Implementing Best Practice
In Medication Management
In a Nursing Home

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Abstract
Medication management is one of the major roles of a nurse leader in any health care setting particularly in the nursing homes. Evidence suggests that errors do occur at any stage of the medication use process (prescribing, documenting/transcribing, dispensing, administering and monitoring) and these might pose significant risks to older people in nursing homes. Thus, this change project was carried out to reduce the incidence of medication errors, ensure resident’s safety and promote compliance with professional and national standards on medication management. A multiple approach using the PDSA cycle and Kotter’s eight steps change model was adopted to guide the change project. Data were collected 4 weeks prior to the implementation of this change project and the following types and frequency of error were detected: error detected through chart review include transcription error (2), omission error (4) and wrong time error (2); error detected through observation include wrong form (crushing medication-4), wrong time (1), wrong patient (2) and wrong dose (5) while medication incident reporting form detected omission error (1) and wrong dose error (1). At the end of 5 months, data were collected through chart review, medication error reporting form and observation. Results showed that there was reduction in errors associated with lack of nurses’ knowledge on medication given resulting in brand name versus generic name confusion leading to transcription error. Wrong dose, wrong time, omission, wrong resident and wrong form errors were also observed to be significantly reduced.
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Chapter 1

Introduction

1.1 Introduction.

Medication management is one of the major responsibilities of a nurse leader/manager in any health care setting particularly in nursing homes (Health Information and Quality Authority (HIQA) 2009). It is a complex process which involves different phases including prescribing, transcribing, ordering, dispensing, supplying, administering and storing (Dilles et al. 2011). Evidence suggests that at each phase of the cycle, error do occur adversely influencing patients’ safety, which is a priority in today’s nursing practice (Pronovost et al. 2005). Additionally, Tumheim (2003) concluded that adverse drug events are common in nursing homes, and nursing home residents are vulnerable to such events due to a high incidence of polypharmacy and changed pharmacokinetics and pharmacodynamics. ‘The latter issues refer to age-related changes in the functions and composition of the human body, which require adjustments of medication selection and dosage for elderly individuals’ (Dilles et al. 2011, p.172). According to Choo et al. (2010), medication errors are one of the most common types of medical errors that occur in healthcare institutions. They further state that morbidity from medication errors results in high financial costs for health care institutions and adversely affects the patient’s quality of life. Medication errors have also been identified as the most common single preventable cause of adverse events (National Medicines Information Centre, 2001).

In practice, nurses have been trained to practice the five rights of medication administration, namely, the right medication, right dose, right route, right time and right patient but evident suggests that although the five rights ‘provide a useful checking ritual, they focus on the individual nurse’s performance during the final stage of medication administration and
do not reflect the responsibility and accountability associated with medication administration or multidisciplinary approaches to medication management’ (Choo et al., 2010, p.854).

Therefore it was proposed that additional strategies should be implemented to prevent and reduce medication error (William, 2007).

In this chapter, the writer will focus on the aim and objectives of the change project and the rationale for carrying out the change.

1.2 Aim and objectives

The aim of this project was to implement best practice in medication management in a nursing home and the objectives were to reduce medication errors/adverse drug events through incident reporting and adherence to medication administration safety guidelines (nine rights of medication administration); to promote the safety of the residents and comply with professional and national standards on medication management.

1.3 Rationale for carrying out the change

Under the Health (Nursing Homes) (Amendment) Act (Health Act) (2007), all providers and social care services including private, public and voluntary sector have to register with HIQA if they undertake regulated activities as defined in the Act. This prompted a recent unannounced inspection of the writer’s health care setting by HIQA, many recommendations were made to ensure that the provider/person in charge (nurse manager/leader) comply with the Health Act 2007 and National Quality Standards for Residential Care Settings for Older People in Ireland prior to being registered. These recommendations involve change in practice, structure and systems of the organization. This is congruent with Donabedian (2003) who state that quality is a function of three domains: structure, process and outcome.

Structure relate to the conditions under which care is provided, including material resources, human resources, and organizational characteristics (Donabedian 2003). Process refers to the activities that constitute health care, including diagnosis, treatment, rehabilitation, prevention,
and patient education (Donabedian, 2003). Finally, outcome relate to changes in individuals and populations that can be attributed to health care, including changes in health status, changes in knowledge, changes in behavior, and satisfaction with the care received and its outcomes (Donabedian, 2003).

However, given the importance of medications in the care of the residents in nursing homes (HIQA, 2009), errors in medication are taken seriously by the Inspectors. Thus, medication management was one of the identified priority areas for further improvement in the writer’s organization. Additionally, the An Bord Altranais (ABA) in an attempt to assist nurses to understand their roles and responsibilities in medication management prepared a guideline titled ‘guidance to nurses and midwife on medication management’ (ABA, 2007). The guideline was also written to enable nurses to reflect on the key points associated with medication management and the related principles, and thus support effective, safe and ethical practice’ (ABA, 2007, p.5).

Therefore, the rationale for carrying out this project were as follows: (1) the writer being the person in charge, a nurse and manager/leader of the organization is ultimately responsible to ensure medication management is in line with best practice (HIQA, 2007; ABA, 2007); (2) medication management is particularly important in older people as they are extremely vulnerable to adverse effects of medication (Kosh et al. 2010); (3) the topic chosen is in line with the guideline for project dissertation published by the Royal College of Surgeons in Ireland; (4) the proposed change is linked to real problems that are understood by all stakeholders (Pearce, 2007); (5) the change being implemented is in agreement with strategic plan and goal of the organization (Cervone, 2011) i.e. obtain registration to operate.
1.4 Summary

Medication management in nursing homes is complex and older people living in such settings are potentially at risk of medication error than other groups. This error could result in adverse drug event leading to morbidity and mortality. It is therefore required that all nursing homes put a system in place to prevent medication error prior to being registered.

This change project was carried out to reduce medication error, promote safety culture and ensure compliance with both professional and national standards on medication management.
Chapter 2

Literature review

2.1 Introduction

According to Dille et al. (2011), research on medication management in nursing homes is uncommon and most studies are limited to the stage of medication administration and do not address other stages of the medication process. However, in order to carry out a broader search of relevant literature on this change topic, the Royal College of Surgeon in Ireland (RCSI) library resources was used mainly Science Direct, OVID, CINAHL, Wiley and Emerald. Other resources used include Google Scholar and INMO (Irish Nursing and Midwifery Organization) library.

