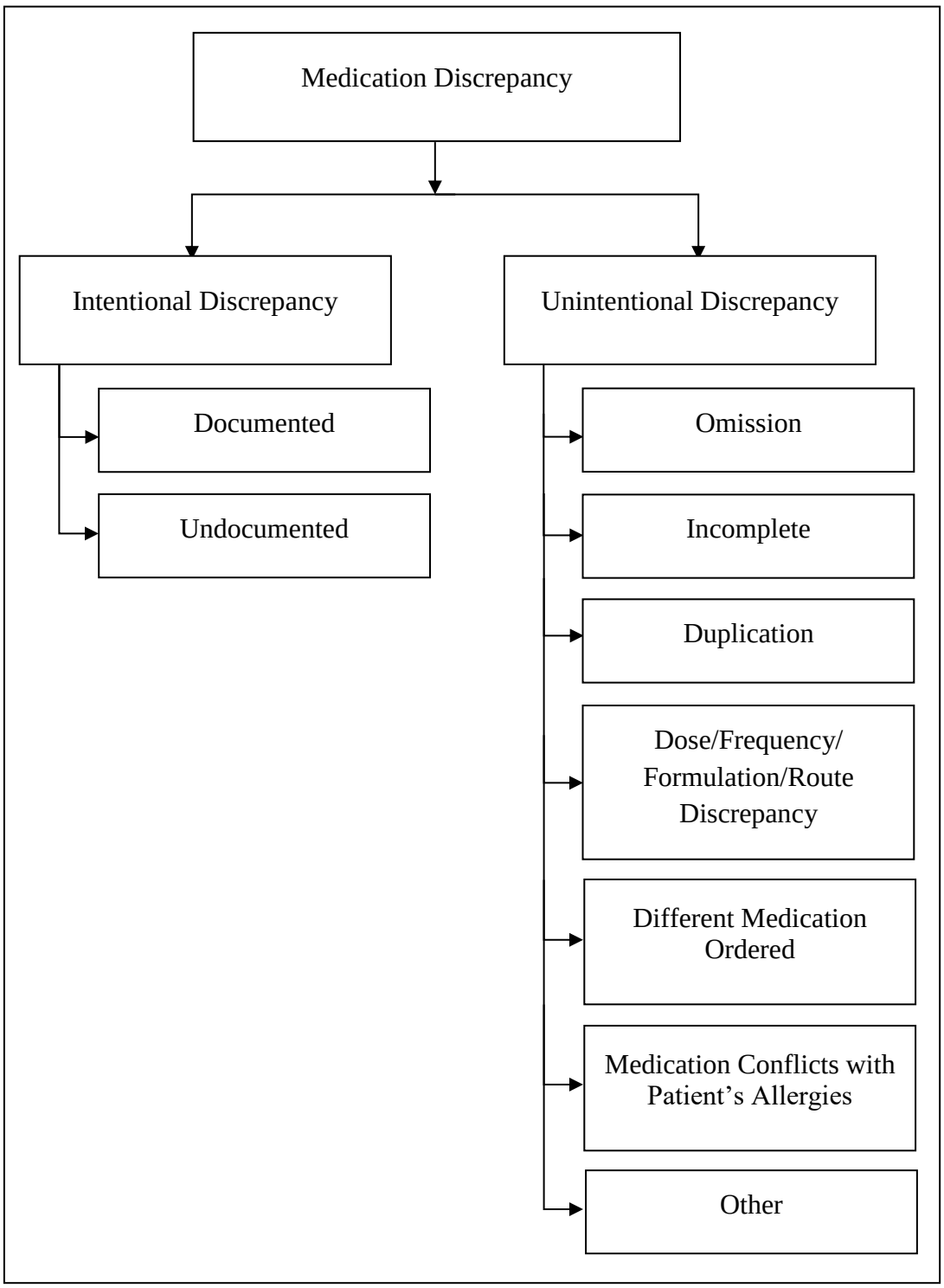

Figure 1.1 Classification of Medication Discrepancies

Many different medication discrepancies exist. The target of medication reconciliation is to clearly document any medication changes in a patient's treatment.

Medication reconciliation enables the provision of ongoing personalised pharmaceutical care whilst at the same time ensures correct handover of patient information across clinical handoffs (Stowasser et al., 2002; Bolas et al., 2004). The 2015 NICE guideline on Medicines Optimisation suggests that medication reconciliation carried out by a trained healthcare professional is a core activity of rational medication use. This guideline also makes recommendations on the timings when medication reconciliation should be performed; suggesting a 24-hour maximum limit at admission and when transitioning between hospital settings. Locally, it is not mandatory for healthcare professionals to perform medication reconciliation for hospital admissions and discharges. This can be a possible new service development to be taken up by clinical pharmacists.

Medication reconciliation is a pillar of many healthcare systems by promoting patient safety and reducing the financial burden of ADRs (Bates et al., 1997; Classen et al., 1997; Jencks et al., 2009; Karnon et al., 2009). Studies have highlighted that the presence of pharmacists in transitions of care programmes can reduce re-hospitalisations which results in a financial benefit to the institution (Forster et al., 2003; Coleman et al., 2005; Ali et al., 2017). An important key step in performing medication reconciliation at discharge is to share the discharge documents with the next in line healthcare professional, including the patient's community pharmacist (Hansen et al., 2011). Kwan et al., in 2013, suggested that the process of medication reconciliation in isolation does not reduce the use of hospital resources.

Pharmacist-led medication reconciliation programmes, either in isolation or in combination with other clinical activities such as patient counselling and medication reviews have been performed across various settings and at different points of care; including admission alone (Fertleman et al., 2005; Strunk et al., 2008; Mekonnen et al., 2016), discharge alone (Boockvar and Lacorte, 2006; Kriplani et al., 2007; Mekonnen et al., 2016) or across all transition points (Koehler et al., 2009; George et al., 2011).

The WHO High 5s Project[5] was piloted to address the occurrence of patient harm in healthcare and established medication reconciliation as a complex intervention ensuring accurate transfer of medication information. A systematic review of medication reconciliation on twenty-six controlled studies conducted by Mueller et al., in 2012 has identified that medication reconciliation interventions performed by pharmacists on high-risk patients of developing ADRs proved successful and thus helped in improving transfer of information across different settings. In a prospective study carried out by Bishop et al., in 2015 on internal medicine patients, it was demonstrated that the integration of pharmacist-led medication reconciliation service at discharge enabled medication discrepancies to be corrected and avoided preventable ADRs.

[5] World Health Organisation [Internet]. The High 5s Project – Standard Operating Protocol [cited 14 October 2017]. Available from: http://www.who.int/patientsafety/implementation/ solutions/high5s/h5s-sop.pdf.

1.6 Setting of the Research

The research study was carried out at the Hospitality Lounge at Mater Dei Hospital. Mater Dei Hospital is a 928-bed hospital and functions as the sole acute public general hospital in the healthcare system of Malta. It is a teaching hospital, with management encouraging further education and training of personnel by collaborating with various academic institutions.

The Hospitality Lounge at Mater Dei Hospital is a designated clinical area whereby an adult patient who has been discharged from a ward is transferred to wait for the necessary documentation and advice prior to leaving the hospital. An average of 15 patients per day are discharged through the Hospitality Lounge. The Hospitality Lounge opens from 8am to 4pm from Monday to Saturday. The resident staff complement consists of two nurses, two care workers and a clerk. The opening of the Hospitality Lounge in December 2016 represented an opportunity for the development of pharmacist-led services focusing on transitions of care. The operation of the service matched the opening hours of the dispensary at the Pharmacy Department of Mater Dei Hospital which run from 8am to 2pm from Monday to Friday and from 8am to 12.15pm on Saturdays. Medical officers of various medical and surgical firms attend the Hospitality Lounge to provide documentation and any necessary information to patients as part of the discharge process. Not all hospital discharged patients are transferred through this setting since medical exclusion criteria apply for transfer. Adult patients that are: oriented to place, person and time; patients mobilising with minimal assistance and patients requiring minimal help can be transferred through this setting.

The hospital discharge rates in the EU vary, with Malta in 2013[6] having a discharge rate of 14 per 100 inhabitants, classifying below the EU average of 16.5. Local policy-makers have recognised the need to prioritise the liberation of unnecessary occupied hospital beds, avoid unnecessary hospital admissions and facilitate shorter lengths of stay at hospital by enhancing community and out-patient services[7]. One initiative aimed at increasing bed availability within the institution was the setting up of the Hospital Lounge.

1.7 Rationale of the Research

Currently, the direct contact of a discharged patient with a pharmacist is often limited to the interaction at the hospital dispensary for medication collection. At Mater Dei Hospital, not all firms have clinical pharmacist coverage. The potential of local hospital pharmacists was underutilised in this aspect, as medication discrepancies may remain unidentified during dispensing. The research project was undertaken to expand the patient accessibility to pharmacist services by enabling direct patient contact and active participation as part of the multidisciplinary team during discharge. This observation was used as the driving force to devise a transitional care service to cater for a wider range of

[6] European Commission [Internet] Malta Health Care and Long-term Care Systems [cited 27 October 2017] Available from: htttp://ec.europa.eu/info/sites/info/files/file_import/joint-report_mt_en_2.pdf

[7] Ministry for Energy and Health – Parliamentary Secretary for Health [Internet] Report on the performance of the Maltese Health System [cited 05 January 2018] Available from: http://deputyprimeminister.gov.mt/en/dhir/Documents/HSPA%20-%20Malta%20Report%20-%20Final%20050416.pdf.

discharged patients by tailoring pharmacist interventions specifically at the transitional phase of hospital discharge.

An enhancement of pharmacist-provided services focusing on transitions of care is needed by allocating additional resources to its development (Bates et al., 1997; Classen et al., 1997; Jencks et al., 2009). The discharge planning process involving pharmacists to provide safe transitions of care has been limited locally by time constraints and costs involved. The creation of a tailored pharmacist-led service can serve as an incentive to enhance the pharmaceutical services provided locally to focus more on patient safety at transitions of care. The availability of a pharmacist at the transitional phase of discharge following implementation of the pharmacist-led service characterizes a new pivotal direction in the provision of pharmaceutical services as part of the interdisciplinary team to improve clinical outcome of patients.

1.8 Aims and Objectives

The aim of this research was to develop and implement a patient-centred pharmacist-led discharge service within the Hospitality Lounge at Mater Dei Hospital.

The objectives of the research were to:

i. Develop a tailored pharmaceutical service for patients during discharge from the acute general hospital
ii. Pilot a medication reconciliation-based service on a selected patient cohort at discharge
iii. Gauge healthcare professionals' perception on the provision of medication reconciliation-based services locally

CHAPTER 2

METHODOLOGY

2.1 Study Design

The methodology of the research consisted of a mixed methods approach using concurrent triangulation. Ethics approval (Appendix I) from the Faculty Research and Ethics Committee and the University Research and Ethics Committee was sought and granted (Protocol 40/2017 and Protocol 71/2017).

2.2 Phase I – Observation Phase

An observation phase was carried out at the Hospitality Lounge in order to identify whether there is a niche for pharmaceutical services to develop in this clinical setting. During this phase, the medical and hospital services provided at the Hospitality Lounge were still in their infancy and working procedures of the multi-disciplinary team were still evolving. A reflective journal method was employed and field notes were recorded. This led to the mapping of work-flow processes (Figure 2.1) which govern the Hospitality Lounge as a system and special attention was given to those processes which were pharmaceutical in nature. With this data, Plan-Do-Study-Act (PDSA) cycles were carried out using the IHI PDSA Model to devise a practical and efficient on-demand pharmacist service targeting patients discharged through the Hospitality Lounge. Prior to using this model, permission was granted to use this tool within the context of this research.

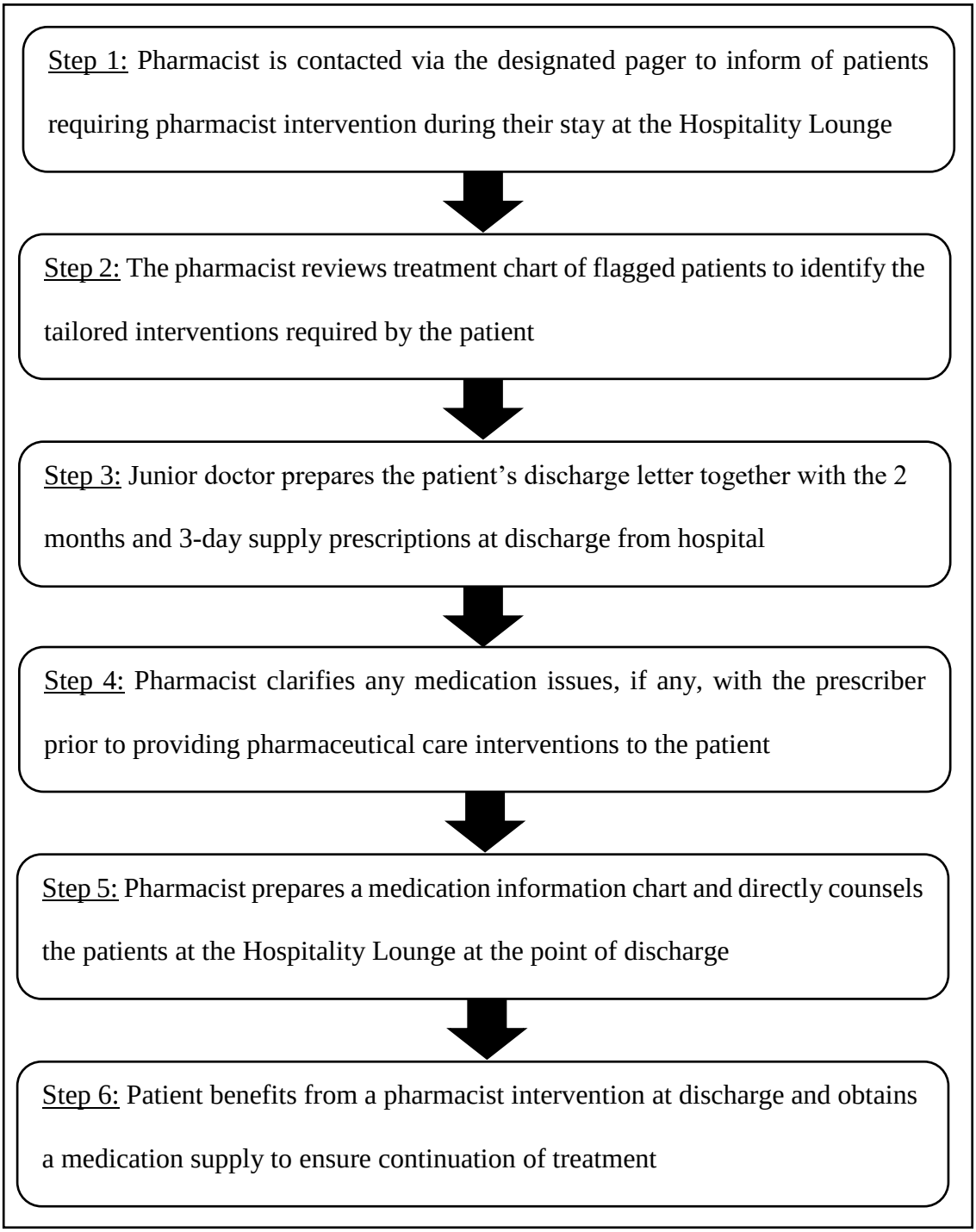

Figure 2.1 Work Flow Processes for Pharmaceutical Service Provision

Workflow processes for pharmaceutical service provision within the Hospitality Lounge were tested prior to implementation using Plan-Do-Study-Act cycles.