The search term used include: medication safety, medication errors and nursing homes, adverse drug event, private and public nursing homes, medication management and older adult. The criteria of selection include the original research article or a systematic review article. Both English and non English journal articles were included in the selection. Thus, the following themes emerge:

2.2 Nursing homes in Ireland

Nursing home also referred to as long-term, aged or skilled care facility, have an important role in the provision of care for dependent older people (Spilsbury et al. 2011). It was described by Buccheri et al, 2010, p.1367) as a ‘residential facility for persons who require nursing care and related medical or psychosocial services’. Du Moulin et al (2010) described it ‘as long-term care facilities that offer 24-h room, board, and health care services, including basic and skilled nursing care and, for example, rehabilitation or therapies’ (p.289). In Ireland, nursing homes are referred to as designated centre or residential care setting (HIQA, 2009). According to a report published by HIQA (2012), there are
currently 574 designated centres for dependent persons in the sector, classified by provider
type as follows: private – 387 (68%), voluntary – 64 (11%) and public – 123 (21%). All
nursing homes (private, voluntary and public) are regulated under the Health Act (2007). The
Department of Health and Children (DoHC) (2006) estimated that 4.3% of people over the
age of 65 were resident in nursing homes, i.e., approximately 19,500 patients of 456,000 and
postulated that if this percentage remain constant as the population in Ireland ages, by 2051
the number in care will exceed 60,000. In contrast, approximately 1.6 million elderly and
disabled persons receive care in 1 of the 17,000 nursing homes in the United States (Jones et
al. 2009). In addition, a survey of 10 developed countries found projected increases in the
percentage of the elderly population from 35% to 99% by 2025, with between 2% and 14.5%
of elderly people residing in some form of long-term care setting (Ribbe et al. 1997).
In recent years, nursing homes are becoming increasingly responsible for the management
of an ever wider range of complex nursing and medical conditions and various initiative have
been developed to improve quality of care delivered to the residents such as educating staff
and introducing care protocols, but despite this, there is still need for further improvement in
the quality of care provided (Du Moulin et al. 2010).

2.3 Medication management in the nursing home sector

Managing medication is a regulated activity under the Health Act (2007) and all registered
nurses (staff nurses and nurse managers) have a duty to protect the residents against risks
associated with management of medication (HIQA, 2009).

Medication management is defined as ‘the facilitation of safe and effective use of
prescription and over-the-counter medicinal products’ (Bulechek and McCloskey, 1999 cited
in ABA 2007, p.53). It is a complex process involving different phases, namely, procurement
(the acquisition and storage processes used by institutions); prescribing (the point that
involves a licensed prescriber issuing a prescription or medication order); transcribing/documenting (a point that involves the act of transcribing an order or documenting procedures or anything pertinent to the resident in the notes or on the resident’s chart); dispensing (this involves the pharmacist’s assessment of the prescription or order and the release of the product for use by the health care provider or the resident); administering (this encompasses the act of preparing and providing the medication to the resident using the five rights of which nurses are aware and is a guiding principle intended to avert errors); monitoring (an inter-disciplinary approach in evaluating, scrutinizing, and recording the resident’s response/reaction to the medication administered) (Hicks et al. 2008). According to Mrayyan et al. (2007), errors can occur in all stages of the process and different professionals can be involved - physicians, pharmacists and nurses (Figure 1).

![The Medication Use Process](image)

US pharmacopeia (2004, Figure 1)
2.4 Medication error

In nursing homes, approximately 19% of all administered medication doses are associated with medication error (Barker et al. 2002). Preventable adverse drug events occur at a rate of approximately 1 per 100 resident-months, with more than 60% of these events considered to be fatal, life threatening, or serious (Gurwitz, 2000). Medication error is any preventable event that may cause or lead to inappropriate medication use or patient/resident harm while medication is in the control of the health care professional, patient, or consumer. Such events may be related to professional practice, health care products, procedures, and systems including prescribing; order communication; product labelling, packaging, and nomenclature; compounding; dispensing; distribution; administration; education; monitoring; and use (National Coordinating Council for Medication Error Reporting and Prevention, 2007, p.1).

2.5 Adverse drug events

An adverse drug event could be described as ‘preventable mistakes in prescribing and delivering medication to patients such as prescribing two or more drugs whose interaction is known to produce side effects, or prescribing a drug to which the patient is known to be allergic’ (Department of Health and Children (DoHC) 2008, p.42). ‘Studies of adverse events in numerous countries around the world demonstrate that between 4% and 16% of patients admitted to hospital experience one or more adverse events, of which up to half are preventable’ (DoHC 2008, p.2). Some medication errors can lead to adverse events. An adverse event attributable to medication error is a “preventable adverse event” (Institute of Medicine, 2000, p. 28). Among the most common adverse events reported internationally are adverse drug events. A study by the Agency for Healthcare Research and Quality (AHRQ) in the United States found that adverse medication events caused one out of five injuries or deaths per year to patients in the hospitals that were studied (Leape et al, 1991).
Much research is being carried out internationally to categorize preventable adverse drug events and to develop methods to prevent them. The Prescription for Change series, published in the US in 2000 (Clinical Initiatives Centre, 2000), evaluated the efficacy and cost of practices to improve medication safety in the hospital setting. The most effective, least expensive strategies are pharmacy-managed protocols and pharmacist interview (admission history taking or checking by a pharmacist), dispensing protocols (involving double checks at nearly all points in process), dedicated observers (observational studies to check accuracy of administration) and pharmacist order entry. At greater expense, recommended strategies are: computerised prescribing, code reconciliation (medication scanned against prescription), automated dispensing systems (pharmacy robots dispense medication).

In Ireland, data on medication error and adverse drug reactions in four hospitals recorded 510 events/near-misses in a three-month period (Kirke et al. 2007). The most common event/near-miss types were wrong dose, frequency/rate and dose/drug omission, with monitoring, omission and wrong frequency/rate being the most common categories for adverse drug events i.e. resulting in patient harm. Seven per cent of the reports involved patient harm due to adverse drug reactions or medication error (DoHC, 2008).

2.6 Types and causes of medication error

Medication errors in nursing homes are very common due to the fact that nursing home residents receive more medications than patients in other healthcare settings putting them at risk of medication related error (Hansen et al. 2010). Although, studies reviewing the type and causes of medication error in nursing homes are limited, evidence is available in other settings and these could be applied to nursing homes (Hodgkinson et al. 2006).

According to William (2007), medication errors could be classified according to the stage of the medication management cycle in which they occur, namely, prescribing errors, dispensing
errors, administration errors, and transcribing errors. A prescribing error includes prescribing a wrong drug for a patient as well as the wrong dose, quantity and indication, and prescribing a contraindicated drug (Williams, 2007). Prescribing errors occur in 0.4% of prescriptions, and happen as a result of inadequate knowledge of the patient and his/her clinical condition, inadequate knowledge of the drug, calculation errors, illegible prescriptions, drug name confusion, dosage formulation, use of abbreviations, use of zero and decimal points, unusual routes of administration, uncommon/complicated dosage regimens and poor history taking (DH, 2004). Dispensing errors occur when there is a deviation from the drug prescribed as a result of drug name confusion, failure to clarify an ambiguous or illegible prescription, similar packaging or single checking (DH, 2004).

According to Dickens (2007), an administration error is an error that results in a patient receiving a drug other than that intended by the prescriber or when a medication reaches the patient in a form, dose or strength other than that planned by the prescriber or is administered at the incorrect route or wrong time. He stated further that an administration error can also take the form of omission of medication without a valid or error in documentation for example failure to document that a medication has been given. In addition, Drach-Zahavy and Pud (2010) defined medication administration error as ‘any deviation from procedures, policies and/or best practices for medication administration’ (p.794).