Once permission was granted, three PDSA cycles were run to address any limitations of the workflow processes to eradicate communication barriers between healthcare professionals and inaccessibility to essential IT support and other necessary resources on the premises. At the end of this phase, a final cycle which successfully tested the proposed pharmacist's interventions at the Hospitality Lounge was obtained. Considering the novelty of the service, there was a need to devise a standard operating procedure governing the processes occurring at the Hospitality Lounge.

The Pharmacy Department at Mater Dei Hospital was a key stakeholder with respect to the running of the service and the pharmacist researcher has partaken in meetings regarding procedures within the Hospitality Lounge and acted as a liaison for the Pharmacy Department at Mater Dei Hospital. A standard operating procedure was developed and reviewed by a multidisciplinary cohort, including the researcher pharmacist. This standardised operating procedure was adopted by Mater Dei Hospital as part of the quality system for the hospital and is now an official Mater Dei Hospital document. Its development served as a pivotal step in devising the pharmacist's role to tailor the pharmaceutical service for discharged patients within this setting.

2.3 Phase II – Pharmacist-Led Discharge Service

A novel clinical pharmacist service was implemented during this phase following the adoption of the standardised operating procedure. Discharged patients identified by healthcare professionals were reviewed by the researcher pharmacist within the Hospitality Lounge. There were no set criteria on when the pharmacist should be

contacted and patient flagging relied on individual healthcare professionals' perception of which patients needed further intervention. The interventions performed by the researcher consisted of: arrangements to ensure access to medication supply; direct patient counselling at discharge on all the medication treatment and validation of information at discharge by providing a clinical check. A need for the pharmacist to be involved in the operational tasks described in Table 2.1 as part of the multidisciplinary team was also evident for efficient patient centred-service provision within this setting.

Table 2.1 Pharmacist Interventions on the Operations of the Hospitality Lounge

Pharmacist Interventions	**Issues Addressed**
Assist in the upkeep of the emergency medication trolley drawer	Ensuring an up-to-date emergency medication trolley as per the Institution's Resuscitation Committee recommendations
Make recommendations for the procurement of a pharmaceutical-grade fridge	Ensuring good storing practices for medications stored within the Hospitality Lounge
Make recommendations and assist with correct medicine administration practices	Assist the nursing staff in the reconstitution and safe medication handling
Make recommendations for the availability of medicinal oxygen on site	Avoid interruption of oxygen provision during patient transfer and ensure that any oxygen driven nebuliser treatment can be safely administered
Make recommendations regarding resources and IT software availability	Persuade stakeholders regarding the importance of resources that facilitate pharmacist interventions at the Hospitality Lounge to be made available
Make recommendations about the development of a multidisciplinary standard operating procedure	Pharmacist taking leadership positions in the running of patient centred activities including recommendation on the medical criteria for safe patient transfer within this setting

The pharmacist contributed as a facilitator in operational processes and drafting of policies with key stakeholders for the smooth running of services within the research setting.

2.4 Phase III – Quantitative Study

The aim of this phase was to pilot an innovative and holistic bundled pharmaceutical service with embedded medication reconciliation. A prospective study was performed by using a control and study group design as described in Figure 2.2. Sample size calculations were performed and in order to achieve a 95% confidence level, a minimum of 192 patients per group were required. Patients in the study group and control group each consisted of 196 patients discharged through the Hospitality Lounge. Patients allocated in the study group received a pharmacist intervention consisting of medication reconciliation with tailored patient counselling about all the drug therapy and a medication profile review. Patients in the control group have received the usual standard of care consisting of routine discharge instructions during hospital discharge. For data collection purposes, the data collection sheet was filled in with clinical information available during discharge for patients allocated in the control group to generate the best possible medication discharge list (BPMDL).

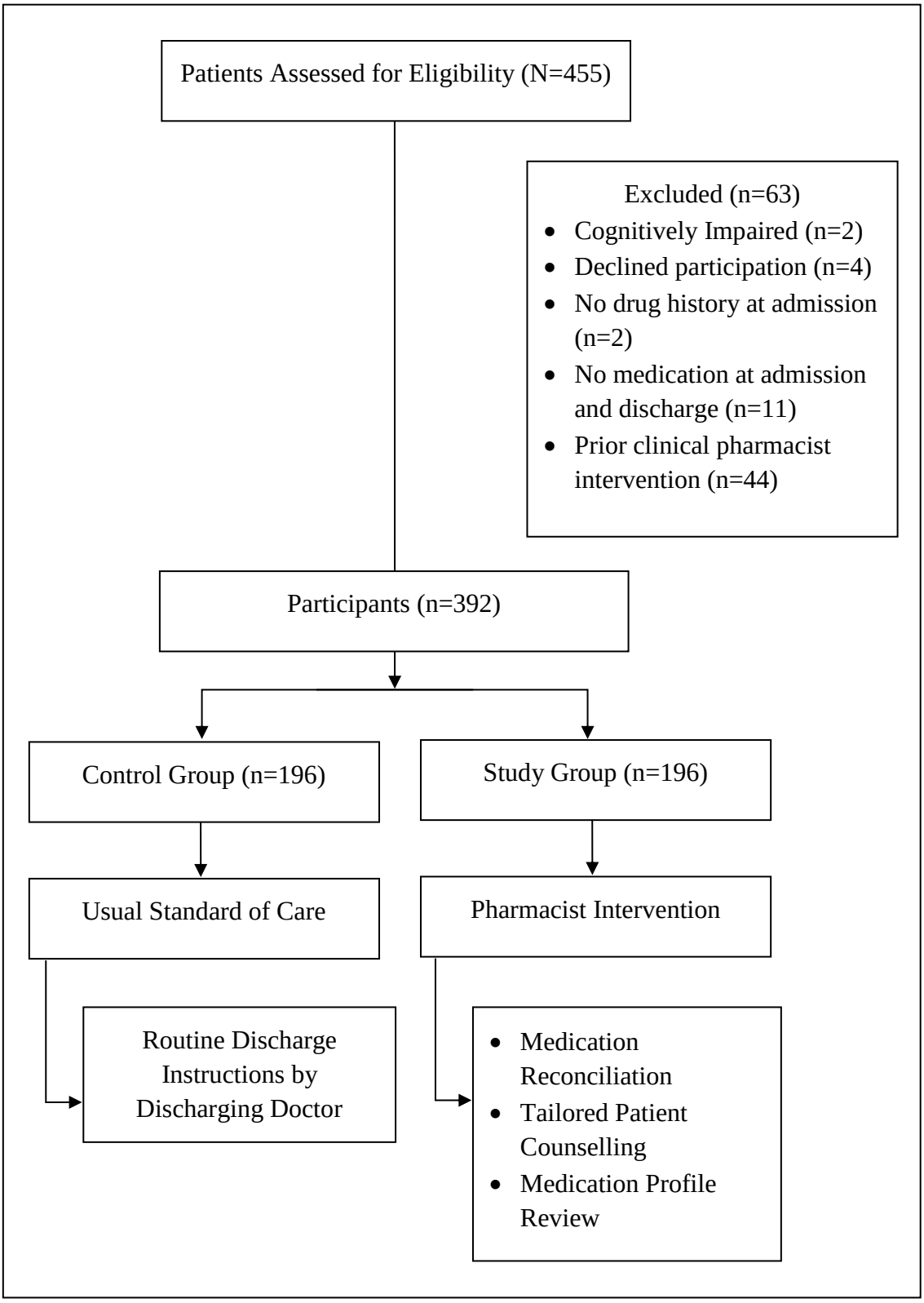

Figure 2.2 Methodology of Phase III

Patients in the study group benefited from a novel pharmacist intervention with medication reconciliation and tailored patient counselling being performed, together with the creation of a medication profile at discharge.

2.4.1 Development of the Data Collection Tool

A data collection tool (Appendix II) was designed in English following extensive literature review. The data collection tool consisted of nine sections which guided the researcher to perform medication reconciliation and patient interviewing in a step-wise and standardised manner. A Maltese version of the data collection tool (Appendix II) was created by back-translation of the English version by a native Maltese speaker to the Maltese version. The Maltese version was then translated by a different native Maltese speaker into the English version for comparison.

2.4.2 Psychometric Evaluation

Psychometric evaluation was carried out to assess applicability, practicality and reliability of the data collection tool. Drafts of the tool in both the English and Maltese language were reviewed initially by a panel of experts who were asked to analyse the research instrument critically to assess the ability of the tool to fulfil the aims of the study. Fourteen professionals were contacted to participate in the psychometric evaluation of the tool. The panel of experts were chosen according to their exposure to the discharge process. Individual first appointments were set up with the professionals who accepted to be part of the panel and reviewing of the questionnaires was performed. The panel of experts consisted of 8 pharmacists involved in the dispensing of prescriptions for discharged patients at the hospital dispensary, 3 hospital nurses and 3 medical doctors.

A second appointment was set to obtain feedback regarding the data collection tool. During this appointment, a discussion with the expert was performed to review any necessary amendments. After amending these documents, a professional interpreter was asked to check the language style, grammar and consistency between both versions of the tool.

2.4.3 Pilot Study

A pilot study was conducted to identify whether the methodology adopted for the study was feasible to conduct and to assess whether the chosen method reached the objectives of the research. Each group consisted of 20 patients to represent 10% of the study sample and the inclusion criteria of the study were followed (Table 2.2). Following the pilot study, the data collection sheet was slightly amended in layout to streamline and facilitate data collection and inputting.

2.4.4 Patient Selection Process

The maximum occupancy of the Hospitality Lounge is of 32 patients per day. A daily manual patient register is kept at the Hospitality Lounge and patients are listed according to their time of arrival. This patient register represented the sampling frame of Phase III of the study.

Table 2.2 Participant Selection Criteria for Inclusion of Patients within Phase III

	Inclusion Criteria	**Exclusion Criteria**
1	Able to understand Maltese or English	No drug history taken at admission
2	Age ≥ 18 years	Participated in pilot study
3	Taking one or more medication at admission or discharge	Received pharmacist intervention during discharge at ward level
4	Not cognitively impaired	

Following random sampling of the patients at the Hospitality Lounge, the participants were screened to ascertain that the inclusion criteria of the research were met.

An online generator of random numbers was used to select patients for recruitment which was run from 1 to 32. The generated number was then matched to the patient list. When the corresponding patient satisfied the inclusion criteria of the research, the patient was approached to participate. The same procedure was run again in instances when: 1) a patient was not found to be suitable for inclusion in the study; 2) the selected number did not match any patient; 3) the patient file was not transferred to the Hospitality Lounge or 4) the patient had left the hospital. A patient code was given to protect the confidentiality and anonymity of the respondents.

Once random selection took place, the patient was approached and a covering letter (Appendix III) stating: the aims of the study, confidentiality issues, anonymity issues and the contact details of the researcher was given. Once the patient agreed to partake in the research, a consent form (Appendix IV) was provided either in the English or Maltese language.

2.4.5 Statistical Analysis

All quantitative data collected was inputted into IBM® SPSS® Statistics 24 for analysis and statistical calculations were carried out and discussed with a statistician. The differences in continuous variables between the control and study groups were analysed using the Mann-Whitney test whilst categorical variables between the control and study groups were analysed using the Pearson's Chi-square test. A *p*-value less than the 0.05 level of significance was considered statistically significant. A general linear regression model was developed to identify predictors affecting the time taken to obtain the BPMDL in both the control and study group.

2.5 Phase IV – Qualitative Study

A qualitative research perspective was adopted to gather insight on the implementation of medication reconciliation on a wider scale within the local acute hospital. The data collection tool used in the study by Sanchez et al., in 2014, was selected for use since the research tool was used in large medical centres in the USA that struggle to implement medication reconciliation consistently. This similar contextual background was identified to be the appropriate starting point to engage in a qualitative study in the local setting to identify the perspectives of the healthcare professionals involved in the Hospitality Lounge. The emergent themes may contribute to improve the organisation's implementation model for service expansion. Medication reconciliation is not formally carried out and there is no procedure currently in place which stipulates roles and responsibilities of the multidisciplinary healthcare team. Permission for use of the semi-structured interview (Appendix II) in the study by Sanchez et al., 2014 was obtained for the use of the data collection tool within this study.

2.5.1 Feedback from Healthcare Professionals

Selection of interview participants relied on non-random purposive sampling by selecting healthcare professionals directly involved in the discharge process within the Hospitality Lounge. Multi-disciplinary input was sought by recruiting physicians and nurses who perform their duties within the Hospitality Lounge.

2.5.2 Data Collection

Twenty semi-structured interviews were carried out during December 2017 – January 2018 and voice recorded. The interviewed healthcare professionals consisted of 5 nurses and 15 doctors. The interviewees were briefed about the research and its aim via a covering letter (Appendix III). Informed consent was obtained by the interviewees by administering the consent form (Appendix IV) before data collection. Semi-structured interviews containing open ended questions enabled free exploration of the perspectives of the participants. The interviews were performed at a place and time convenient to each participant. Reflective journaling was performed by compiling personal notes when collecting and analysing the data. The qualitative research was conducted with a rigorous approach to ensure trustworthiness of the research.

2.5.3 Data Analysis

Thematic analysis was used to describe the participants' perspective to the responses generated when performing the semi-structured interview. Thematic analysis enabled the identification of themes that emerge to describe the phenomenon (Fereday and Muir-Cochrane, 2006). Transcription of the audio recording of the individual interviews was performed *ad verbatim*. Preliminary familiarisation with the data occurred by listening to the recordings and reading the interview transcripts. The participants' responses were pooled according to the question. Computer-assisted qualitative data analysis was performed using the software package NVivo 11[8]. Normalization Process Theory was the

[8] NVivo qualitative data analysis software; QSR International Pty Ltd. Version 11, 2014.

theoretical framework use for data interpretation. Broad-brush coding was applied to identify and classify all data for systematic comparison with the data set. As data analysis proceeded, codes were refined into themes and sub-themes. Nodes were created per question to access concepts and themes. Reflective journaling assisted in the identification of the emerging themes. Once each theme and sub-theme was identified, the supporting data was re-examined by hearing the audio files and reading the transcripts for final re-contextualisation to focus on the underlying meaning of each theme.

CHAPTER 3

RESULTS

3.1 Phase I – Observation Phase

During the observational phase, ten hours per week for a total of eight weeks of direct observational visits were carried out. Field notes enabled to identify four key areas for service development and implementation. The identified areas observed to require further interventions were: 1) continuity of treatment; 2) medication counselling; 3) storage of pharmaceutical items and 4) maintenance of emergency drugs.

Fragmentation of patient care was noted in the identified four key areas resulting from a lack of coordination in the delegation of responsibilities between the multidisciplinary team. These issues were addressed by running three PDSA cycles. During the first PDSA cycle, a process incorporating the usage of the pneumatic tube system to facilitate the transport of treatment was considered. Due to the absence of the pneumatic tube system at the Hospitality Lounge, the tube system of an adjacent ward was considered and tested for use as a supply depot to the study setting. This proved to be very time consuming and impractical for use. The second PDSA cycle was performed by installing and testing the use of hospital-based software within the setting to operate a requisition system similar to that available for wards. This was not found to be convenient in view of a small staff complement at the Hospitality Lounge. The third PDSA Cycle was performed by testing the concept of a pager system for flagging of patients and supply of stocks directly by the pharmacist to this setting. The work flow processes for this system were mapped and found to be suitable for performing the pharmacist-led discharge service and any additional activities related to pharmaceutical activities within the Hospitality Lounge. These mapped processes formed the basis for the pharmacist researcher to partake in the reviewing activities of the multidisciplinary standardised operating procedures governing

the discharge process through this specialised setting. The pharmacist operated services were integrated within the standard operating procedure following approval by the hospital management.