It is estimated that administration errors on hospital wards involve around 5% of doses and occur when the drug administered to the patient is not what was intended by the prescriber (Williams, 2007; DH, 2004). This type of error could result from errors in other phases of medication management such as selection, procurement, storage, prescribing, ordering and transcribing (The Joint Commission, 2007). Alternatively, they may occur as a consequence of individual or system issues which include poorly written orders, calculation errors, inadequate space for charting and documentation, lack of sufficient knowledge about
the residents, lack of knowledge about medications, confusion with names of medicines, interruptions, deviation from policies and procedures, type of administration system, nursing shortage, small medication rooms, poor lighting, long working hours and inadequate training (Brady et al 2009; Mrayyan et al 2007; Fontan et al 2003).
Frequent causes of medication administration errors are illegible prescriptions, verbal orders, transcribing errors and inadequate labeling (DH, 2004). Other causes identified include ‘look alike and sound alike’ medications, equipment failure or malfunction, inadequate abbreviations during prescribing, excessive workload, lapses and unavailability of medications (DH, 2004).
In a current literature review, two main types of medication errors were identified which include preparation errors and administration errors (Agyemang and While, 2010). Preparation error was then subcategorized as wrong dosage, dose omission, wrong drug/fluid, wrong patient, wrong time, wrong form of medication, wrong solvent and unlabelled medication containers. Administration error was subcategorized as administration rate error (Agyemang & While, 2010). This is congruent with Pierson et al. (2007) who conducted a survey of medication errors in 25 nursing homes in US and found that the most common errors were dose omission, overdose, underdose, wrong patient, wrong product and wrong strength. They concluded that errors most commonly occurred during medication administration as a result of basic human error including high staff turnover, heavy use of agency nurses, understaffing, and lack of communication between staff.

2.7 Cost of medication errors
The personal costs of medication errors for patients may include suffering, the need for additional treatment, loss of income, and death. Family members also experience emotional trauma as a result of seeing a loved one suffer. For the estimated 1.5 million people who are injured by medication errors each year in United State, health care facilities incur a
conservative estimate of $3.5 billion in additional expenses while treating their injuries. If this dollar amount were extended to lost wages, lost productivity, and other additional expenses, the costs associated with medication errors might increase to as much as $29 billion (Aspden et al. 2007). The UK Audit Commission estimate that the adverse events associated with the use of medicines in the NHS cost £820 million per year and that this cost trend is upwards (DH, 2004). This does not include the cost of litigation or of human suffering associated with these events. If these estimates are extrapolated to the Irish population it will amount to a potential cost of €54·6 million for extra bed occupancy alone. To place €54·6 million in context this is almost half of the total amount of money spent by Irish hospitals on drugs each year and it is more than double the amount spent on staffing the pharmaceutical services in the hospitals (HSE, 2005).

In addition to the financial costs involved in medication errors, there are substantial costs to the reputation of the health care profession and its members. Every time a medication error occurs, whether it is reported by the media or whether the information simply is spread by word of mouth, the public loses confidence in the quality of health care that is provided (HSE, 2005).

2.8 Medication error detection methods

There are several ways in which medication errors have been detected and an error rate compiled. Schneider (2002) presented nine workshop vignettes on medication error detection methods in hospitals. These nine methods ranged from the voluntary reporting method, to chart review method, to the observation method, to using various computer-assisted information technology methods. He concluded by stating that no single method offers a comprehensive measure of medication safety, but rather a combination of methods needs to be used. Furthermore, Flynn et al. (2002) conducted a study in which the observation, chart review and incident report (self report) methods were compared in 36
hospitals and skilled nursing facilities in two cities. Results of the study revealed that the observation method was far better at detecting the most common categories of medication errors. Out of a total of 457 errors confirmed by a research pharmacist, 300 of 457 were detected by observation method, 17 of 457 by chart review & 1 of 457 by incident report. This is congruent with Barker et al. (2002) who concluded that direct observation is the highly reliable in detecting large numbers of medication administration errors in in-patient and long term settings.

2.9 Medication supply systems

Despite that medication management involves other health care professional- doctors and pharmacists; it is an important part of the nursing role (ABA 2007). Nurses have the responsibility of preparing the medication before administering it to residents (O’Shea 1999). In nursing homes, medications are supplied in different systems prior to being administered by nurses. These include compliance aids/monitored dosage systems (Appendix 1) also referred to as individual medication supply system or unit of use packaging. (Hodgkinson et al. 2006); Lipowski et al.2002) and traditional bulk packaging (Lipowski et al. 2002).

Compliance aids are devices in which a resident’s tablets and capsules are packed into separate compartments, usually four for each day corresponding to the doses to be taken at mealtimes and bedtime. They are designed to assist residents to self administer their medications (ABA, 2007). Examples are the dossette boxes and medidos (Ashurst, 1992). Monitored dosage systems are based on a 28-day cycle. The tablets/capsules are individually sealed into a blister pack divided into four columns and seven rows; each column represents 1 week and the rows represent the days of the week (Ashurst, 1992).

In contrast, systems used in the hospital settings include ward stock and computerized system for example automated dispensing, bedside terminals, computer generated MAR, alert systems and bar coding (Hodgkinson et al. 2006). These systems have been shown to reduce
costs while reducing medication error (Perras et al. 2009). Nonetheless, the nursing homes
sector lags far behind in the use of these technologies (Poon et al. 2006). But given the high
risk of medication error in long-term care (Pierson et al. 2007), there is need for
implementation of best practice in medication management in nursing homes.

2.10 Best practice in medication management

Managing medication is a vast area that is governed by legislation and best practice. The
national standards for older people in residential care in Ireland arising from Health Act
(2007) as well as ABA (2007) guidance for nurses on medication management explicitly state
the responsibilities of the person in charge/nurse manager in relation to medication
management. Under Part 8, section 33 (1) and (2) of the Health Act 2007, it is required that
‘the registered provider shall ensure that the designated centre has appropriate and suitable
practices and written operational policies relating to the ordering, prescribing, storing and
administration of medicines to residents’ (p.19) and ‘the person in charge shall ensure that
staff are familiar with such policies and procedures’ (p.19). Additionally, the registered
provider is expected to ‘ensure that there are suitable arrangements and appropriate
procedures and written policies in accordance with current regulations, guidelines and
legislation for the handling and disposal of unused or out of date medicines and the person in
charge should ‘ensure that staff are familiar with such procedures and policies’ (p.19).
Similarly, ABA (2007) state that nurses exercising their professional accountability in the
best interests of patients must be sure to apply the five rights of medication administration i.e.
right medication, patient/service-user, dosage, form, time. On the contrary, Cox (2000)
argued that quality in medication administration is not simply a matter of adhering to these
five rights. This view was supported by Elliot and Liu (2010) who state that although seven
rights (the five rights plus right response and documentation) have been proposed, errors still
occur. Therefore, they went further to propose the nine rights(Figure 2) of medication
administration (right patient, right drug, right route, right time, right dose, right documentation, right action, right form and right response).

Elliot and Liu (2010, Figure 2)

Furthermore, Elliot and Liu (2010) state that medication errors can take many forms, and may occur at different phases of the medication administration process (from prescription by the medical officer/transcription by the nurse, to dispensing by the pharmacist, or administration by the nurse). To this end, ABA (2007) clearly set out best practice in medication management i.e. from prescription/transcription all through to administration of medication. They suggest that the responsibility for documenting the prescription/medication order is with the medical practitioner and/or the registered nurse prescriber to prevent the possibility of error by another individual and a nurse who transcribes is professionally accountable for her/his decision to transcribe and the accuracy of the transcription (ABA, 2007). Several strategies have been proposed in the literature to reduce prescription error including
computerized physician order entry (CPOE), use of medical administration record (MAR)/electronic medical administration record (eMAR) (Hodgkinson et al. 2006) as well as double checking mechanism where a nurse took on the responsibility of transcription (ABA, 2007). In addition, it was recommended that medications should be dispensed by the pharmacist and should only be undertaken by the nurse in exceptional circumstances (ABA, 2007). In order to prevent dispensing errors, evidence suggests that technological systems, such as bar coding of medicines, may offer real opportunities to reduce the level of dispensing errors as well as independent check on dispensed medication by another professional colleague (Ashcroft et al. 2005). ABA (2007) stated further that the nurse should observe the five rights in order to prevent errors during medication administration but evidence has proved that the five rights are not enough to prevent error ((Elliott & Liu, 2010). Therefore, other strategies have been recommended, for example, ensuring that dosage calculations are checked independently by another health care professional before administration, ensuring that prescription, drug and patient are in the same place in order that they may be checked against one another, minimizing interruptions during drug rounds by wearing red apron and adopting a non-punitive approach to error reporting (William, 2007). Furthermore, Cousins (1998) suggest that in long term care settings (nursing homes), the most effective strategies to reduce medication error include nurse education, physician education, changing the role of the pharmacists to allow them become proactive in the medication management process and use of automated systems.

2.11 Barriers to implementing medication safety

According to Greenall and David (2004), barriers to the implementation of medication safety strategies in hospitals include a lack of specific planning, scarce resources, complacency, and insensitivity to the inherent risks in the medication process. They state further that fear of
reprisal and personal relationship could be a significant obstacle to reporting incidents and influence sharing and reporting information.

In a recent study conducted by Dille et al. (2011), identified barriers to implement medication safety in nursing homes include being interrupted, not knowing enough on interactions, and barriers to inter-disciplinary cooperation (informing, reporting, and the frequency of communication), a feeling of lack of responsibility in monitoring medication effects and a lack of time to double-check medication prior to administration.

2.12 Summary

In this chapter, the writer has defined and discussed nursing homes, medication error and adverse drug events. In addition, types and causes of medication errors, different types of medication administration methods, strategies to prevent medication errors and barriers to implementing medication safety have been explored. It is worth noting that in nursing homes, medication management has received comparatively little attention and the issues differ substantially from the hospital setting because of the lower acuity, increased number of medication, cognitive impairment and frailty of most residents (Hodgkinson et al. 2006)
Chapter 3

Change process

3.1 Introduction

Organizations are continually in the process of change, with the expectation of becoming more productive, efficient, and effective in their goals and mission and effective management of that change is an important competency currently required (Briody et al. 2012). In this chapter, various types of organizational change and change models will be discussed. The writer will also discuss the change implemented using a blend of the plan-do-study-act cycle and Kotter’s eight step model.

3.2 Critical review of approaches to change

Before delving into various approaches to change, it is important to examine the types of change in organizations. Weick and Quinn (1999) categorized organizational change as either episodic (infrequent and sometimes radical) or continuous (incremental, emergent, and without end). According to Gilley et al. (2009) change may be further classified as transitional- improvement of the current state through minor, gradual changes in people, structure, procedures, or technology; transformational- change in culture, processes, structure and strategy (Barr and Dowding, 2008); or developmental- improvement of skill and processes (Burke, 2011). From performance improvement view point, change could be classified as reactive- required to maintain the system in the current level of performance or fundamental-needed to create a new system of performance (Langley et al. 2009).

Smith (2005) describe change as moving from an existing state of things to a new state and according to Jones and Jenkins (2007) there are no one only solution for moving from the existing state to a newly desired state, they suggest that change models/theories be used as a guide to facilitate a successful change. Therefore, reviewing the literature, there are different types of change models and many ways by which these have been categorized but the two
dominant ones are the planned and emergent change models (Burnes, 2005). Planned change models focus on changes that are deliberately brought about by stakeholders who are accountable for the organization’s operation (Lewis, 2011) while the emergent models focus on changes that occur spontaneously in response to some unanticipated external factors (Burke, 2010).

3.2.1 Planned change models

The planned change model assumes that structures, processes, technology and human skills, capabilities, and knowledge can be changed to support or optimize the achievement of identified strategic organizational goals (Gardner and Ash, 2003). These models are subgrouped as follows:

*Traditional model:* This model could be referred to as the step model. From the 1950s to early 1980s, models of change management followed a relatively simple step process that included evaluating and preparing an organization for change, engaging in change, and solidifying the change into the fabric of employees’ daily lives (Medley and Akan, 2008). Lewin’s (1951 cited in Barr and Dowding 2008, p.205) 3 step model, for example, consists of unfreezing, moving and refreezing. Other examples are: Lippet *et al.* (1958 cited in Barr and Dowding 2008, p.205) 3 phase model consisting of clarification or diagnosis of the problem, examination of alternatives and establishing a plan of action and transformation of intention into actions that will lead to change; Beckhard’s (1969 cited in Armstrong 2006, p.343-357) 4 stage model including setting goals and defining the future state or organizational conditions desired after the change, diagnosing the present condition in relations to these goals, defining the transition state activities and commitments required to meet the future state, developing strategies and action plans for managing this transition in the light of and analysis of the factors likely to affect the introduction of change; Thurley’s (1979 cited in Armstrong 2006, p.343-357) 5 stage model which include ‘directive, bargained, hearts and

Contemporary Model: By the late 1980s to 1990s, theorists of organizational change suggest more extensive, multistep frameworks that include leadership, employee involvement, rewards, communication, and more (Medley and Akan, 2008). Examples are: Kanter et al. (1992 cited in Burnes 2009, p.117)) 10 step model consisting of analyse the organization and its need of change, create a shared vision and a common direction, separate from the past, create a sense of urgency, support a strong leader role, line up political sponsorship, craft an implementation plan, develop enabling structures, communicate, involve people and be honest, reinforce and institutionalize change; Ulrich (1998) 7 step model which include leading change, creating a shared need, shaping a vision, mobilizing commitment, changing systems and structures, monitoring progress and making change last; Critics of these models cite failure to recognize the complexity of change, simplistic assumptions of success should one follow the rigid steps in order, failure to recognize the human factor, and lack of preparedness for resistance, to name a few (Gilley et al. 2009).

3.2.2 Emergent change models

According to Yeo and Ajam (2010) this model is associated with learning process rather than a method of change to influence organizational structures and practices. They further state that it operates on the assumption that change is not linear but involves complexity and ambiguity. With this view, leaders are seen as highly competent and adaptable, capable of switching from being controllers and coordinators to facilitators and collaborators while
employees are believed to be willing to take responsibility for identifying deficiencies and implementing change. These models could be sub classified as follows:

**System model:** The system concept views organizations as constantly interacting with their environment. The organizational environment is comprised of a set of relationships between agents or stakeholders and other factors that may be beyond the control of the organization (Mason, 2007). Examples are: Pettigrew and Whipp (1991) model of strategic change which suggests that there are five interrelated factors that are important in shaping organization’s performance, namely, environmental assessment, human resources as assets and liabilities, linking strategic and operational change, leading change and overall coherence (Shanley, 2007); Mckinsey’s 7s model of organizational change consisting of seven elements that influences planned organisational change. They are: skills, systems, style, staff, shared values, structure and strategy (Barr and Dowding 2008); Leavitt et al. (1973) four-dimensional systems model of change, namely, structure, technology, people, or task; Burke-Litwin (1992) model of organizational change consisting of external environment, mission and strategy, leadership and culture, management practices, structure, systems, work unit climate, motivation, individual needs and values, task requirements; Kotter (1996) 8 stage process of leading change consisting of establishing a sense of urgency, creating the guiding coalition, developing a change vision, communicating the vision for buy-in, empowering broad-based action, generating short-term wins, never letting up and incorporating changes into the culture.