3.2 Phase II – Pharmacist-Led Discharge Service

The service was launched on the 20 December 2016 and over 12 months of service, there were 4515 discharged patients through the Hospitality Lounge. The pharmacist was contacted 247 times and 679 patients were flagged for further pharmacist intervention (Table 3.1). During the working hours of the dispensary, there were 3161 patients discharged through the research setting and approximately 21.5% (n=679) of patients benefitted from the discharge service devised in this study. The Hospitality Lounge has longer opening hours than the hospital dispensary. Around 30% (n=1354) of the total discharges (n=4515) occurred outside the working hours of the Pharmacy Department at Mater Dei Hospital. No tailored pharmacist service was provided for this setting outside the normal working hours of the Pharmacy Department at Mater Dei Hospital.

Table 3.1 Summary of the Number of Calls and Referrals to the Pharmacist

Month	*Number of Calls*	*Number of Patients*
20th – 31st Dec 16	1	1
Jan-17	1	1
Feb-17	14	37
Mar-17	28	75
Apr-17	25	76
May-17	25	69
Jun-17	25	56
Jul-17	26	72
Aug-17	22	57
Sep-17	23	62
Oct-17	22	65
Nov-17	17	51
Dec-17	18	57
Total	247	679

During the research period, the researcher pharmacist was paged 247 times and 679 patients were flagged for further intervention amounting to 21% of patients discharged during the working hours of the Pharmacy Department at Mater Dei Hospital.

3.2.1 Pharmacist Activities at the Hospitality Lounge

Figure 3.1 describes the pharmacist interventions performed for patients during 12 months of service operation. Tailored patient counselling was offered in the reviewing of indications of therapy, advising on potential side effects to medication and addressing any patient and relative concerns with any medication issues. Around 5.3% of patients (n=36) were identified to benefit from additional follow-up through existing community services and these were channelled to the appropriate specialised services available to ensure seamless care provision. This coordinator role of the pharmacist was greatly facilitated by being on site and at direct contact with the various healthcare professionals. Arrangements were done to provide an uninterrupted medication supply at discharge together with a supply of discharge medication as per the institution's discharge policy. For patients requiring a dose (n=452) while awaiting discharge instructions, clinical checks were performed to the treatment charts to identify and correct any DRPs. These interventions were not in isolation but combined as a bundle of pharmacist's interventions.

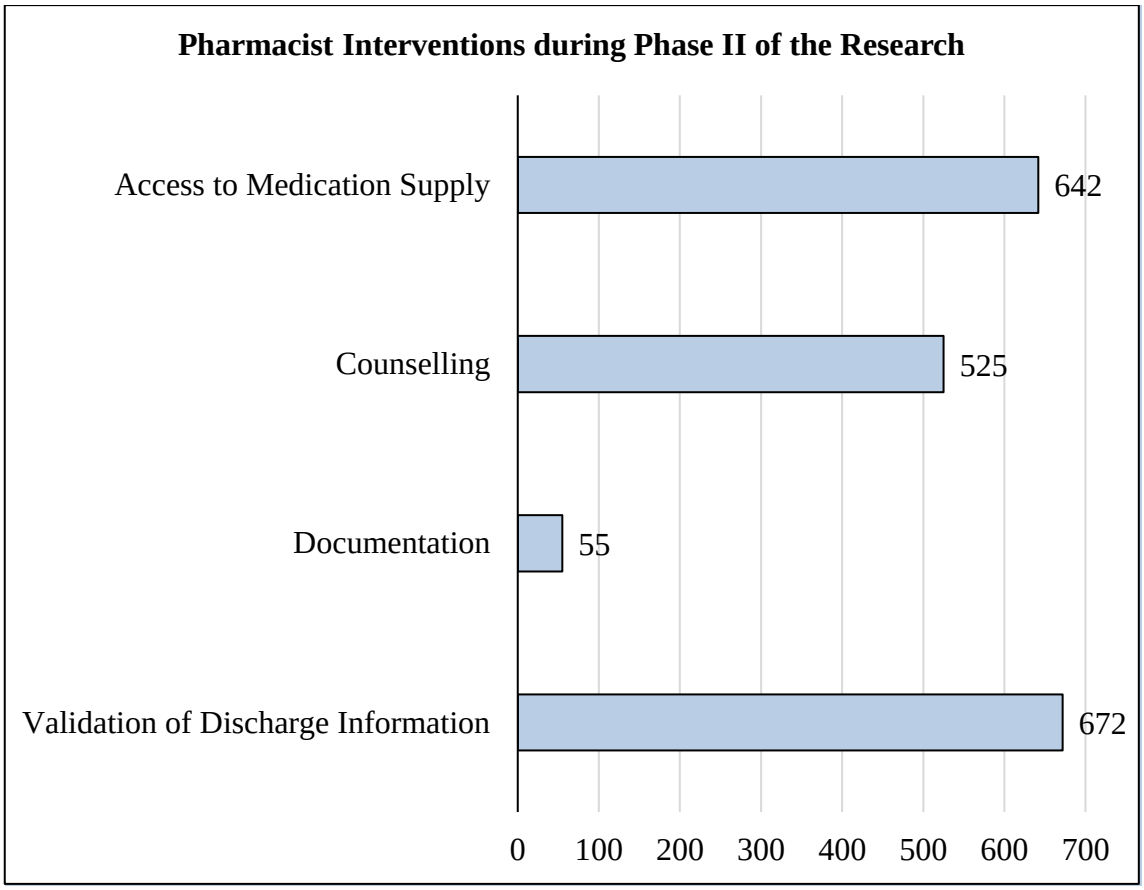

Figure 3.1 Interventions Performed by the Pharmacist during Phase II

Holistic operational and service-based pharmacist services were delivered as part of the discharge service within the Hospitality Lounge. Pharmacist provided service included logistical arrangements to ensure access to medication supply and validation of documentation and discharge information.

3.3 Phase III – Quantitative Study

The data collection tool (Appendix II) was subjected to psychometric evaluation to assess applicability, practicality, validity and reliability of the tool. The panel commented that the questionnaire was of adequate length. The suggestions given by the panel consisted of including the level of education of the patient and of increasing font size. The suggestions were incorporated in the amended version of the tool.

The pilot study was crucial for the pharmacist researcher to develop familiarity with the data collection tool and to ascertain that the research instrument was fit for its intended purpose. Logistical issues identified during this phase were mostly related to limited access to patient data and were resolved during the pilot study by co-ordinating with the staff of the Hospitality Lounge to retrieve the patient files earlier on for data collection. The randomisation of patients using an online generator of random numbers was tested and found to be suitable for patient selection.

3.3.1 Medication Reconciliation Service

During the medication reconciliation service, 455 patients were randomly screened for suitability for inclusion in the study. Four patients declined participation and 59 patients were excluded from participating since they did not meet the inclusion criteria. The minimum number of patients required through the sample size calculation was of 192 patients per control and study group. The groups consisted of 196 patients each. Mean patient characteristics are described in Table 3.2. The gender distribution of the groups was 40.8% female (n=80) for the control group, whilst the study group consisted of 42.3%

(n=83) females. The mean age of the patients in both the control and study group was of 55 years. Patients in the control group had a mean of 4.2 medications at admission and 4.7 at discharge. Patients in the study group had a mean of 4.3 medications at admission and 4.8 at discharge.

3.3.1.1 Statistical Analysis of Continuous Variables

Continuous variables are quantitative variables that have a numerical value. The Mann-Whitney test was used to compare mean scores between the two independent groups (control and study groups). This non-parametric test is an alternative to the independent samples t-test and was used because the distribution of the continuous variables was skewed and the data did not satisfy the normality assumptions.

The null hypothesis specifies that the means vary marginally between the groups and is accepted if the *p*-value exceeds the 0.05 level of significance. There was no statistically significant difference between the characteristics of the participants in both the study group and control group in the characteristics of mean age of patients, mean length of hospitalisation, mean number of medications at admission and mean number of medications at discharge when the Mann-Whitney test was applied.

The alternative hypothesis specifies that the means vary significantly between the two groups and is accepted if the *p*-value is less than the 0.05 criterion. There was a statistically significant difference in the time taken to obtain the BPMDL in the study group when the Mann-Whitney test was applied since a *p*-value less than the 0.05 level of significance was obtained.

Table 3.2 Comparison of Group Characteristics for Continuous Variables

Variable	Group	N	Mean	Std. Deviation	Std. Error Mean	*p*-value
Age (Years)	Control	196	54.84	21.748	1.553	0.970
	Study	196	54.65	21.961	1.569	
Length of Stay (Days)	Control	196	2.07	1.236	.088	0.770
	Study	196	2.06	1.317	.094	
Number of Medications at Admission	Control	196	4.24	2.282	0.163	0.899
	Study	196	4.28	2.527	0.180	
Number of Medications at Discharge	Control	196	4.68	2.310	0.165	0.907
	Study	196	4.80	2.721	0.194	
Time Taken for Compilation of the Best Possible Medication Discharge List (Minutes)	Control	196	8.16	3.260	0.233	<0.001
	Study	196	40.52	6.826	0.488	

A statistically significant difference was observed for the time taken to compile the best possible medication discharge list between the two independent groups since a *p*-value smaller than the 0.05 level of significance was obtained when the Mann-Whitney test was applied.

3.3.1.2 Statistical Analysis of Categorical Variables

Categorical variables are qualitative variables which do not have a definite number. The Pearson's Chi-square test was used to assess the association between two categorical variables. One of the variables was the independent group (control or study groups) while the other variable described patients' characteristics. The null hypothesis specifies that there is no association between the two categorical variables and is accepted if the *p-value* exceeds the 0.05 level of significance. The alternative hypothesis specifies that there is a significant association between the two categorical variables and is accepted if the *p*-value is less than the 0.05 level of significance.

Table 3.3 illustrates that there was a statistically significant difference in the documentation between groups in OTC medication use, patient's own medication and the use of supplements, vitamins and herbal products since the *p*-value was smaller than the 0.05 level of significance. There were 81.6% (n=160) of the patients in the control group and 56.1% (n=110) of patients in the study group that did not have any documented OTC medication use. The percentage difference of 31.1% (n=122) is significant since the *p*-value is less than the 0.05 level of significance. There were 90.3% (n=177) of the patients in the control group and 77.6% (n=152) of patients in the study group that did not have any documented patient's own medication. The percentage difference of 16.1% (n=63) is significant since the *p*-value is less than the 0.05 level of significance. There were 82.1% (n=161) of the patients in the control group and 67.9% (n=133) of patients in the study group did not have any documented OTC medication use. The percentage difference of 25% (n=98) is significant since the *p*-value is less than the 0.05 level of significance.

Table 3.3 Comparison of Group Characteristics for Categorical Variables

			Group		Total	X^2	Df	*p*-value
			Control	**Study**				
Documentation of OTC Medication Use	No	Count	160	110	270	10.667	1	<0.001
		Percentage	81.6%	56.1%	68.9%			
	Yes	Count	36	86	122			
		Percentage	18.4%	43.9%	31.1%			
Documentation of Patients' Own Medication	No	Count	177	152	329	11.820	1	0.001
		Percentage	90.3%	77.6%	83.9%			
	Yes	Count	19	44	63			
		Percentage	9.7%	22.4%	16.1%			
Documentation of Supplement, Vitamins and Herbal Product Use	No	Count	161	133	294	10.667	1	0.001
		Percentage	82.1%	67.9%	75.0%			
	Yes	Count	35	63	98			
		Percentage	17.9%	32.1%	25.0%			

Statistical significance was achieved when the Pearson's Chi Square test for categorical variables for the documentation of OTC medication use, documentation of patient's own medication and documentation for supplement, vitamins and herbal product use was applied. Documentation of this data is not always completed in the patient's notes.

3.3.1.3 General Linear Regression Model

The limitation of the Mann-Whitney test and the Pearson's Chi Square test is that they can only relate groups with one predictor. A single predictor can be rendered significant when analysed on its own and rendered unimportant in the presence of other predictors. The goal of the research was to analyse the joint impact of the predictors on the dependent variable (control and study group). An alternative model was used to relate the time taken to generate the BPMDL with predictors which were partly continuous and partly categorical. Since a number of these predictors were found to be significant in the model fit, a backward procedure was used to identify the Parsimonious model. This procedure eliminated the insignificant predictors one at a time. This model identified 3 significant predictors where patient interview was the best predictor of time taken since it had the longest F value (Table 3.4). This is followed by length of hospital stay and relative participation. This three-predictor model explains 92.9% of the total variation of the time taken ($R^2 = 0.929$).

Table 3.4 General Linear Regression Model

Source	Sum of Squares	Df	Mean Square	F	*p*-value
Corrected Model	105686.926	4	26421.732	1271.326	0.000
Intercept	3228.542	1	3228.542	155.347	0.000
Length of Hospital Stay	2684.311	1	2684.311	129.160	0.000
Patient Interview	55831.571	1	55831.571	2686.430	0.000
Relative Participation	903.236	1	903.236	43.461	0.000
Error	8042.949	387	20.783		
Total	345951.000	392			
Corrected Total	113729.875	391			
$R^2 = 0.929$					

The time taken to obtain the best possible medication discharge list was affected by three variables identified by a Parsimonious model: patient interview, length of hospital stay and relative participation. The best predictor for the time taken to generate the best possible medication discharge list was patient interview since it had the longest F value.

3.3.1.4 Proportion of Omissions of Reported Medications

The study group benefitted from bundled pharmaceutical interventions which enabled the capturing of medication omissions while creating the BPMDL with the involvement of patients and relatives. The capturing of omissions in the control groups were identifiable through the creation of the BPMDL from the patient's documentation. The two-tailed z-score test was used to test whether there is a difference in the proportion of omissions identified between the two independent groups. From a total of 941 medications at discharge for the study group, 23 omissions were identified. From a total of 917 medications at discharge for the control group, 7 omissions were identified. A two tailed z-score of ±2.874 and a *p*-value of 0.04 was obtained which is less than the 0.05 level of significance. This indicates that there is a statistically significant difference between the proportion of omissions identified between two groups illustrating that more medication discrepancies are captured with patient and relative involvement.

3.4 Phase IV – Qualitative Study: Healthcare Professionals' Perception

Twenty-two healthcare professionals directly involved in the discharge process at the Hospitality Lounge were asked to participate in the qualitative study. Two participants were unavailable to be interviewed during the study period. All 20 participants opted to use the English language during the semi-structured interview and the average length of the interview was of 32 minutes.

3.4.1 Participant Characteristics

Of the 20 interviewed participants, 5 were nursing staff having an average of 7 years of experience (SD=5.4) in the profession and 15 were doctors who had an average of 1.6 years of experience (SD=1.3) in the profession.

3.4.2 Emergent Themes

Thematic analysis yielded distinct themes. The first identified theme was an overall agreement amongst the interviewed healthcare professionals that medication reconciliation is an effective patient-centred intervention which promotes patient safety and continuation of care. The second and third theme identified operational and patient-level barriers that preclude service availability. The fourth theme identified the facilitators that can assist in service provision.

3.4.2.1 Benefits of Medication Reconciliation

There was a wide consensus (n=17) among interviewed healthcare professionals that medication reconciliation is an essential intervention which promotes patient safety, improves interdisciplinary communication and continuity of care. Despite the lack of a standardised procedure, some participants (n=11) described that activities to reduce medication discrepancies are informally performed. The lack of concerted efforts may result in fragmentation as there is no coordination and standardisation of practices rendering it a complex process to implement.

3.4.2.2 Operational Barriers

Interviewed participants (n=15) feel that since the hospital setting provides acute care, there is a high patient turn over which requires quick and fast decisions to be taken. Healthcare professionals with experience in non-acute settings (n=7) have described that time is a major limitation in performing medication reconciliation.

A consensus (n=16) was widely achieved that the workload would negatively be impacted should medication reconciliation services become mandatory. Healthcare professionals commented that their job is very demanding (n=18) and the addition of novel tasks should be accompanied by an increase in human resources.