**Complexity models:** Complexity model proposes that organizations are dynamic, non-linear systems and, as such, the outcome of their actions is unpredictable therefore ‘organizations need to promote structures, policies and practices which allow the democracy and power equalization which create the conditions for self-organization’ [in order to implement change successfully] (Burnes 2007, p.85). Examples are Brown and Eisenhardt (1998) model of
change management which include 3 core concepts, namely, time pacing-establishing the
time of change, edge of time-evolve to tomorrow’s business and edge of chaos-compete in
today’s business (Brown and Eisenhardt 1998); Beer et al. (1990 cited in Blake and Bush
2009,p.10) 6 step process- mobilizing commitment to change through joint diagnosis,
develop a shared vision of how to organize, foster concensus, competence and commitment
to a shared vision, spread the word about change, institutionalise the change through formal
policies and monitor and adjust as needed.
Lorenzi et al. (2004) state that health care organizations are constantly trying to reassess their
future direction and there is no single model that can be used in every situation. They suggest
that change management leader should take time to know the desired state and the
organizations current situation and then develop an appropriate model to help facilitate
achievement of the desired state. It could be argued that a model such as the Health Service
Executive (HSE) model of change was developed. The model was based on the following
notions: a) ongoing change within the Irish health system impacts upon almost every aspect
of the organization’s culture; b) change is not linear but it’s a continuous and adaptive
process in which all of elements are interrelated and can influence each other; c) change
cannot be predicted easily and can emerge over time. It involves four key elements- initiating,
planning, mainstreaming and implementation (HSE, 2008). Furthermore, in a current study of
organizational change management theories, Young (2009) argued that most change models
might be helpful in guiding change implementation but in terms of simplicity and clarity, few
practitioners and managers ‘understand or manage to follow the basic principles surrounding
the change process’ (p.524). Therefore, he proposed a meta model of change based on
identification of common themes from a broad range of change literature. This includes
existing or pre-change paradigm, a stimulus, consideration, validating the need, preparation,
commitment to act, the transition (do-check-study), specific result, the enduring benefit (new normal).

Recently, health policy in much of the developed world is concerned with assessing and improving the quality of health care (Davies et al. 2000). To this effect, quality paradigm has become one of the strategic elements in which healthcare system change and improvement is based. According to Gupta et al. (2008), many healthcare organizations have adopted TQM (total quality management), Six Sigma, PDSA (Plan, Do, Study, Act), and other data-driven methodologies to conduct, achieve, and sustain quality improvement (QI) and performance improvement (PI) projects. According to Hughes (2008), TQM as a management philosophy was originally taken up in Japan in the 1950s and 1960s but proved popular in the West in the early 1990s with over 75% of US Fortune 1000 companies introducing a TQM effort. Thakkar et al. (2006) suggested the whole concept of TQM or Continuous Quality Improvement (CQI) mainly ‘revolves around involvement of people at all level, understanding customer requirements and working towards their satisfaction, commitment of top management and development of a culture where organization-wide impact can be realized’ (p. 56).

3.2.3 Tools for total quality management in healthcare

Quality tools used to define and assess problems with health care were seen as being helpful in prioritizing quality and safety problems and focusing on systems, not individuals (Hughes 2008). According to the literature on TQM there are two components in a TQM system: the management system and the technical system, or the ‘soft’ and ‘hard’ part. The hard part includes production and work process control techniques, which ensure the correct functioning of such processes (amongst others, process design, the ‘just in time’ philosophy, the ISO 9000 norm and the seven basic quality control tools) (Evans and
Lindsay, 1999; Wilkinson et al. 1998). The two dimensions reflect all the issues which a manager must bear in mind for a successful TQM implementation. Researchers have identified a number of tools and techniques for quality improvement. A single tool is a device with a clear function, and is usually applied on its own, whereas a technique has a wider application and is understood as a set of tools (McQuater et al., 1995).

Although there are several approaches to implementing TQM, the most commonly known and widely adopted QI methodologies used in health care are PDSA, six-sigma, and lean strategies (Varkey et al. 2007). The choice of methodology depends on the nature of the improvement project. Within most methodologies, users will find similar techniques. Most methodologies typically include iterative testing of ideas and redesign of process or technology based on lessons learned (Massoud, 2001). More recently, experts have been using principles from the different methodologies for the same project (i.e., use of “lean-sigma” methodology), thus making distinctions less relevant (Varkey et al. 2007).

Langley et al. (2009) state that the Deming cycle or PDSA cycle/model has two parts (Figure 3). The first part is the thinking part which poses three fundamental questions and involves gathering evidence and ideas for improvement projects. Question 1 is designed to build knowledge about current practice, whereas question 2 helps teams to choose measures to check whether planned changes do result in improvement. The third question focuses on the improvement effort and is underpinned by the second part which is the doing part i.e. the PDSA cycle allows teams to learn as they go and to use their learning to inform their next change. The model is a structured approach to a rapid cycle test of change. It follows a scientific method to quality improvement and is most often used to improve relatively simple processes that are amenable to quick transformation (Langley et al. 2009). Plan refers to first understanding the process, then proposing an action aimed at improvement, and finally
deciding how the action will be tested and how data will be collected to determine the effect of the action taken (Langley et al. 2009). Implementation of the change occurs in the do phase. The study phase studies the results of the new process and compares it to the expected outcome. The final act phase analyzes the discrepancies in outcomes (Cousins, 1998). A key feature of the PDSA cycle is that it is an iterative process. Ideally, learning and improvement occurs with each successive PDSA cycle (Beringer, 2005; Speroff and O’Connor, 2004). According to Esmail et al. (2005), the methodology works well with changes that needed to be tested right away (i.e. hunches, best practice, suggestions that staff have brought up). They further state that it is a methodology with minimal risk and that after a change is tested, based on the results, the change can be adopted, adapted or modified, and re-tested or abandon all together.

3.3 Rationale for the change model selected

Massoud (2001) pointed out that ideas for healthcare improvements come from countless sources including a leader identifying a gap related to organizational objectives, or teams identifying opportunities based on provider and patient/client experience and in some cases, quality monitoring issues, public reporting on quality indicators or new best practice guidelines serve as an impetus for quality improvement (QI) projects. He state further that many approaches to quality improvement exist; deciding on which one to use depends on the circumstances or situation. Some problems are simple and can be resolved rapidly, while others involve core processes and require extensive research. This view was supported by Kotter and Schlesinger (2008) who concur that most change efforts failed because managers did not tailor the speed of their strategy to the situation. Therefore, due to the source (HIQA report and audit), situation and speed (simple, needed to be resolved rapidly and right away) of this change project, the PDSA model of improvement was selected. In addition, this model was selected based on the fact that the methodology was originally applied to healthcare
systems by the Institute for Healthcare Improvement (IHI) in the US, and has recently been adopted in a number of countries such as the UK and Australia.

However, given that all improvement requires making changes (Langley et al. 2009), Kotter’s eight step change model (Figure 4) was incorporated into the change model selected. This is congruent with Langley et al. (2009) who pointed out that the PDSA cycle is not meant to replace change models that organizations may already be using, but rather to accelerate improvement. This view was supported by Smith (2011) who stated that ‘focus on quality [improvement] and change together can form a powerful combination’ (p.112).

Kotter’s model provides eight reasons why organizational change processes fail. Conversely he proposes eight steps for successful organizational change. In other words, by ensuring the eight reasons for failure are removed, contained, or at least their impact minimized, successful change will follow (Sidorko, 2008). According to Sidorko (2008), the eight steps can broadly be divided into three categories, namely, preparation (steps 1-4), action (steps 5-7) and grounding (step 8).

![Diagram of the PDSA cycle](image)

Peck (2004, Figure 3)
Paper *et al.* (2001, Figure 4)

3.4 Change model

3.4.1 Question 1: What are we trying to accomplish?

Based on the feedback from HIQA inspection and audit of the current practice using an audit tool (Appendix 2) adopted from HSE (2009), the following flaws were discovered: (1) blister pack was in use and there was no system in place to identify each medication in the blister pack resulting in nurses giving medications that they have no knowledge of; (2) no incident reporting system in place; (3) medications were not reviewed on a regular basis; (4) medications that require nurse’s judgment were packaged in the blister pack and this could lead to adverse drug event; (5) medication administration record sheet did not include all the required information in line with best practice; (6) medications were improperly stored; (7) controlled drug register in use does not meet HIQA standard; (8) the principle of safe administration of medication was not implemented i.e. the nine rights of medication administration (right patient, right drug, right route, right time, right dose, right documentation, right action, right form and right response); (9) nurses received no training on medication management.
Given the above, it could be concluded that the current practice is error prone from dispensing to the administration of medication to residents and this may result in serious consequences. Langley et al. (2009) state that prior to implementing an improvement project, it is necessary to work with the people involved, know the system’s goal and understand all the steps involved. Similarly, Kotter (1996) first four steps suggested that to implement a change successfully, there is need to create a sense of urgency, form a powerful high level guiding coalition, develop a vision and communicate that vision. Therefore, the writer/project champion presented the information to the stakeholders i.e. the proprietor (owner of the organization), the community pharmacist (who was responsible for dispensing the medication to the residents) and the nurses. This view was supported by Proctor and Doukakis (2003) who pointed out that the key to implementing a change is to get the people involved early, consult with and get them to take ownership of the new idea being introduced. Stakeholder is defined as ‘people and group with an interest in the programme or service or people who are affected by it in some way’ (Ovretveit 2002, p.23). Consequently, the following aims were agreed upon: (a) increase staff compliance to the nine rights of medication administration by 90% within 3 months and (b) to reduce medication errors by 90% within 3 months.

3.4.2 Question 2: How will we know that a change is an improvement?

In order to identify that the change has led to an improvement, it was agreed that data will be collected on type and rate of medication error in the organization through observation, chart review and medication error reporting form during and post implementation of the change project (Dickens, 2007).

3.4.3 Question 3: What changes can we make that will result in an improvement?

As determined by the Inspection report and findings from the audit conducted coupled with literature review on this project, it was necessary to discontinue the use of blister pack and
implement safe medication administration system in order to ensure medication safety and comply with HIQA standards. Thus, it was decided that new practice should involve the following: (1) the resident’s medication to be supplied individually in their original packs and the medication label to include the resident’s name, identification number, the medication’s generic and trade names (Appendix 3) (2) medication incident report form to be designed and implemented (3) medication administration record sheet to be redesigned to include the signature of second nurse who double checked the transcription.

3.4.4 Plan stage

According to Langley et al. (2009), this stage involves stating the objective of the test, making predictions about what will happen and why and developing a plan to test the change (Who? What? When? Where? What data need to be collected?). In addition to this, Gupta et al. (2008) state that at the planning stage some data need to be collected to quantify exactly how bad the problem is, and so that improvement can be shown later. In the light of this, an action plan (Appendix 4) was developed by all the stakeholders. This is consistent with O’Neal and Manley (2007) who state that action planning is a key step in achieving change in practice. They state further that involving others in the process of action planning enables the intended change to be achieved and sustained. This stage could be arguably said to be similar to the fifth step of Kotter’s change model which suggests that there is need to empower people in the organization to act on the vision, that is, remove obstacles to change, improve processes and systems, encourage and enable people to take risks, engage in nontraditional thinking and activities (Smith, 2011).

3.4.5 Do stage

This stage involves carrying out the plan, documenting problems and unexpected observations and analysis of the data (Langley et al. 2009). To ensure that this stage was successfully implemented, Kotter’s sixth step was incorporated. This step suggests the need
to plan for visible short-term performance, that is, enable the change to occur and recognize the achievement and the work of those who have enabled that achievement (Smith, 2011). Thus, the new system was implemented on 1st of November, 2011 and tested over a three month time frame. To better understand the challenges/problems encountered during the implementation of this change project, an analytical tool called force-field analysis was adopted. Force-field analysis (FFA), originated by Kurt Lewin, is a technique used to diagrammatically display key forces in a situation characterized by conflict or planned change and to use it to resolve the conflict or to plan the change more effectively (Lewin, 1952). In FFA, the first step is to identify the key driving forces promoting the shift to a new, desired situation and those restraining forces inhibiting such a change. The second step is to estimate the strength or importance of each force and represent it via the length of its arrow. When the diagram (Appendix 5) is completed, logic dictates that a change from the status quo to a new situation can be achieved only when the driving forces are greater than the restraining forces. Following this logic, the third step is to devise specific change objectives that would have the effect of increasing the driving forces, decreasing the restraining forces, and/or changing restraining forces into driving forces (Pearce and Robinson, 1989).

According to Thakkar et al. (2006) force field analysis is used to identify the forces that help or obstruct a change. They stated further that by using it during implementation of a change, ‘difficulty in implementing a change can be assessed, and plans for overcoming barriers to change can be developed’ (p.68). Thus, the identified barriers/challenges to this change project were: (a) lack of supportive infrastructure-pharmacy off site (Kosh et al. 2010); (b) lack of adequate storage facility for example drug trolley; (c) lack of passenger lift; (d) Staff fear of reporting errors due to mandatory requirements that nursing homes report all adverse events that cause resident harm to HIQA; (e) staff fear of being blamed if error is reported; (f) giving many medications at the same time especially during the night shift and(}
g) interruption when medication is being prepared and administered (Dilles et al. 2011). In order to overcome these challenges/barriers and ensure that change is brought about within the time frame, the writer being the change champion and nurse manager/leader of the organization used legitimate power (power gained by title or official position in an organization) to influence the stakeholders by educating the nurses on the need and importance of error reporting and acted as role model leading the way in the implementation of this change project (Marquis and Huston, 2009). This is in line with Kotter and Schlesinger (2008) who stated that the more the power a change agent has in relation to resistors; the faster the change will be implemented. They state further that education and communication is pivotal to overcoming resistance to change. In addition, an easy to carry medication box with lock was put in place to address the issue of no trolley and no lift (Idzinga et al. 2009).