The hospital setting has no ward pharmacist service available and clinical pharmacist coverage does not cover all consultant-led firms. This issue was widely described by interviewed participants (n=17) who would welcome the availability of pharmacists assisting in the medication-use process as part of their firm. Junior doctors have commented that their limited clinical experience renders the discharge process particularly challenging. Many participants (n=12) commented that multiple pharmacists are required within the Hospitality Lounge to cover patient discharges to cater for a large number of daily discharges occurring through this setting.

Healthcare professionals have widely agreed (n=14) that there is a lack of resources available that preclude medication reconciliation to be performed for each patient. Lack of computer stations and IT software was widely cited (n=13) as a physical barrier. There was wide consensus amongst interviewed participants (n=19) that doctors, nurses and

pharmacists who received training to perform medication reconciliation may perform this process. The ability to allocate a responsible professional to perform this process was welcomed by interviewed healthcare professionals (n=13). Interviewed participants have not pin-pointed which professional should perform this process.

Interviewed healthcare professionals (n=14) have agreed that patient factors affect the ability to elicit a medication history. Most patients have difficulty with remembering instructions, names of drugs and also frequency of medication use. Healthcare professionals (n=11) believe that poor patient understanding affects the ability to proceed with a discharge plan efficiently. Patients who actively participate in their management plan facilitate the discharge process. This contrasted to patients who are very eager to leave the hospital and pay little attention to the discharge instructions being provided.

Many patients require specialised support and follow-up care. The quick nature of the discharge process does not encourage patient involvement. This was pointed out by interviewed participants (n=12) to be especially relevant in patients with a low level of education or patients who have poor family support.

3.4.2.3 Facilitators to Implementation

Interviewed participants (n=12) believe that pharmacists have an important role in ensuring that medication reconciliation is achieved effectively. The availability of ward pharmacists to cover the hospitalisation process and clinical pharmacists to participate within the firm was strongly desirable (n=17). Healthcare professionals (n=12) with experience in different settings who had clinical pharmacist and ward pharmacist coverage were convinced that a positive improvement in the quality of patient care can be achieved by increasing pharmacists' involvement. A wide consensus was achieved with interviewed participant (n=12) that relatives prove more attentive than patients at times, either due to low education or due to patient being too distraught about his medical condition hindering registration of new information.

The availability of updated medication lists was scarce in the opinion of interviewed healthcare professionals (n=16). When patients present with medication lists, the transfer of information is more accurate and the identification of the medications taken by patients is rendered more comprehensive to all healthcare professionals. This was especially relevant for interviewed healthcare professionals (n=11) who commented about not having vast familiarity with medications not available within the government formulary list. The ability to have medication lists was strongly felt to be necessary and patients should be encouraged to provide updated medication lists when being reviewed by clinicians.

The ability to systematically record data and increase accessibility to medication information was an emergent theme by interviewed healthcare professionals (n=11). A

large amount of time is employed in the manual sorting and chasing of case notes. Some of the interviewed healthcare professionals (n=11) feel that computerised records are the way forward, especially since patients under the care of the firm are located in various different locations across hospitals. The ability to access patient records irrespective of the location of the patient has multifaceted advantages.

CHAPTER 4

DISCUSSION

4.1 Outcomes of the Study

An innovative clinical pharmacy service was devised and implemented within the Hospitality Lounge at Mater Dei Hospital during this research. The pharmacist researcher took up a leadership role during the discharge phase by providing customised pharmaceutical interventions on site when patients were receiving the discharge instructions from the discharging doctor.

A junior doctor is responsible to provide discharge instructions to the patients prior to leaving the acute general hospital. Once a patient is eligible for a medication supply on hospital discharge, the patient presents at the hospital dispensary for medication collection. The hospital policy on medication supply for discharged patients enables the collection of a 3-day supply of medicines available on the NHS for free. Patients having dose regimen changes and patients using medications not available on the government formulary list are not eligible for a medication supply at discharge. The interaction of a pharmacist with discharged patients is limited to the collection of a medication supply from the hospital dispensary. Not all relevant patient information is available to the pharmacist when patients present at the dispensary for a discharge medication collection. Medication reconciliation and medication use reviews are not performed by hospital pharmacists during discharge. This reduces the ability of a dispensing pharmacist to perform effective discharge counselling and identify pharmaceutical care issues. For the purpose of this study, the researcher embarked on a pivotal organisation change to re-design the discharge process to include a pharmacist at the transitional point of discharge. The presence on site of a pharmacist at the Hospitality Lounge enabled interaction with patients irrespective of whether a medication supply was needed and a personalised

service was provided to patients benefitting from the service. This research strategically tailored a novel and holistic service which was previously unavailable for discharged patients.

Direct observation on the daily operational functions of this specialised clinical setting was imperative to identify key areas for implementation. This led to the research methodology adopted in this study to revolve around devising and implementing a service which is practical and relevant to the study setting. The preliminary observation phase enabled the pharmacist researcher to identify avenues for development in operational aspects and in the provision of a tailored patient-centred transition of care service. Various opportunities for TCPs roles were evident within this setting. This observation may be extended to the whole hospital setting whereby all discharged patients would benefit from increased accessibility to pharmacists during, and not after, the discharge process as is the current practice. No prior pharmacist services existed within the Hospitality Lounge prior to this research. The initial interventions were directed towards the implementation of a common working operating system between the multidisciplinary team.

Not all discharged patients are transferred to the Hospitality Lounge to await discharge instructions. Following the opening of the Hospitality Lounge, the clinical criteria for patient transfer were not set. This posed a threat to patient safety as the Hospitality Lounge is not equipped like a hospital ward. A small staff complement renders it not a suitable setting to accept all clinically discharged patients. Another issue encountered was that there was no uniform procedure being followed by the discharging wards who requested patient transfers to the Hospitality Lounge. The pharmacist researcher identified groups of patients that would be suitable for transfer through the research

setting and transfer criteria were adopted following key stakeholder meetings. The establishment of workflow processes describing the devised service framework has led to the generation of a multidisciplinary standard operating procedure. This was a fundamental step in ensuring uniformity in service provision between the various healthcare professionals performing their duties within the Hospitality Lounge. When operational and logistical issues were addressed and standardised, the research focused on launching the pharmacist-led discharge service within this novel specialised setting.

Following the initial operational re-arrangements, the areas of patient centred service provision relied on making arrangements to ensure access to medication supply, provide tailored pharmacist interventions at discharge and ensure validation of discharge information. Targeting the transitional phase of discharge is complex and the need of patient counselling is very relevant as the patient transitions from the controlled environment of a ward setting and resumes medication taking independently (Karapinar-Carkit et al., 2009; Willoch et al., 2012). The availability of a pharmacist on site at the transition of discharge implemented in this study enabled the interception of DRPs, improved dialogue about discharge plans and addressed patient understanding of the discharge plan. Dispensing pharmacists based in the hospital pharmacy have limited opportunities to identify DRPs and to actively participate in the discharge process since patients present at the dispensary of Mater Dei Hospital to collect a three day supply once the formal discharge process is completed.

The availability of pharmacists' interventions at discharge and the provision of a medication chart were found to improve medication compliance and reduce hospital re-

admission (Duggan et al., 1998; Al-Rashed et al., 2002). The study of Duggan et al., in 1998, determined that for every 19 patients discharged with counselling and a medication chart, one unintentional discrepancy leading to an adverse effect is prevented. In this study, any medication issues encountered during service provision were resolved by contacting a doctor of the caring firm. This was greatly facilitated by the fact that the discharging doctors generate discharge letters within the research setting. This close proximity of a pharmacist with both the multidisciplinary team and the patients enabled any potential DRPs to be intercepted and be easily resolved at discharge. The feasibility of the process and patient convenience were streamlined by having the pharmacist on site. The confinement of hospital pharmacists within a dispensary reduces the ability to perform direct interaction with healthcare professionals and identify areas for improving patient care. The implemented model in this study has the potential to be applied in various other clinical setting by appointing TCPs within leadership roles during the discharge process.

Within this study, patients who benefitted from the pharmacist-led discharge service required a healthcare professional to summon a pharmacist for further intervention. There were no set criteria on when the pharmacist should be contacted and flagging of patients relied on the individual healthcare professionals' perception of which patients needed further intervention. The opening hours of the Hospitality Lounge are longer than the opening hours of the Pharmacy Department at Mater Dei Hospital. Pharmacist intervention was exclusively available for patients discharged through this setting during the working hours of the Pharmacy Department at Mater Dei Hospital. During the first two months of the study, flagging of patients by healthcare professionals was minimal as familiarity with pharmacist provided interventions was low and with time, there were a

constant daily number of patients flagged to the pharmacist for intervention. The services provided by the pharmacist at discharge were recognised by the healthcare professionals who welcomed the addition of a pharmacist providing patient centred care in the setting.

Prior to the inception of the discharge service within this research, patient accessibility to pharmacists was precluded for patients who were not eligible for a discharge medication supply. The real-life situation encountered during the patient counselling services performed with the inception of the pharmacist-led discharge service indicated that many patients require pharmacist intervention regardless of whether patients are entitled to a 3-day medication supply. This includes instances where new medications were prescribed at discharge, counselling of patients' own medication, dosage changes, and use of OTC products, herbal supplementations and vitamins.

TCPs identify opportunities to coordinate seamless care provision by acting as a liaison between the hospital team and follow-up providers. Acting as patient advocates, pharmacists can promote patient safety and ensure that the patients' care is more personalised and holistic. The adoption of transitions of care roles by a pharmacist can circumvent system vulnerabilities in established policies and increase accessibility to the pharmacist provided services. The research focused on the development of a TCP role during the patient discharge process.

The American Society of Health-System Pharmacists Foundation[9] has issued the Pharmacy Forecast 2016-2020 which is a strategic planning for pharmacy departments in hospital and health systems. A vision was set to entrust pharmacists with leadership roles in medication-use processes. This vision was used to drive the evolvement of this new service provision, intended to optimise medication therapy management during the discharge phase. Pharmacists are the ideal healthcare professional towards the integrated approach in healthcare delivery, acting as coordinators of care between different providers and ensuring that the patient is the central focus of care. The inauguration of the Hospitality Lounge at Mater Dei Hospital was an opportunity to further expand the transitional care services provided by the Pharmacy Department at Mater Dei Hospital and a TCP role was incepted through this research.

4.2 Medication Reconciliation Service at Hospital Discharge

Medication reconciliation is not formally implemented within Mater Dei Hospital and a pilot service assessing its feasibility was performed. Concurrent triangulation was used to identify the challenges precluding widespread medication reconciliation service provision. The identification of home medication use was possible through patient and carer interviewing in conjunction with collateral information from other sources such as dispensing records and entitlement documents.

[9] ASHP Foundation [Internet] Pharmacy Forecast 2016 [cited 3 March 2018]. Available from: http://www.ashpfoundation.org/PharmacyForecast2016

Many institutions worldwide perform a clarified secondary history known as a Best Possible Medication History (BPMH) after admission. Locally, this is not performed and this lack of clarification gives rise to the occurrence of medication discrepancies in the treatment taken by the patient. The BPMH is a comprehensive medication history that assesses medication lists, allows for patient or relative participation and improves communication with other healthcare professionals. It is widely documented that any errors introduced during admission may continue propagating (Cornu et al., 2012; Hellstrom et al., 2012). This phenomenon is likely to occur in the local context especially because the primary history is not clarified. The perpetuation of these errors can result in patient harm (Duguid, 2012). Medication issues were identified when comparing the patient's documentation. The rationale behind the reviewing of the case notes relied on the particular situation whereby the documentation of patients is handwritten and CDSSs are not available within the hospital setting.

The patient is the only constant factor in the provision of health. Similar to a study of Karapinar-Carkit et al., in 2009, more interventions were performed by the pharmacist when medication reconciliation was coupled with bundled pharmaceutical interventions, thereby confirming the importance of patient involvement in the process. For the control group, the BPMDL was obtained for data collection exclusively by relying on medical records. Documentation of medical records, fraught with lack of detail and illegibility, reduced the ability to capture pertinent information for patients in the control group. There was an added value of a pharmacist performing patient interviewing, especially since no admission BPMH is performed in the local setting.

Patient involvement is multi-faceted and includes the role of patients in providing a medication history, eliciting adherence and concordance and in carrying their own medication lists when visiting healthcare professionals (Boivin et al., 2014). The study group benefited from direct pharmacist intervention which was crucial to counsel patients on changes in medication doses and ensuring access to medication supply at discharge. Patient interviewing was an essential step to obtain information not available on patient documentation, and often carers or relatives had to be approached for further clarification. General linear regression identified patient interviewing as one of the 3 predictors contributing to the time taken to obtain the BPMDL. This time-consuming step was often cited by the interviewed healthcare professionals as a barrier towards implementing medication reconciliation services locally. This illustrates that dedicated time needs to be allocated to elicit patient histories.

The occurrence of the lack of patient understanding of the treatment prescribed may preclude the patient from following discharge instructions and execute the recommended discharge treatment plan (Schnipper et al., 2009). Patient involvement and education at discharge was possible by addressing the current lacunae in service provision at discharge by hospital pharmacists. The addition of the indication on medication lists was found to be associated with better medication adherence (Schiff et al., 2016). One main function performed was the creation of a medication chart which included the medication's indication. This chart assists patients and relatives on how the medication should be taken at home by acting as a visual aid. Accurate medication lists were generated once medication reconciliation was performed for patients.

The participation of a relative was an essential step to elicit a BPMH since documentation alone was insufficient to provide accurate medication information. A significant large number of patients are unable to list the medications prescribed during hospital discharge (Makaryus and Friedman, 2005). In the study group (n=196), it was observed that 19.4% (n=38) of patients were not able to list the medication they were taking. The input of a carer or family member was sought in these cases. Hospitalised patients are known to experience a temporary loss of functional ability and the involvement of relatives and carers is essential to ensure a smooth transition (Katikireddi and Cloud, 2008). Low health literacy of a patient is a known obstacle to medication reconciliation (Persell et al., 2007) and a vast majority of tailored pharmacist interventions were only possible through relative and carer interviewing.

The ability to interview patients and relatives determined medication use patterns which would not have been intercepted by simple examination of the patient file. Often, patients and relatives relied on the description of the medication such as dosage form, size, shape and colour. This can mislead and confuse the professional eliciting a medication history. Relative participation proved to be invaluable in eliciting a medication history albeit this was found through the general linear regression model to be one of the 3 factors significantly affecting the time taken to perform medication reconciliation.

Improving the documentation of care is one of the key evolving roles TCPs can embark on (Hudson et al., 2007). The Standards of Practice for Clinical Pharmacy developed by

the American College of Clinical Pharmacy[10] stipulate that direct documentation by pharmacists in the patient's files should be performed, including taking a medication history, listing active problems and the goals of therapy. These standards have yet to be transposed in the local setting and can only occur by increasing pharmacist accessibility. A medication discrepancy was intercepted when there was no information available in the patient file regarding the status of a medication. The reason why a medication was started stopped or dose-adjusted was often not listed. A documented discrepancy was identified when a change in the status of a medication was clearly enlisted in the patient file. To obtain this information, the patient's case notes were consulted. The documentation of the case notes was often very brief and no explanation was given. This may limit the generalisation of the findings as many medication issues would not be intercepted. Follow-up healthcare professionals would not be able to understand the rationale of a treatment change or identify any medication discrepancies occurred. It is the gold standard of care for treatment changes to be documented with the reasons clearly stated to avoid misunderstandings and patient confusion (Bookcvar and Lacorte, 2006). In this regard, there is a need to improve documentation practices and pharmacists may assist by implementing the Standards of Practice for Clinical Pharmacy as described above.

The allergies of the patients were widely documented in the patient's file. There were 1% (n=4) of patients who had the allergies not documented, corresponding to 2 cases in each group. The documentation of patient allergies was greatly facilitated with the treatment

[10] American College of Clinical Pharmacy [Internet] Standards of Practice for Clinical Pharmacy [cited 10 March 2018]. Available from: http:// www.accp.com/docs/positions/guidelines/standardsofpractice.pdf

chart having a mandatory allergy section. Patients who have allergies had the allergy listed and the type of reaction exhibited marked. Moreover, the case summary template used as a discharge letter has a mandatory adverse reaction field. There was no medication prescribed erroneously in view of an allergy in both the study and control group. In this aspect, the inclusion of mandatory data fields was beneficial for documentation purposes and ensured clinicians documented this data. This suggests that a template for manual documentation may assist in good documentation practices.

Many reports cite the occurrence of medication discrepancies at discharge to be in the range of 14.1-59.6% (Rainville et al., 1998; Stewart et al., 1998; Coleman et al., 2005; Walker et al., 2009). Twenty-three omissions were identified for the study group. In this group, the omission of inclusion of the use of medication on an as-needed basis and non-prescription medication accounted for the majority of the medication discrepancies observed. This finding is similar to other studies reporting that the most common discrepancies occurring at discharge include omission of medication (Coleman et al., 2005; Santell, 2006; Collins et al., 2004). The earlier intervention of a healthcare professionals to start the medication reconciliation process through a BPMH can allow for the interception of such medication issues earlier on in the patient's hospital stay and the inception of a more holistic transitions of care service.

An undocumented intentional discrepancy occurs when the prescriber does not clearly document a change but intentionally amends the medication of a patient. The intercepted pharmaceutical care issues were addressed with the prescriber prior to patient discharge. Such issues are not possible to intercept when patients present with prescriptions for a medication supply at the dispensary. This serves to reinforce that the potential of hospital

pharmacists is not maximised and direct patient contact along the hospitalisation stay is essential for targeted pharmaceutical interventions.

The occurrence of medication discrepancies may create confusion especially regarding the status of pre-admission medication at discharge. Cases encountered included the omission to document restarting of medications which were stopped prior to surgery and unclear dosage regimens. The developed discharge service identified these information lacunae. Such targeted interventions ensure seamless care provision and improve the patient's experience at the hospital.

Various studies have noted that despite the widespread occurrence of unintentional discrepancies, many may result in no clinical significance (Dean and Barber, 1999; Vira 2006; Bayley et al., 2007; Grimes et al., 2011; Kwan et al., 2013). Mekonnen et al., in 2016, described that the extent of the clinical significance of medication discrepancies may be limited due to the fact that most studies follow up patients for a short period after hospitalisation. The resolution of a medication discrepancy may become evident after the period of study has elapsed and the effectiveness of the intervention may be under-reported (Mekonnen et al., 2016). The lack of documentation was cited to prevent from an assessment of clinic significance of discrepancies (Kramer et al., 2007). The ability to perform a medication reconciliation service to prevent the occurrence of medication discrepancies is a patient safety initiative that enhances the safety cultures of institutions (Kruer et al., 2014) and should be implemented locally.

4.3 Healthcare Professionals' Perception

The gauging of the perception of healthcare professionals on the delivery of medication reconciliation services at discharge was performed in order to devise a model which can be successfully implemented in the local setting. The focus of this phase was to identify the barriers which preclude the availability of medication reconciliation and to determine which facilitators promote wider implementation from the perspective of the healthcare professionals who participate in the delivery of patient care during the discharge phase.

A complex intervention consists of a deliberate set of actions introduced in an organisation to modify existing practices. In the context of this research, medication reconciliation was seen as a complex healthcare intervention which required the input of various healthcare professionals, each with unique and differing perspectives. This complex intervention can be explained using the theoretical framework of Normalization Process Theory (May and Finch, 2009; McEvoy et al., 2014) which proposes that implementation of complex interventions is possible through integration into the work processes of individuals. This theoretical framework enabled to forecast emergent issues and identify facilitators which yielded promising avenues for improvement when thematic analysis was applied.

The findings of the qualitative study have valid implications for expanding transitions of care service delivery. Healthcare professionals recognised that medication reconciliation is an intervention which facilitates safe patient handling. An understanding of the barriers and facilitators affecting medication reconciliation services within the institution enables specialised roles such as medication reconciliation champions to be advocated to improve

upon the existing system and ameliorate service provision to patients when transitioning from the hospital setting.

Many barriers for implementing a medication reconciliation service have been identified in literature, including but not limited to insufficient staff training, cost of the manpower, unclear task responsibilities, incomplete documentation at clinical handoffs and lack of collaboration between professionals (Fernandes and Shojania, 2012; van Sluisveld et al., 2012). Lack of ownership of this process is a known barrier precluding medication reconciliation service delivery (Porcelli et al., 2010). The cost of healthcare professional time is one of the main factors which can limit the wider application of medication reconciliation within the desired settings (Fertleman et al., 2005; Strunk et al., 2008). The direct costings of a service need to consider multiple factors including IT applications, training and policy development (Stowasser et al., 2002; Bolas et al., 2004; Karnon et al., 2009). These in turn need to be balanced with cost-avoidance of medicine optimisation which decreases unnecessary medication use, reduces occurrence of adverse events and re-admissions (Karnon et al., 2009). These barriers, together with those identified by the interviewed healthcare professionals should be addressed to enable medication reconciliation services to be implemented locally.

It is an ongoing challenge faced by healthcare professionals to consistently perform medication reconciliation (Wong et al., 2008). Multiple challenges need to be acknowledged to allow for medication reconciliation to occur in the local setting. Commitment to change traditional roles and improve the communication between different healthcare professionals form the basis of medication reconciliation services (Sanchez et al., 2014). Changes in customs require acceptance by healthcare professionals

to ensure the sustainability of the enacted initiatives. These changes need the support of all stakeholders involved and this research has set the initial steps to encourage dialogue and test the feasibility of medication reconciliation services.

The qualitative part of this study to understand the perception of healthcare professionals, widely revealed that pharmacists are well identified as the key healthcare professional that can champion medication reconciliation services. Many studies have established the suitability of pharmacists in performing medication reconciliation services because of their extensive patient-centred training and clinical aptitude (Kaboli et al., 2006; Knez et al., 2011; Mueller et al., 2012; Steeb and Webster, 2012; Kwan et al., 2013). It can never be overemphasised that the role of the pharmacist performing medication reconciliation is not in isolation and relies on the combined efforts of the multidisciplinary team for successful implementation (Steeb and Wesbter, 2012; van Sluisveld et al., 2012; Sanchez et al., 2014).

Family or carer support was a prevalent emergent theme in the successful implementation of medication reconciliation services. This was further corroborated when performing the medication reconciliation study. The relative support was essential in 19.4% (n=38) of patients in the study group as these patients could not provide identification of the medication being taken on their own.

The availability of updated medication lists was identified as a facilitator to medication reconciliation services in the interviewed healthcare professional cohort following thematic analysis. The pharmacist developed medication lists as visual aids to perform discharge counselling in the incepted service. The availability of an updated and accurate

medication list when the patient presents to the hospital enables correct information transfer. Instilling the simple principle of updating medication lists in patients when interacting with healthcare professionals was found to enhance the accuracy of medication reconciliation (Varkey et al., 2007) and ensures the safe medication administration in patients (Gizzi et al., 2010).

The qualitative study revealed there was a wide consensus (n=14) regarding the effect of individual patient characteristics on discharge information provision. Many healthcare professionals commented how patients would be waiting to be discharged and in turn, do not give much attention to the discharge information being supplied. This phenomenon was described in the qualitative study by van Sluisveld et al., in 2012 analysing barriers to medication reconciliation at both admission and discharge. TCPs can provide a patient-oriented approach by performing tailored patient counselling while the patients await their documentation at the Hospitality Lounge, thereby ensuring that undue delays in patient discharges do not occur.

Electronic aids can improve workflow efficiency and enable effective communication, especially during clinical handoffs. The benefit of computerised resources includes that documentation is kept consistent and is easily accessible (Duguid, 2012). Healthcare professionals (n=11) described that information retrieval using the current paper-based system is a constant struggle. Introducing computerised patient records would revolutionise the system and enable updating of patient medication lists.

4.4 Limitations

Since the inauguration of the Hospitality Lounge in December 2016 and up to December 2017, there were 4515 patient discharges, of which 1354 occurred outside the working hours of the pharmacy. This corresponds to approximately 30% of patients who were automatically precluded from the availability of the pharmacist provided discharge service. The service is not accessible to all patients discharged through the Hospitality Lounge in view of different opening hours and this represents a major limitation to the service. A relieving system is needed for the service to be offered uninterruptedly by having more than one pharmacist trained to perform discharge pharmaceutical interventions. Such a limitation precludes access to patients to the devised service and requires an operational shift for the expansion of the service to cater for the patient flow through the Hospitality Lounge.

The pharmacist interventions were made available to approximately 21.5% (n=679) of patients discharged through the Hospitality Lounge during the working hours of the Pharmacy Department at Mater Dei Hospital (n=3161). Time constraints did not permit a wider patient coverage of the service. Despite recognising medication reconciliation to be an essential intervention to ensure safe transitions of care, wider implementation is widely hindered by time constraints. The estimated time employed to perform medication reconciliation in the study group ranged from 16 minutes up to 56 minutes. Time constraints precluded medication reconciliation to be widely offered to patients being reviewed by the pharmacist as part of the discharge service provided and were only offered through the pilot quantitative study. The pharmacist-led discharge service has the

potential to provide medication reconciliation services. Service expansion is possible especially if a formal TCP role is incepted.

The flagging of patients by healthcare professionals using a pager system was found to be the most appropriate and practical set-up for service delivery during the PDSA cycles. This system enabled the pharmacist researcher to provide the discharge service when available on the premise and covered the working hours of the pharmacy. The set-up of a pager system, despite being practical, hindered from wider access to discharge patients as it required a healthcare professional to summon the pharmacist for reviewing of a patient. There were no set selection criteria for when healthcare professionals should flag patients to the pharmacist. Patients requiring medications during their stay at the Hospitality Lounge were reviewed by the pharmacist researcher. This was used as an opportunity to provide pharmacist's interventions. Identification of patient cohorts that would benefit the most from the tailored pharmacist service provided at discharge should be performed so as to streamline service operation and prioritise service delivery to patient cohorts who would benefit the most from the service. Aspects of prioritisation may include patients at risk of developing ADRs such as patients with multiple co-morbidities, polypharmacy and the use of high risk medications.

A multidisciplinary approach for a standardised medication reconciliation system with continuous cross-checks is required for implementation of an effective patient-centred system. Audit cycles and feedback from all healthcare professionals together with continuing education on the occurrence of medication discrepancies are necessary for a successful medication reconciliation implementation system. An integrated medication

reconciliation system which is synchronised with the hospitalisation of a patient is essential to coordinate the efforts of all healthcare professionals together in delivering patient care. Collaboration with doctors and nurses should be the standard practice when performing medication reconciliation and patient counselling. In order to do this, a recruitment programme should be developed to identify champions to establish patient-centred services.

For research purposes, a randomised sampling strategy was selected for patient allocation to the pharmacist-led service with embedded medication reconciliation-bundled interventions. It would be more appropriate to identify patient cohorts who would benefit the most from medication reconciliation services. Performing medication reconciliation requires organisational support and dedicated personnel to advocate safe practice. This study provided an exploratory step for medication reconciliation implementation locally and more effort is required to explore the logistical infrastructure required to launch medication reconciliation services all throughout hospital.

Purposive sampling was employed for participant recruitment to ensure relevance to the service provided within the research setting. Purposive sampling is prone to researcher bias and generalisation of findings is limited (Etikan, 2016). This innate limitation bears importance in view that the Hospitality Lounge is a specialised clinical setting and the performed pharmacist-led discharge service was only available to patients discharged through this setting.

4.5 Recommendations for Service Provision

In view that the service is delivered by one pharmacist, it would be beneficial to prioritise the service to discharged patients at high risk for DRPs. Many studies described different risk factors such as female gender, the use of cardiovascular drugs and the number of medications prescribed to be contributing factors which increase the likelihood of a patient to experience a clinically significant medication discrepancy (Perren et al., 2009; Unroe et al., 2010; Stuijt et al., 2017). Patients with heart failure were found to benefit from pharmacists' intervention at discharge, particularly in the reduction of hospital re-admissions in the first 30 days after discharge (Jaarsma et al., 2005; Koshman et al., 2008; Eggink et al., 2010). Selection of these patient cohorts benefiting from prioritisation of the developed service may be fruitful for sparse resource allocation. Patient cohorts at high-risk for DRPs include patients with a hospitalisation within 30 days previous to the presentation, diagnosis of heart failure, myocardial infarction, diabetes mellitus, hypertension or chronic obstructive pulmonary disease and patients on warfarin, aspirin or clopidogrel (Buckley et al., 2013). This research did not delve into patient characteristics that increase the likelihood of a DRP to occur.

The education level and age of the patient, the number of medication at admission and the number of medications at discharge were not found to be predictors affecting the time taken to generate the BPMDL. The length of hospital stay, patient interviewing and relative participation were predictors affecting the time taken to obtain the BPMDL. These issues should be addressed by policy makers when allocating human resources to perform medication reconciliation.

The proposed research targeted the transitional phase of discharge only. During the service period, the functions of the Hospitality Lounge have expanded to accommodate the transfer of patients undergoing planned elective admissions onto medical or surgical wards and direct admissions from out-patient clinics. This represents a novel opportunity for transitions of care services to be developed to target the admission phase. Pharmacists can perform patient interviews and drug histories to elicit the BPMH early during the admission phase and intercept any medication issues during the hospitalisation process. This role extension is an opportunity which may pave the pathway for the introduction of multi-level medication reconciliation services locally and encourages the development of holistic transitions of care services.

Continuous training and education for healthcare professionals should be developed to champion transitional care services. Training and education are the basic foundation on which medication reconciliation services run and education should be provided on an ongoing basis to healthcare professionals. Various outlets may be used by using the hospital-wide dissemination methods or by targeting induction of professionals at the hospital. The training programme can enable more pharmacists to partake in transitional care services to upscale the proposed service model to various areas within the institution.

An advanced pharmacist intervention that can be considered in addition to the service provided is to assess patient adherence to therapy. Assessment of patient adherence can lead to a realistic assessment of the drug taking patterns of patients and determine any additional support the patient may require to ensure appropriate medication taking.

An emergent theme on the barriers precluding medication reconciliation to occur locally was the lack of IT resources available. The implementation of an integrated information system can improve medication safety during transitional care (Bayley et al., 2007). Many medication reconciliation-based studies employed electronic systems which have greatly facilitated the dissemination of medical information and resolved legibility problems which afflict handwritten documentation (Pilai et al., 2004; Kramer et al., 2007). The cluster randomised trial performed by Schnipper et al., in 2009, employed a computerized medication reconciliation tool to identify unintentional discrepancies between medications taken by patients before admission by comparing them to medications at discharge. Electronic tools have the disadvantage of requiring constant maintenance. Computerised records may lag in reporting medication changes and be incomplete if not updated real-time (Gleason et al., 2010). The investment in IT resources should cater for an efficient and integrated system which has an embedded medication reconciliation tool to obtain the full benefit of the technology.

The devised transitional model of care delivery focused on the provision of tailored pharmaceutical interventions. The service can be integrated to improve the community support service available for patients following transitions from the hospital. The community pharmacy setting is afflicted with a major limitation that hospital medical records are inaccessible to the community pharmacist (Mekonnen et al., 2016). These scenarios create a niche for fragmentation of care to occur and the strengthening of community services is required for seamless care provision (Karapinar-Carkit et al., 2009). The ability of the pharmacist to access medical records on site was a key advantage for the tailored patient service to be feasible. There is also an element of fragmentation

of information sharing about the changes in medication during hospitalisation with the primary care setting.