3.4.6 Study stage

During the study stage, Kotter’s seventh step (consolidate improvements and produce more change) was incorporated. Thus, based on the agreed aimed for testing the change, data were collected through chart review, medication error reporting form and observation at the end of 3 months of implementation of the change project. Results showed that there was reduction in errors associated with lack of nurses’ knowledge on medication given resulting in brand name versus generic name confusion leading to transcription error but wrong dose error, wrong time and omission error remained unchanged. This result was presented to the nurses and during the discussion the following reasons for wrong dose and omission error emerge. They include lack of effective communication, absence of a resident from the nursing home and nurses forgetting to sign the medication administration record before hand over (Barber et al. 2009). In addition, a medication self reporting questionnaire (Appendix 6) was used to
ascertain nurses’ compliance with the nine rights of medication administration. 90% of the nurses reported that they adhere to the nine rights of medication administration. This is congruent with Gupta et al. (2008) who state that it is important to consider both quantitative and qualitative information such as how staff feel about the new system and how staff feel further changes could be made.

3.4.7 Act stage

This is the stage of refining the change, based on what was learned from the test. It involves determination of what modifications should be made and preparing a plan for the next test. The last step in Kotter’s model suggests that there is need to institutionalize new approaches. Therefore, given the problems discussed in the study stage, effort was made to address these problems by redesigning the handover. Thus, it was agreed that nurses coming on duty should check the medication administration record with the outgoing nursing staff to ensure medications are signed for or other explanations provided (Johnson et al. 2011). Based on the findings of this test/implementation, a plan to continue the new system with some modifications was made.

3.4.8 Summary

Managing organizational change is critical in a complex environment such as the health care setting. Change can be triggered by external or internal causes and occurs in different types (Weick and Quinn, 1999). In this chapter, the writer has critically reviewed various approaches to implementing change in organizations and discussed the change implemented using a blend of the PDSA cycle and Kotter’s eight step model. The PDSA model of improvement is scientific and widely used in health care for problem solving/quality improvements (IHI, 2011). The writer incorporated Kotter’s eight step model to the
methodology selected because this project is an improvement project as well as a change project.
Chapter 4

Evaluation

4.1 Introduction

According to Battilana et al. (2010), change leaders need to evaluate the extent to which organization members are performing the practices or behaviours targeted in the change initiative. In addition, Hodges (2008) states that the evaluation process is the final component and an essential part of a change process as it helps an organization to understand the outcome and impact of a particular intervention as well as helps the feed forward cycle of further change initiatives. Ovretveit (2002) defined evaluation as ‘judging the value of something by gathering valid information about it in a systematic way and by making comparison’ (p.11). It involves collection of qualitative data (provides information on how many, how often or an average response), quantitative data (provide information on what worked during the change project, how the project was useful or what factors influenced success or failure) or mix of both (Zaccagnini and White 2011).

According to Ovretveit (2002), there are various types of evaluation in healthcare. These include programme feasibility assessment or option appraisal (carried out to decide if a change project should be implemented or not); process or formative evaluation (carried out at the early stage of change programme); outcome or summative (carried out at the end stage of a change initiative), action evaluation (carried out to seek feedback from stakeholders). In addition, Khandker et al. (2010) concur that there are two types of evaluation methods, namely, qualitative and quantitative. According to Flippo and Caverly (2000), qualitative methods emphasizes the perception, feelings, and reactions of individuals involved in the project being evaluated and quantitative method emphasizes the numerical expression based on numbers, relationships and experiments.
Zaccagnini and White (2011) pointed out that there various tools for gathering qualitative and quantitative data. They state further that tools for quantitative data include observations, ethnographic interviews, written questions, and chart review. In contrast, tools for qualitative data include surveys, health factors and laboratory test results. However, due to the nature of this change project, a multiple approach involving qualitative and quantitative methods was adopted. This is consistent with Khandler et al (2010) who state that a mixture of both qualitative and quantitative (mixed method approach) is useful in gaining a comprehensive view of the project’s effectiveness. Quantitative data collection method used includes observation, chart review and medication incident reporting form while qualitative data was collected through survey. This is congruent with Morimoto et al. (2004) who stated that chart review can identify both medication errors and adverse drug events. They further state that in nursing homes incidents were found by reviewing records and self-reports from health professionals because no other approach was practical.

In this chapter the writer will describe various methods and tools used to collect data on type and frequency of medication errors prior to and after implementation of the new medication administration system and then discuss the results of the evaluation.

4.2 Description of method/tools used for data collection

4.2.1 Quantitative data collection methods

Observation: According to Dickens (2007), observation is the most powerful method to accurately detect medication administration error. During the observation a medication administration pro forma was adopted (Appendix 7). In line with Dickens (2007), the observer (writer) ‘stands by (within 1 metre of) the nurse administering medication’ (p.170) and record on the pro forma details of each medicine to be administered, the resident to whom the medication is intended to be given, the time of administration and other important features of the process (right documentation, right action and right response). After the
observation, the observer then cross referenced the details of the medication given collected on the pro forma with prescribed items on the medication chart.

Chart review: Hillsden and Fenton (2006) state that chart review is less expensive and has proved to be useful in detecting medication prescribing errors and poorly written prescriptions as well as poor recording of medication administration. During this process, medication errors were detected by scrutinizing the resident’s current medication charts, for example failure to document medication given, administration from invalid or unsigned prescription, wrong time and failure to record the route of administration when a variable route is prescribe (Dickens et al. 2006).

Medication incident reporting form: ABA (2007) guidelines on medication management require nurses to report immediately any error made in administration of medication and several methods have been proposed including use of medication reporting forms and self reporting questionnaire (Belela et al. 2011; Johnson et al. 2011). However, in this change project, a paper medication incident reporting form (Appendix 8) was used. The form contains a column to record details about how errors are perceived to have occurred and whether there were any contributory factors (Dickens, 2007). The non-punitive aspect of this data collection process and organizational learning were emphasized with nurses prior to given the questionnaire (Belela et al. 2011; Dickens, 2007)

4.2.2 Quantitative data collection method

Survey: This was carried out to ascertain the satisfaction of the nurses (users of the new administration system) with regard to the efficacy, access and safety of the new medication administration system (Hurley et al. 2006). This is congruent with Hurley et al (2007) who stated that if nurses are satisfied with the new medication administration system, they may be more likely to spend their time and energy focusing on the professional aspects of medication administration rather than focusing on the workload or extra time required to use the new
system. Hence, a validated paper and pen questionnaire referred to as Medication Administration System-Nurses Assessment of Satisfaction (MAS-NAS) scale (Appendix 9) was adopted. This was given to the nurses to complete and return to the writer. Items in the scale pertain to support for team communication, efficient use of time, ease of carrying out the nine rights of medication administration, support for the application of clinical judgment, and straightforward, real-time documentation (Hurley et al. 2006). In line with Hurley et al. (2007), a 6-point Likert rating system anchored with descriptors ‘‘strongly agree’’ (score, 1) and ‘‘strongly disagree’’ (score, 6) was used with reverse scoring on selected items so that high scores indicated high satisfaction.