A longitudinal approach across transition settings consisting of comprehensive post-discharge interventions may be considered for implementation such as follow up phone calls (Jack et al., 2009; Koehler et al., 2009; Walker et al., 2010; Kriplani et al., 2012) ambulatory support (Persell et al., 2007; Sen et al., 2014), out-patient managed transition clinics (Sen et al., 2014) and home visits (Trang et al., 2015). This can further support patients to achieve the required health outcomes and evaluate actual drug taking patterns and the level of compliance to the recommended discharge treatment plans (Hansen et al., 2011).

Further studies should be directed to elucidate factors which affect the patient's ability to comply with discharge instructions. Unclear information and a fast discharge were found in this study to be areas for improvement in the local discharge process. Patients are often not in a position to describe the name of the medication, indications and side-effects. This occurrence was described by Makaryus and Friedman in 2005 to contribute to the patient being unaware of the discharge plan and an inability to reach the required health outcomes.

Locally, the enactment of discharge policies which are patient-oriented and which can promote patient accessibility to a pharmacist are required. Discharge planning consists of concerted actions which promote better use of acute hospital beds and result in positive healthcare outcomes (Katikireddi and Cloud, 2008). The lack of uniformity in medication

history taking and clarity of documentation affect the quality of discharge information and communication. The study has created the framework for a pharmacist to participate during the discharge process and established the will of healthcare professionals to have pharmacists as active participators in seamless care provision.

4.6 Recommendations for Further Research

The cost of having a pharmacist employed may be one of the main expenditures which can limit the availability of TCPs, especially when medication reconciliation services are provided (Fertleman et al., 2005; Strunk et al., 2008). Many studies differ in the reported time taken by a pharmacist to perform medication reconciliation activities, especially because of the variation in study design and complexity of interventions (Mekonnen et al., 2006). A cost-benefit analysis can study the phenomenon and assist in making recommendations to policy makers to invest in increasing direct patient care by pharmacists.

Future studies should be performed by using hospital readmissions as an outcome measure of the effectiveness of the pharmacist led-discharge service. The effect of pharmacist's intervention on healthcare utilisation, especially in the area of unplanned readmission and emergency department visits may add to the body of evidence that can convince local stakeholders and policymakers to invest in the organisational shift required to increase access to clinical pharmacy services in the local healthcare system.

Patient satisfaction is a humanistic outcome which indicates the quality of a service and can determine the sustainability of a healthcare service (Panvelkar et al., 2009). Patients who are satisfied with a health service provided have overall positive health behaviours (Schommer and Kucukarslan, 1997). Satisfaction with the proposed model of care should be sought as the continuous monitoring of patient satisfaction enables to identify areas of improvement (Panvelkar et al., 2009).

4.7 Conclusion

The transfer of patients between different care settings represent instances where fragmentation of care occurs. Within the local scenario, holistic patient assessment by pharmacists was limited by the discharge policy of the institution regarding medication supply. Healthcare professionals involved in the discharge process at hospital advocate a more patient-centred discharge policy which should be enacted to facilitate the process of continuity of care. Pharmacists working in direct contact with policymakers and healthcare professionals can re-design the discharge process to be more patient-oriented. One way this research sought to address this was through having the researcher pharmacist acting as a reference professional at the discharge site during transitions of care.

The framework for a pharmacist to be involved in the discharge process was established within this research. The pharmacist-operated services for discharged patients flagged by healthcare professionals from the Hospitality Lounge were approved by the senior executive team of the hospital. The pharmacist's input is included as part of the standard

operating procedures governing the multidisciplinary services provided in the Hospitality Lounge. This is a significant aspect in that pharmacist service provision within this setting can continue to run beyond this research.

A discharge medication reconciliation model was piloted which enabled the pharmacist to have an active role in care co-ordination. Medication reconciliation can only become the standard of care practice by encouraging multidisciplinary team building and re-designing the hospitalisation process to have medication histories verified shortly after admission and while transitioning to different care settings. The qualitative study revealed a consensus among healthcare professionals that the pharmacist is the ideal professional to obtain medication histories and perform patient interviewing. Identifying facilitators and barriers to medication reconciliation elucidated promising avenues for improvements for wider medication reconciliation service provision in the local hospital. This can serve as the impetus to develop a structured medication reconciliation policy for implementation within the local hospital.

In conclusion, an innovative patient-centred pharmaceutical service was developed for patients discharged through the Hospitality Lounge at Mater Dei Hospital. Targeted pharmacists' interventions allowed the identification of pharmaceutical care issues and promoted the multidisciplinary approach towards ensuring continuity of care. This patient-specific service targeted a previously unexplored niche by hospital pharmacists. The successful implementation of the devised discharge service highlighted the leadership roles pharmacists can embark on during transitional care. This research can be successfully adapted into various other clinical settings to facilitate seamless care provision.

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APPENDIX I

ETHICS APPROVAL

L-UNIVERSITA TA' MALTA
Msida – Malta
Skola Medika
Sptar Mater Dei

UNIVERSITY OF MALTA
Msida – Malta
Medical School
Mater Dei Hospital

Ref No: **40/2017**

Tuesday 10th October 2017

Ms. Denise Borg
Perla
Triq il-Mediterran
San Gwann
SGN1873

Dear Ms. Denise Borg,

Please refer to your application submitted to the Research Ethics Committee in connection with your research entitled:

Pharmacist-led discharge service at Mater Dei Hospital

The University Research Ethics Committee granted ethical approval for the above mentioned protocol,

Yours sincerely,

Dr. Mario Vassallo
Chairman
Research Ethics Committee

Email: umms@um.edu.mt **Web:** http://www.um.edu.mt/ms

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Ref No: **71/2017**

Wednesday 6th December 2017

Ms. Denise Borg
38, Peria
Triq il-Mediterran
San Gwann, SGN1873

Dear Ms. Denise Borg,

Please refer to your application submitted to the Research Ethics Committee in connection with your research entitled:

Pharmacist-led discharge service at Mater Dei Hospital — Healthcare Professional's Perception of the Service

The University Research Ethics Committee granted ethical approval for the above mentioned protocol.

Yours sincerely,

Dr. Mario Vassallo
Chairman
Research Ethics Committee

APPENDIX II

DATA COLLECTION TOOL

Data Collection Tool

Pharmacist-Led Discharge Service at Mater Dei Hospital

Section A: Demographics

Patient Name _____ **Patient Code** _____

Age _____ **Patient is** □ **Study Group**

Educational Level _____ **allocated in** □ **Control Group**

Section B: Medication History

Any known allergies □ **No known drug allergy**

□ **Known drug allergy** **Allergy details** _____

Past Medical History _____

_____

_____

_____

Does the patient use any non-prescription medication?

□ **Yes** **Medication details** _____

□ **No** _____

Does the patient have any of his own medication?

□ **Yes** **Medication details** _____

□ **No** _____

Does the patient use any herbal medication, vitamins or food supplements?

□ **Yes** **Medication details** _____

□ **No** _____

Section C: Data Sources for Patient Information

Which sources were used to obtain Patient Information?

- □ Admission Notes
- □ Discharge Letter
- □ MAS permits
- □ MDH Dispensary Records
- □ Patient File
- □ Patient Interview
- □ POYC Records
- □ Relative
- □ Schedule V
- □ Treatment Chart
- □ Other (please specify) _____

Section D: Medication at Admission

Was a medication history taken at admission?

- □ Yes — By who _____
- □ No

Medications Documented on Admission				
	Medication	*Dose*	*Route*	*Frequency*
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
Number of Medications Documented at Admission _____				

Section E: Medication Changes

Were there any documented medication changes?

□ **Yes** □ **No**

If yes:

Documented Medication Changes						
	Medication	***Dose***	***Route***	***Frequency***	***Rationale***	***Time***
1						
2						
3						
4						

Were there any undocumented medication changes?

□ **Yes** □ **No**

If yes:

Undocumented Medication Changes						
	Medication	***Dose***	***Route***	***Frequency***	***Comments***	***Time***
1						
2						
3						
4						

Were there any medications which were previously stopped and have to be restarted on discharge?

□ **Yes** □ **No**

If yes:

Medications to Restart on Discharge						
	Medication	***Dose***	***Route***	***Frequency***	***Rationale***	***Time***
1						
2						
3						
4						

Were there any new medications to start on discharge?

□ **Yes** □ **No**

If yes:

Medications to Start on Discharge						
	Medication	***Dose***	***Route***	***Frequency***	***Rationale***	***Period***
1						
2						
3						
4						

Section F: Medicines Reconciliation

Obtain the Best Possible Medication Discharge List (BPMDL) by completing the table overleaf:

Best Possible Medication Discharge List (BPMDL)		Dose	Route	Frequency	Unchanged	Changed	New	Discrepancy Type				Unintentional Discrepancy Comments						
								1. No Discrepancy				1. Omission of medication						
								2. Documented Intentional Discrepancy				2. Discharge summary incomplete or inaccurate						
								3. Undocumented Intentional Discrepancy				3. Duplication of treatment						
								4. Unintentional Discrepancy				4. Dose/Frequency/Formulation/Route discrepancy						
												5. Different medication ordered						
												6. Ordered medication conflicts with patient's allergies						
												7. Other						
								1	*2*	*3*	*4*	*1*	*2*	*3*	4	5	6	7
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
Discrepancy Total																		
Total Number of Medications at Discharge																		
Time Taken																		

Section G: Unintentional Discrepancies

- **Were there any unintentional discrepancies in the medications of the patient at discharge?**

  □ **Yes** □ **No**

- **Were there any medication errors as a result of this unintentional discrepancy?**

  □ **Yes** □ **No** □ **Not Applicable**

- **Were there any intentional discrepancies in the medications of the patient at discharge?**

  □ **Yes** □ **No**

If answering yes to any of the three questions in section F above, describe occurrence as follows:

Description	Outcome

- **Does the patient require any intervention following this actual or potential medication error?**

  □ **Yes** □ **No** □ **Not Applicable**

- **If yes, please describe:**

_____

_____

_____

Section H: Pharmaceutical Care Issues at Discharge

Pharmaceutical Care Issues to Consider

- **Untreated Indication**
- **Improper Medicine Selection**
- **Sub-therapeutic Dose**
- **Overdose**
- **Medicine Interaction**
- **Medication Use without Indication**
- **Duplication of Therapy**
- **Failure to Receive Medicine Appropriately**
- **Monitoring Need**
- **Counselling Need**
- **Seamless Care Need**
- **Adverse Drug Reaction**

	Care Issue	Proposed Action	Outcome
1			
2			
3			
4			

Section I: Discharge Information

- **Was the patient counselled by the pharmacist on discharge?**

□ **Yes** □ **No** □ **Not Applicable**

- **Was a medication chart prepared for the patient?**

□ **Yes** □ **No** □ **Not Applicable**

Proforma għall-Ġbir ta' Informazzjoni

Servizz Immexxi Minn Spiżjara Waqt il-Liċenzjar Mill-Isptar Mater Dei

Taqsima A: Informazzjoni Demografika

Isem _____ **Kodiċi** _____

Eta' _____ **Allokazzjoni** □ **Grupp ta' studju**

Livell ta' _____ □ **Grupp ta' kontroll**

Edukazzjoni

Taqsima B: Użu tal-Mediċina

Allerġiji □ **Ma hemm l-ebda allerġiji** **Iktar detall:**

□ **Hemm allerġija għal mediċina** _____

Storja Medika _____

_____

_____

Il-pazjent jagħmel użu minn mediċina li ma hemmx bżonn riċetta għaliha?

□ **Iva** **Iktar detall dwar il-mediċina:** _____

□ **Le** _____

Il-pazjent għandu miegħu mediċini tiegħu personali?

□ **Iva** **Iktar detall dwar il-mediċina:** _____

□ **Le** _____

Il-pazjent juża prodotti mediċinali erbali, vitamini jew supplimenti oħra?

□ **Iva** **Iktar detall dwar il-mediċina:** _____

□ **Le** _____

Taqsima C: Sorsi ta' Informazzjoni Dwar il-Pazjent

Liema sorsi kienu użati biex tinkiseb informazzjoni dwar il-pazjent?

- □ **Noti ta' meta l-pazjent jidħol l-isptar**
- □ **Noti ta' meta l-pazjent joħrog mill-isptar**
- □ **Permessi tal-mediċini**
- □ **Rekords ta' l-ispizerija ta' l-isptar**
- □ **Fajl tal-pazjent**
- □ **Intervista mal-pazjent**
- □ **Rekords ta' l-ispizerija ta' l-għażla tiegħek**
- □ **Intervista mal-persuna li tieħu ħsieb il-pazjent**
- □ **Kartuna Safra**
- □ **Ċart tat-trattament**
- □ **Oħra (jekk jogħġbok speċifika)** _____

Taqsima D: Mediċina Meħuda Meta l-Pazjent Iddaħħal L-Isptar

Kienu l-mediċini meħuda mill-pazjent meta ddaħħal l-isptar imnizzla fin-noti tal-pazjent?

- □ **Iva** **Minn min** _____
- □ **Le**

Mediċini Meħuda Meta l-Pazjent Iddaħħal L-Isptar				
	Mediċina	***Dosa***	***Kif tingħata***	***Frekwenza***
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
Numru ta' mediċini meħuda meta l-pazjent iddaħħal l-isptar _____				

Taqsima E: Tibdil fil-Mediċina

Kien hemm xi bidliet fil-mediċina li ġew iddokumentati?

□ **Iva** □ **Le**

Jekk iva:

Bidliet fil-Mediċina li Ġew Iddokumentati						
Mediċina		**Dosa**	**Kif tingħata**	**Frekwenza**	**Raġuni**	**Ħin**
1						
2						
3						
4						

Kien hemm xi bidliet fil-mediċina li ma ġewx iddokumentati?

□ **Iva** □ **Le**

Jekk iva:

Bidliet fil-Mediċina li Ma Ġewx Iddokumentati						
Mediċina		**Dosa**	**Kif tingħata**	**Frekwenza**	**Raġuni**	**Ħin**
1						
2						
3						
4						

Kien hemm xi mediċina li ġiet imwaqqfa meta l-pazjent kien l-isptar u li trid terġgħa tinbeda hekk kif il-pazjent ħiereġ mill-isptar?

□ **Iva** □ **Le**

Jekk iva:

Mediċina li Trid Terġgħa Tinbeda						
Mediċina		**Dosa**	**Kif tingħata**	**Frekwenza**	**Raġuni**	**Ħin**
1						
2						
3						
4						

Kien hemm mediċina li trid tinbeda meta l-pazjent ħiereġ mill-isptar?

□ **Iva** □ **Le**

Jekk iva:

Mediċina li Trid Tinbeda Meta l-Pazjent Ħiereġ mill-Isptar						
Mediċina		**Dosa**	**Kif tingħata**	**Frekwenza**	**Raġuni**	**Ħin**
1						
2						
3						
4						

Taqsima F: Rikonċiljazjoni tal-Mediċina

Imla l-Aħjar Lista Possibli tal-Mediċini meta l-pazjent ħiereġ mill-isptar:

L-Aħjar Lista Possibli tal-Mediċini meta l-pazjent ħiereġ mill-isptar		Dosa	Kif tingħata	Frekwenza	Mediċina Baqgħet L-istess	Mediċina Mbidla	Mediċina Ġdida	Tip ta' Diskrepanza				Tip ta' Diskrepanza Mhux Intenzjonata						
								1. L-ebda Diskerepanza				1. Ommissjoni tal-mediċina						
								2. Diskrepanza Intenzjonata				2. L-informazjoni fil-'*Case Summary*' mhix korreta						
								3. Diskrepanza Intenzjonata Mhux Iddokumentata				3. Duplikazzjoni tat-trattament						
								4. Diskrepanza Mhux Intenzjonata				4. Diskrepanza fid-doża/frekwenza/kif tingħata l-mediċina						
												5. Mediċina ordnata hi differenti minn dik suppost						
												6. Mediċina ordnata ma taqbilx mal-allerġiji tal-pazjent						
												7. Oħra						
								1	*2*	*3*	*4*	*1*	*2*	*3*	4	5	6	7
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
Total ta' Diskrepanzi																		
Numru Totali Ta' Medicina Meta L-Pazjent Ħiereġ Mill-Isptar																		
Ħin																		

Taqsima G: Diskrepanzi Mhux Intenzjonati

- **Kien hemm discrepanzi mhux intenzjonati fil-mediċina hekk kif il-pazjent kien ħiereġ mill-isptar?**

  □ **Iva** □ **Le**

- **Kien hemm xi żbalji fil-mediċina bħala konsegwenza ta' din id-diskrepanza mhux intenzjonata?**

  □ **Iva** □ **Le** □ **Mhux Applikabbli**

- **Kien hemm discrepanzi intenzjonati fil-mediċina hekk kif il-pazjent kien ħiereġ mill-isptar?**

  □ **Iva** □ **Le**

Jekk twieġeb iva għal waħda mit-tliet mistoqsijiet f'Taqsima F hawn fuq, jekk jogħġbok iddeskrivi l-okkorrenza:

Deskrizzjoni	Riżultat

- **Il-pazjent jeħtieġ intervent wara li setgħa kien hemm żball attwali jew potenzjali fil-medikazzjoni?**

  □ **Iva** □ **Le** □ **Mhux Applikabbli**

- **Jekk iva, jekk jogħġbok speċifika:**

_____

_____

_____

Taqsima H: Kwistjonijiet Farmaċewtiċi

Tipi ta' Kwistjonijiet Farmaċewtiċi

- **Indikazzjoni mhux itrattata**
- **Doża eċċessiva**
- **Doża baxxa**
- **Selezjoni mhux ottimali tal- mediċina**
- **Interazzjoni bejn l-mediċini**
- **Użu tal-mediċina mingħajr bżonn**
- **Duplikazzjoni tat-terapija**
- **Nuqqas li l-pazjent jirċievi l-mediċina kif suppost**
- **Bżonn ta' monitoraġġ**
- **Bżonn ta' iktar informazzjoni**
- **Bżonn ta 'Seamless Care'**
- **Reazzjoni Avversa għal mediċina**

	Kwistjoni	Azzjoni Proposta	Riżultat
1			
2			
3			
4			
5			

Taqsima I: Informazzjoni Waqt li l-Pazjent Ħiereġ mill-Isptar

- **Kien il-pazjent mogħti informazzjoni minn spizjar hekk kif kien ħiereġ mill-isptar?**

  □ **Iva** □ **Le** □ **Mhux Applikabbli**

- **Kien il-pazjent mogħti ċart ta kif għandu jieħu l-mediċini hekk kif kien ħiereġ mill-isptar?**

  □ **Iva** □ **Le** □ **Mhux Applikabbli**

Pharmacist-Led Discharge Service at Mater Dei Hospital – Healthcare Professional's Perception of the Service

Semi Structured Interview

1. Please tell me your position and how long you have been in that role.
2. What has your role been in the patient discharge process?
3. When did you first begin working on medication reconciliation at Mater Dei Hospital?
4. What is or has been your role in the medication reconciliation system used at Mater Dei Hospital?
    a. Has your role changed?
    b. How long (each role)?
    c. How much of your time (percentage) did you spend implementing these procedures? Is that on-going or has it changed?
5. To what extent have you been involved in the implementation of medication reconciliation at Mater Dei Hospital?
6. Please describe the purpose of medication reconciliation.
7. What does medication reconciliation entail?
8. How do you think medication reconciliation should be best performed?
    a. Who do you think should be responsible for medication reconciliation?
    b. What is the optimal role for doctors, pharmacists, and nurses?
9. Do you think the current system is effective? Why or why not?
10. What do you perceive as the facilitators to medication reconciliation?
    a. What aspects of the process contributed to these facilitators being effective?

11. What do you perceive as the barriers to medication reconciliation?
    a. What aspects of the process contributed to these barriers being in place?
    b. Which aspects can be changed?
12. If you had complete control over the system, how would you adapt the current process to achieve successful implementation?
    a. What barriers, if any, exist for these adaptations to take place?
13. Is there anything else you would do to improve the current system?
14. Are there any changes currently being worked on?
    a. What is the impetus for these changes?
    b. Do you think they will improve the current system and if so, how?
15. Is there anything you wish to share?

Available from:

Sanchez SH, Sethi Sanjum S, Santos SL, Boockvar K. Implementing medication reconciliation from the planner's perspective: a qualitatative study. *BMC Health Services Research* 2014; 14:290-300.

Pharmacist-Led Discharge Service at Mater Dei Hospital – Healthcare Professional's Perception of the Service

Intervista Semi-Strutturata

1. Jekk jogħġbok għidli l-pożizzjoni tiegħek u kemm ilek f'dan l-irwol.
2. X'inhu l-irwol tiegħek fil-proċess ta' meta pazjent se jkun se jiġi rriliaxxat mill-isptar?
3. Meta kien l-ewwel darba li bdejt taħdem fuq ir-rikonċiljazzjoni tal-mediċini fl-Isptar Mater Dei?
4. X'inhu jew x'kien l-irwol tiegħek fis-sistema ta 'rikonċiljazzjoni tal-mediċina użata fl-Isptar Mater Dei?
    a. L-Irwol tiegħek inbidel?
    b. Kemm iddum f'dan l-irwol?
    c. Kemm mill-ħin tiegħek (persentaġġ) qattajt fl-implimentazzjoni ta 'dawn il-proċeduri? Għadek tkun involut f'dawn il-proċeduri jew seħħew?
5. Sa liema punt kont involut fl-implimentazzjoni tar-rikonċiljazzjoni tal-mediċini fl-Isptar Mater Dei?
6. Jekk jogħġbok iddeskrivi l-iskop tar-rikonċiljazzjoni tal-medikazzjoni.
7. Fiex jikkonsisti r-rikonċiljazzjoni tal-mediċini?
8. Kif taħseb li għandha titwettaq bl-aħjar mod ir-rikonċiljazzjoni tal-mediċini?
    a. Min taħseb li għandu jkun responsabbli għar-rikonċiljazzjoni tal-mediċini?
    b. X'inhu r-rwol ottimali għat-tobba, l-ispiżjara u l-infermiera?
9. Taħseb li s-sistema attwali hija effettiva? Għaliex jew għaliex le?
10. X'taħseb li huma dawk il-fatturi li jifaċilitaw ir-rikonċiljazzjoni tal-mediċini?

a. X'inhuma l-aspetti tal-proċess li jikkontribwixxu sabiex dawn il-faċilitaturi jkunu effettivi?

11. X'taħseb li huma l-ostakoli għar-rikonċiljazzjoni tal-mediċini sabiex iseħħ?

    a. X'inhuma l-aspetti tal-proċess ikkontribwixxew għal dawn l-ostakli?

    b. Liema aspetti jistgħu jinbidlu?

12. Jekk kellek kontroll sħiħ fuq is-sistema, kif tadatta l-proċess attwali sabiex tikseb implimentazzjoni tal-mediċini b'suċċess?

    a. Liema ostakoli, jekk hemm, jeżistu biex dawn l-adattamenti jseħħu?

13. Hemm xi ħaġa oħra li tista' tagħmel biex ittejjeb is-sistema attwali?

14. Hemm xi bidliet li qed jinħadmu bħalissa?

    a. X'inhu l-impetu għal dawn il-bidliet?

    b. Taħseb li se jtejbu s-sistema attwali u jekk iva, kif?

15. Hemm xi ħaġa oħra li tixtieq issemmi?

Disponibli minn:

Sanchez SH, Sethi Sanjum S, Santos SL, Boockvar K. Implementing medication reconciliation from the planner's perspective: a qualiatative study. *BMC Health Services Research* 2014;14:290-300.

APPENDIX III

COVERING LETTERS

Patient Information Sheet

Dear Participant,

I am currently reading for a Doctorate in Pharmacy and I am conducting a research study as part fulfilment of this course which will be taking place within the Hospitality Lounge of Mater Dei Hospital. The aim of this research is to develop a new, patient-centred pharmaceutical discharge service consisting of a pharmacist who counsels on medication use and checks the treatment of patients at discharge.

In order to perform this study, I need your consent and participation. Even though you are under no obligation to participate, your participation would be greatly appreciated. Should you wish to stop your participation in this study, you may do so at any time and without any need to give a reason. You will not be affected in any way if you refuse to participate.

Your identity and all the information disclosed will be kept confidential and will only be accessible to the researcher. The information may be published as part of this study but the information will never be traceable to you.

Thanking you in advance for your participation,

_____

Denise Borg
B.Sc. Pharm. Sci. (Hons.)(Melit.) M.Pharm. (Melit.)

Ittra ta’ Informazzjoni Għall-Pazjent

Għażiż parteċipant,

Jiena bħalissa qiegħda nistudja għal Dottorat fil-Farmaċija u parti mill-kors jikkonsisti f’riċerka li se jsir fil-‘*Hospitality Lounge*’ tal-isptar Mater Dei. L-għan ta' din ir-riċerka huwa li jiġi żviluppat servizz farmaċewtiku ġdid iċċentrat fuq il-pazjent billi jkun hem spiżjar li jieħu ħsieb jagħti pariri fuq il-mediċini u anke biex jiċċekja l-kura mogħtija lill-pażjent.

Sabiex jitwettaq dan l-istudju tiegħi, għandi bżonn il-kunsens u l-parteċipazzjoni tiegħek. Għalkemm napprezza ħafna l-parteċipazzjoni tiegħek f’dan l-istudju, inti m’intix obbligat bl-ebda mod li tieħu sehem. Jekk inti tixtieq twaqqaf il-parteċipazzjoni tiegħek f’dan l-istudju inti tista’ tagħmel dan f’kwalunkwe ħin u mingħajr ebda ħtieġa li tingħata raġuni. Inti mhux se tkun affettwat bl-edba mod jekk int tirrifjuta li tipparteċipa f’dan l-istudju.

L-identita’ u l-informazzjoni kollha tiegħek se tinżamm b’mod kunfidenzjali u ħadd ieħor mhu ħa jkollu aċċess għaliha ħlief jien. L-informazzjoni tista tiġi ippublikata bħala parti mill-istudju tiegħi iżda inti ma tkunx tista tiġi identifikat bl-ebda mod.

Nirringrazzjak bil-quddiem tal- parteċipazzjoni tiegħek,

_____

Denise Borg
B.Sc. Pharm. Sci. (Hons.)(Melit.) M.Pharm. (Melit.)

Covering Letter for Healthcare Professionals

Dear Participant,

I am a pharmacist and I am currently reading for a Doctorate in Pharmacy. I am conducting a research study as part fulfilment of this course which will be taking place within the Hospitality Lounge of Mater Dei Hospital. The aim of this research is to gauge the perception of healthcare professionals on medicine reconciliation based services with the aim to provide a better hospital experience for our patients.

In order to perform this study, I need your consent and participation. Even though you are under no obligation to participate, your participation would be greatly appreciated. Should you wish to stop your participation in this study, you may do so at any time and without any need to give a reason. You will not be affected in any way if you refuse to participate.

Your identity and all the information disclosed will be kept confidential and will only be accessible to the researcher. The information may be published as part of this study but the information will never be traceable to you.

Thanking you in advance for your participation,

_____

Denise Borg
B.Sc. Pharm. Sci. (Hons.)(Melit.) M.Pharm. (Melit.)

Ittra ta’ Informazzjoni Għall-Professjonist tal-Kura tas-Saħħa

Għażiż parteċipant,

Jiena spizjara li bħalissa qiegħda nistudja għal Dottorat fil-Farmaċija u parti mill-kors jikkonsisti f’riċerka li se jsir fil-‘*Hospitality Lounge*’ tal-isptar Mater Dei. L-għan ta' din ir-riċerka huwa li jitkejjel il-perċezzjoni ta professjonisti tal-kura tas-saħħa fuq servizzi irrelatati mar-rikonċiljazzjoni tal-mediċini fl-Isptar Mater Dei, bl-iskop aħħari li niprovdu servizz aħjar għal pazjent.

Sabiex jitwettaq dan l-istudju tiegħi, għandi bżonn il-kunsens u l-parteċipazzjoni tiegħek. Għalkemm napprezza ħafna l-parteċipazzjoni tiegħek f’dan l-istudju, inti m’intix obbligat bl-ebda mod li tieħu sehem. Jekk inti tixtieq twaqqaf il-parteċipazzjoni tiegħek f’dan l-istudju inti tista’ tagħmel dan f’kwalunkwe ħin u mingħajr ebda ħtieġa li tingħata raġuni. Inti mhux se tkun affettwat bl-edba mod jekk int tirrifjuta li tipparteċipa f’dan l-istudju.

L-identita’ u l-informazzjoni kollha tiegħek se tinżamm b’mod kunfidenzjali u ħadd ieħor mhu ħa jkollu aċċess għaliha ħlief jien. L-informazzjoni tista tiġi ippublikata bħala parti mill-istudju tiegħi iżda inti ma tkunx tista tiġi identifikat bl-ebda mod.

Nirringrazzjak bil-quddiem tal- parteċipazzjoni tiegħek,

_____

Denise Borg
B.Sc. Pharm. Sci. (Hons.)(Melit.) M.Pharm. (Melit.)

APPENDIX IV

CONSENT FORMS

Consent Form

I am a Maltese citizen and am over eighteen (18) years of age.

I have been asked to participate in a research study entitled:

'Pharmacist-led Discharge Service at Mater Dei Hospital'

The purpose and details of the study have been explained to me by Ms. Denise Borg and any difficulties which I raised have been adequately clarified.

I give my consent to the Principal Investigator and his delegate either to make the appropriate observations/tests or both or take the necessary samples. I am aware of the inconveniences which this will cause.

I understand that the results of this study may be used for medical or scientific purposes and that the results achieved from the study in which I am participating may be reported or published: however, I shall not be personally identified in any way, either individually or collectively, without my express written permission.

I am under no obligation to participate in this study and am doing so voluntarily.

I may withdraw from the study at any time, without giving any reason. This will not influence in any way the care and attention and treatment normally given to me.

I am/ I am not receiving any remuneration for participating in this study.

In case of queries during the study I may contact Ms. Denise Borg.

Signature of participant _____

Name of Participant _____

ID of participant _____

Signature of Chief Investigator _____

Name of Chief Investigator Denise Borg

ID of Chief Investigator 0145990M

Date _____

Proposta Għall-Formula Tal-Kunsens

Jien/a ċittadin/a Malti/ja u għalaqt tmintax (18)-il sena**.**

Talbuni biex nieħu sehem fi studju riċerka bl-isem ta':

'Servizz immexxi minn spiżjara waqt il-liċenzjar mill-isptar Mater Dei'

L-għan u d-dettalji ta' l-istudju spejgathomli Ms. Denise Borg li wkoll iċċaratli xi mistoqsijiet li għamilt.

Nagħti l-kunsens tiegħi lill-persuna responsabbli għal din ir-riċerka u l-assistenti tagħha biex jagħmlu l-osservazjonijiet li hemm bżonn jew inkella jieħdu l-kampjuni u nifhem li dan jista' jkun ta' skomdu għalija.

Jiena nifhem li r-riżultati ta' dan l-istudju jistgħu jintużaw għal skopijiet xjentifiċi u jista' jiġi ppubblikat rapport bil-miktub: jekk isir hekk b'ebda mod ma nista' nkun identifikat/a, individwalment jew bħala parti minn grupp, mingħajr il-kunsens tiegħi bil-miktub.

Jiena ma għandi l-ebda dmir li nieħu sehem f'dan l-istudju u dan qed nagħmlu minn rajja.

Jiena nista', meta rrid, ma nkomplix nieħu sehem fl-istudju, u mingħajr ma' nagħti raġuni. Jekk nagħmel hekk xorta nibqa' nieħu l-kura li ssoltu tingħatali.

Jiena mhux qed nitħallas biex nieħu sehem f'dan l-istudju.

Jekk ikolli xi diffikulta' waqt l-istudju, nista' nistaqsi għal Ms. Denise Borg.

Firma tal-parteċipant _____

Isem tal-parteċipant _____

Numru ta' l-identita' _____

Firma tal-Persuna Responsabbli għal din ir-riċerka _____

Isem tal-Persuna Responsabbli għal din ir-riċerka Denise Borg

Numru ta' l-identita' 0145990M

Data _____

Consent Form

I am a Maltese citizen and am over eighteen (18) years of age. I have been asked to participate in a research study entitled:

'Pharmacist-Led Discharge Service - Healthcare Professional's Perception of the Service'

The purpose and details of the study have been explained to me by Ms. Denise Borg and any difficulties which I raised have been adequately clarified. I give my consent to the Principal Investigator and his delegate either to make the appropriate observations and I consent to being recorded during the interview. I am aware of the inconveniences which this will cause.

I understand that the results of this study may be used for medical or scientific purposes and that the results achieved from the study in which I am participating may be reported or published: however, I shall not be personally identified in any way, either individually or collectively, without my express written permission.

I am under no obligation to participate in this study and am doing so voluntarily.

I may withdraw from the study at any time, without giving any reason.

I am/ I am not receiving any remuneration for participating in this study.

In case of queries during the study I may contact Ms. Denise Borg.

Signature of participant _____

Name of participant _____

ID of participant _____

Signature of Chief Investigator _____

Name of Chief Investigator Denise Borg

ID of Chief Investigator 0145990M

Date _____

Proposta Għall-Formula Tal-Kunsens

Jien/a ċittadin/a Malti/ja u għalaqt tmintax (18)-il sena. Talbuni biex nieħu sehem fi studju riċerka bl-isem ta':

'Pharmacist-Led Discharge Service - Healthcare Professional's Perception of the Service'

L-għan u d-dettalji ta' l-istudju spejgathomli Ms. Denise Borg li wkoll iċċaratli xi mistoqsijiet li għamilt. Nagħti l-kunsens tiegħi lill-persuna responsabbli għal din ir-riċerka u l-assistenti tagħha biex jagħmlu l-osservazjonijiet li hemm bżonn u nagħti l-kunsens tiegħi li l-intervista tiġi irreġistrata. Nifhem li dan jista' jkun ta' skomdu għalija.

Jiena nifhem li r-riżultati ta' dan l-istudju jistgħu jintużaw għal skopijiet xjentifiċi u jista' jiġi ppubblikat rapport bil-miktub: jekk isir hekk b'ebda mod ma nista' nkun identifikat/a, individwalment jew bħala parti minn grupp, mingħajr il-kunsens tiegħi bil-miktub.

Jiena ma għandi l-ebda dmir li nieħu sehem f'dan l-istudju u dan qed nagħmlu minn rajja.

Jiena nista', meta rrid, ma nkomplix nieħu sehem fl-istudju, u mingħajr ma' nagħti raġuni.

Jiena mhux qed nitħallas biex nieħu sehem f'dan l-istudju.

Jekk ikolli xi diffikulta' waqt l-istudju, nista' nistaqsi għal Ms. Denise Borg.

Firma tal-parteċipant _____

Isem tal-parteċipant _____

Numru ta' l-identita' _____

Firma tal-persuna responsabbli għal din ir-riċerka _____

Isem tal-persuna responsabbli għal din ir-riċerka Denise Borg

Numru ta' l-identita' 0145990M

Data _____

APPENDIX V

PUBLICATIONS

46th ESCP Symposium on Clinical Pharmacy in Heidelberg
Science meets practice - towards evidence-based clinical pharmacy services
Heidelberg, Germany, October 9th-11th, 2017

Chair of the abstracts review process ESCP 2017

Dear Denise Borg,

An abstract that mentions you as co-author has been submitted for the ESCP International Symposium to be held in Heidelberg, Germany, from the 9th to the 11th October 2017.

The abstract submission has been recorded under the identifier ESCP17SY-1522.

For a copy of the abstract, please see the enclosed document.

For questions you may have about the abstract please contact the submitter Louise Grech at the following email address louise.grech@um.edu.mt.

Sincerely yours,

Your ESCP 2017 team ESCP 2017 Symposium– Abstract Management c/o MCI Suisse 9, Rue du Pré-Bouvier 1242, Satigny Geneva, Switzerland Phone: + 41 22 33 99 628 Fax: + 41 22 33 99 601 E-mail: escpabs@mci-group.com

Abstract for the 46th European Society of Clinical Pharmacy (ESCP) 2017 Symposium Hospital Pharmacy - Pharmaceutical Care
ESCP17SY-1522

- Presented as a Poster in Heidelberg Germany October 9th 2017

- Abstract available:

46th ESCP symposium on clinical pharmacy "Science meets practice: towards evidence-based clinical pharmacy services", Heidelberg, Germany, October 9th-11th, 2017. *Int J Clin Pharm*. 2018;40:263

PHARMACIST-LED DISCHARGE SERVICE AT AN ACUTE GENERAL HOSPITAL

Denise Borg[1,2], Louise Grech[1,2], Anthony Cutajar[2], Stephen Falzon[2], Yves Muscat Baron[3], Lilian M. Azzopardi[2]

[1] Department of Pharmacy, Faculty of Medicine and Surgery, University of Malta, Msida, Malta
[2] Pharmacy Department, Mater Dei Hospital, Msida, Malta
[3] Department of Medicine, Mater Dei Hospital, Msida, Malta

Department of Pharmacy University of Malta

INTRODUCTION

Transition of care relies on the provision of a supportive patient process, starting at admission and continuing at every transition point. An innovative model of pharmacist intervention was proposed by redesigning the discharge process to include pharmacist interventions prior to patient discharge from hospital.

AIMS

- To develop a structured, patient centred pharmacist- led discharge service at an acute general hospital
- To promote direct patient counselling at discharge
- To provide the opportunity for novel pharmaceutical services to expand within the local scenario

METHOD

- A novel clinical pharmacy service was implemented, whereby patients flagged by healthcare professionals were reviewed by a pharmacist prior to hospital discharge.
- A dedicated pager service was established, allowing healthcare professionals to contact a designated pharmacist. This enabled assistance on any medication-related issues and patient counselling prior to hospital discharge.
- Performed pharmacist activities included:
  - Validation of discharge information prior to patient discharge by providing a clinical check;
  - Supply of medication at discharge to ensure continuation of care;
  - Customised patient counselling.
- A multidisciplinary standard operating procedure was created. This included the role of a designated pharmacist as part of the team providing a patient discharge service.

RESULTS

- The service was launched on the 20th December 2016. During the working hours of the Pharmacy Department, the pharmacist was paged 190 times and 506 patients were flagged for further intervention.
- Pharmacist activities performed included the validation of discharge information (n=325), medication supply (n=506) and direct patient counselling (n=420).

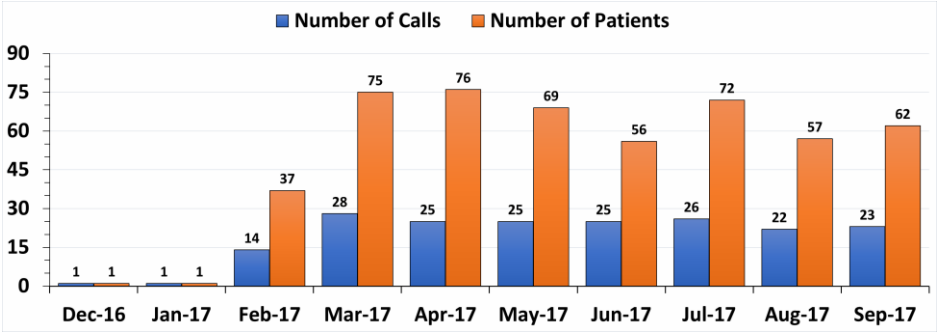

FIGURE 1: Number of calls and number of patients referred to designated pharmacist for intervention per month.

CONCLUSION

An on-demand clinical pharmacy paging service enabled multidisciplinary medication reviews of flagged patients during transition of care. The developed service represented an innovative model of pharmacist intervention in transitional patient care highlighting a ground-breaking service focusing on patient safety.

Background and Objective: Shared care guidelines (SCGs) provide an infrastructure assisting healthcare professionals in clinical deci- sion making, allowing the seamless transition of patients between primary and secondary care settings[1]. The objective is to develop Maltese Rheumatology Shared Care Guidelines (MRSCGs) for rheumatology drugs, emphasizing the role of community pharma- cists in order to address communication barriers between different healthcare sectors.
Setting and Method: The study was carried out in Malta where rheumatology patients get their chronic medication supply free of charge from a community pharmacy of their choice. A list of rheumatology drugs necessitating the development of MRSCGs was compiled. Already existing foreign SCGs, Protocols, and Shared Care Agreements were reviewed. MRSCGs for infliximab, etanercept, methotrexate, leflunomide, hydroxychloroquine and azathioprine were compiled and validated by an expert panel to asses design, content and layout.
Main outcome measures: Development and evaluation of Maltese Rheumatology Shared Care Guidelines.
Results: The MRSCGs consist of 3 sections. Section A outlines pharmacological background, indications, drug administration and dosage regimen. Section B is divided into 2 subsections. The first subsection defines the responsibilities of rheumatology consultant, higher specialist trainee, clinical pharmacist, rheumatology nurse, general practitioner, community pharmacist and the patient. The second subsection consist of a Shared Care Details sheet which addresses communication issues. Section C includes appendices for clinical particulars; monitoring worksheets; Shared Care request form, Acceptance letter by GP to participate in Shared Care, Fast Track Referral Form and Pharmaceutical Care Documentation Sheet which is intended for community pharmacists. The expert panel (n = 10) agreed that community pharmacists dispensing the medi- cations are part of the extended healthcare team with whom communication should be improved. All members agreed that the MRSCGs contain detailed but concise information and that they are user friendly.
Conclusion: The MRSCGs are tools which in the absence of elec- tronic records facilitate documentation and sharing of pharmaceutical care issues and plans across different care settings. Willingness of healthcare professionals to participate in Shared Care and patient's adherence to treatment and commitment will determine the effec- tiveness of the guidelines.

HP-PC071: Pharmacist-led discharge service at an acute general hospital

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Background and Objective: Transition of care relies on the provi- sion of a supportive patient process starting at admission and continuing at every transition point. The goal is to achieve this is through a structured, patient-centred service employing an innovative model of pharmacist intervention. The objective of the study was to develop a patient-centred pharmacist-led discharge service.
Setting and Method: The study was carried out at a general acute public hospital. A novel clinical pharmacy service was implemented whereby patients flagged by healthcare professionals are reviewed by a pharmacist prior to discharge. A dedicated pager service was established whereby healthcare professionals can contact a designated pharmacist for assistance on any medication-related issues and patient counselling prior to discharge.
Main outcome measures: Establishment of pharmacist led discharge service to patients moving from secondary care setting to primary care setting.
Results: During the working hours of the pharmacy department, the pharmacist was paged 120 times from 20December 2016 to 1 July 2017. A total of 315 patients were flagged to the pharmacist for intervention. Activities performed by the pharmacist include valida- tion of discharge information by providing a clinical check, arrangements to ensure ongoing medication supply at discharge and patient counselling on the medication treatment at discharge.
Conclusion: An on-demand clinical pharmacy paging service enables multidisciplinary medication reviews of flagged patients during transition of care. At its core, the inclusion of a pharmacist in the discharge process can prevent medication errors, indirectly provides cost-avoidance on the institution and acts as a measure to promote patient safety at transition of care. By redesigning the discharge process to include pharmacists' interventions prior to patient dis- charge transitional care can be facilitated.

HP-PC072: Development and evaluation of shared paediatric pharmaceutical care plan

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Background and Objective: Effective transitional care as paediatric patients move across primary and secondary care settings is essential to provide a smooth and safe pharmaceutical care service. One of the barriers to effective transitional care is lack of communication at sharing identified pharmaceutical care issues between hospital phar- macists and community pharmacists. Community pharmacists may not have easy access to the medication plan or discharge note outlined within the secondary care setting leading to a lacuna in the pharma- ceutical care service offered. The objective of this study was to develop a shared paediatric pharmaceutical care template aimed at improving communication between pharmacists across different care settings.
Setting and Method: The study focused on paediatric rheumatology patients and was carried out at the general hospital. A literature review was carried out to identify an appropriate template. A dis- cussion with an expert panel was held in order to identify which sections of the pharmaceutical care plan template should be included to facilitate communication and sharing of identified pharmaceutical care needs between the primary and secondary care settings. Fol- lowing a primary validation by the expert panel, the finalised care plan was piloted in a monthly paediatric rheumatology outpatient clinic.
Main outcome measures: Development and evaluation of the Shared Paediatric Pharmaceutical Care template.
Results: The template consists of three sections. Section A relates to carer and patient details, allergies, and co-morbidities. Section B consists of the first clinic date visit, previous and current drug history. Section C documents pharmaceutical care issues, monitoring plans and pharmacist actions. Following the pilot study the first draft of the Shared Paediatric Pharmaceutical Care Plan was revised so as to be more user friendly and easier to complete. The final template for Shared Paediatric Pharmaceutical Care Plan for rheumatology was used as a baseline to draft other paediatric templates such as the one for oncology in paediatrics.
Conclusion: In the absence of an electronic system connecting the different care settings, the developed Shared Paediatric Pharmaceu- tical Care Plan facilitates the communication between the hospital

Abstract for the 2018 American College of Clinical Pharmacy Global Conference

Dear Denise Borg,

Congratulations! Your abstract, titled "Implementation of a pharmacist-led transitional care service at an acute general hospital", is ACCEPTED as a POSTER PRESENTATION at the 2018 ACCP Global Conference on Clinical Pharmacy. The meeting will take place October 20-23, 2018, at the Washington State Conference Center, Seattle, Washington, USA.

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We look forward to your presentation. If you have any questions in the upcoming months please contact ACCP at abstracts@accp.com.

Sincerely,

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Implementation of a pharmacist-led transitional care service at an acute general hospital

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Service or Program: An innovative patient-centred pharmaceutical service was devised for patients who are transitioning from an acute general hospital to other clinical settings. Holistic and tailored interventions were delivered by a hospital pharmacist at Mater Dei Hospital in Malta following an observational phase. These interventions centred around: customised patient counselling, validation of discharge information by providing a clinical check, medication reconciliation and supply of medications at discharge.

Justification/Documentation: Targeted pharmaceutical interventions allow for identification of potential medication errors and promotes the interdisciplinary approach towards ensuring continuity of care. This patient-specific service targeted a previously unexplored niche by clinical pharmacists in Malta and focuses on patients during the transitional phase of hospital discharge.

Adaptability: The service was incepted by allocating a pharmacist to perform transitional care roles. A pager system was devised which enables healthcare professionals to flag patients to the pharmacist to perform advanced pharmaceutical interventions. A model of task allocation was facilitated with the enactment of a multidisciplinary standardised operating procedure governing the processes at

discharge. This service model can be replicated by other institutions globally by engaging pharmacists to perform transitional care initiatives to promote patient safety.

Significance: The successful implementation of the discharge service highlights the leadership roles clinical pharmacists can embark on during transitional care. This innovative service consisted of bundled pharmaceutical interventions and throughout a twelve-month period from service inception, 791 discharged patients benefitted from these interventions. This corresponds to approximately 20% of patients discharged through the study setting. A pilot medication reconciliation service was performed for 196 patients discharged to gauge expansion in the service provision.