4.3 Evaluation results

4.3.1 Pre implementation results

The evaluation was carried out 4 weeks prior to the implementation of this change project and the following types and frequency of error were detected (see table 1): error detected through chart review include transcription error (2), omission error (4) and wrong time error (2); error detected through observation include wrong form (crushing medication-4), wrong time (1), wrong patient (2) and wrong dose (5) while medication incident reporting form detected omission error (1) and wrong dose error (1).

In total, 22 errors were detected. Chart review detected 36.4%, observation 54.6% and medication incident reporting form 9%.

Table 1-Type and frequency of medication error pre implementation

<table>
<thead>
<tr>
<th>Types of error</th>
<th>Chart review</th>
<th>Observation</th>
<th>Medication incident reporting form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transcription error</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Omission error</td>
<td>4</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Wrong time</td>
<td>2</td>
<td>1</td>
<td>-</td>
</tr>
</tbody>
</table>
4.3.2 Post implementation results

The new medication administration system was evaluated 5 months post implementation. Type and frequency of medication errors detected were as follows (see table 2): Chart review - omission error (1); observation-wrong dose (2) and medication incident report form-no error reported. Total of 3 errors were detected. In comparison with errors detected pre implementation, chart review detected 4.5 %; observation 9% and medication incident report form-0%.

Table 2-Types and frequency of medication error post implementation

<table>
<thead>
<tr>
<th>Types of error</th>
<th>Chart review</th>
<th>Observation</th>
<th>Medication incident reporting form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transcription error</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Omission error</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wrong time</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wrong form</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wrong dose</td>
<td>-</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Wrong resident</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 3- Definition of errors

<table>
<thead>
<tr>
<th>Types of errors</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omission errors</td>
<td>Failing to administer a prescribed dose</td>
</tr>
<tr>
<td>Wrong dose error</td>
<td>A dose containing wrong strength</td>
</tr>
<tr>
<td>Wrong resident</td>
<td>Administering medication to a resident for whom it is not prescribed.</td>
</tr>
<tr>
<td>Wrong form error</td>
<td>Administering medication in a different form than prescribed (e.g. crushing tablet)</td>
</tr>
<tr>
<td>Wrong time error</td>
<td>Administering a dose of medication more than 60mins before or after the prescribed time</td>
</tr>
<tr>
<td>Transcription error</td>
<td>Order is not transcribed at all or transcribed incorrectly; allergy is not documented on the medication administration record.</td>
</tr>
</tbody>
</table>

Agyemang and While (2010, Table 3)

Figure 5 – Errors: pre and post implementation
Survey of nurses’ satisfaction with the new medication administration system was also carried out 5 months post implementation. The result showed that in terms of safety, 3 out of 4 nurses that completed the questionnaire ‘strongly agree’ and 1 nurse ‘slightly agree’. In relation to efficacy of the new system, 2 nurses ‘strongly agree’, 1 nurse ‘moderately agree’ and 1 nurse ‘slightly agree’. Regarding the ease of access, 3 nurses ‘strongly agree’ and 1 nurse ‘moderately agree’.

Figure 7: Safety – survey of staff
4.3.3 Financial *impact of the change*

4.3.3.1 *Pay cost*

Although recent literature comparing the cost effectiveness of original pack dispensing and blister pack is scarce but evidence suggests that in terms of value for money, it could be concluded that the new administration system is cheaper than the old system. This is congruent with a U.S study carried out by (Lipowski *et al.*2002) who compared the cost of supplying medication in blister packs and original packs. They concluded that the blister pack costs $6.31 (estimated €4.78) more than the original packs.
4.3.3.2 Non pay cost

Implementation of the new medication administration system had several non-pay costs. Firstly, the use of original pack dispensing has been shown to have several advantages including preservation of the product, batch and company identity (with consequent advantages in determination of product liability); potential for more effective recall, rapid identification in cases of overdose; improved product security and stability, elimination of potential for cross-contamination; better patient compliance because the nurse is held accountable and responsible for the preparation and administration; added patient leaflets, faster dispensing, and mislabelling resulting in avoidance of dispensing and administration error. Secondly, the implementation of the new administration system has led to a reduction in staff tolerance to ‘at risk behaviours’ for example rushed handoffs with next shift/covering colleague, not speaking up because of intimidation when error occurs or observed, removing medications from the pack prior to reaching the resident, obtaining medication by grab and go, not fully reading the label before preparation and administering and administering medication without complete knowledge of medication (Institute of Safe Medication Practice, 2009). Consequently, staff have adopted positive behaviours that leads to resident’s safety. Thirdly, the negative impact of medication error on the staff for example feeling of guilt and stress were eliminated and as a result staff feel more positive about identifying and reporting errors so that the organization can learn from errors (Chang and Mark, 2011). Finally, recent HIQA report showed that the organization was compliant with regulatory requirement on medication management. On the contrary, the new system could be said to be more expensive than the old system. According to (Ashurst 1992), the blister pack saves cost because the time nurses spent on preparing medication is eliminated.
4.4 Summary

In this chapter, the writer has discussed the methods and tools used to evaluate the change project. The results of the data collected have also been discussed. Using a mix of quantitative and qualitative data collection method, it became very clear that the change has led to an improvement, that is, the objectives of the change project were met. In addition, in terms of financial impact, no extra pay cost was required for the successful implementation of this change project.
Chapter 5

Discussion and recommendation

5.1 Introduction

The evaluation showed that errors do occur. Implementing strategies/systems to address and minimize error occurrence such as use of original pack dispensing, nurses’ compliance with the nine rights of medication administration and incident reporting could be an effective method of reducing medication error in a nursing home.

In this chapter, the writer will discuss the strength and limitation of the project. The implication of the change for management and recommendation for future improvements will also be discussed.

5.2 Strengths and limitation of the project

The strength of this change project could be attributed to the leadership commitment to the culture of resident’s safety, readiness for change and support of all the stakeholders as well as the size of the setting (17 bedded, private nursing home) where this change project was implemented. Furthermore, adopting a model of improvement to plan and manage the change contributed to the strength of the project as it allows the implementation process to be broken down into manageable components that can then be tested to ensure the change is sustainable.

The use of multiple approaches to detect medication error has contributed to the strength of the project as this helps to gather information on multiple events thereby facilitating a wider focus on medication error as a system failure rather than simply spotlighting individual error as an isolated event caused by poor practice (Dickens, 2007).

There are several limitations to this change project. First, the physical layout of the building (3 storey building) and lack of resources (passenger lift and drug trolley) posed a serious challenge to the ease of access to resident’s rooms during medication rounds by night nurses. Second, the lack of infrastructure (pharmacists and G.P off site) made it difficult to involve
multidisciplinary teams in the implementation of the change project. Thirdly, the scarcity of current literature on original pack dispensing made it impossible to draw an evidenced based conclusion on its effectiveness in reducing medication error.

5.3 Implication of change for management
Based on the setting where this change project was implemented, it could be said that this is a small change but in terms of its implementation, it has several implication for management in any healthcare setting. Therefore, any nurse leader/manager seeking to implement a change project in their healthcare settings should pay particular attention to the following factors: (1) change should be tested on a small scale before large scale as small scale testing can be useful for confirming (or disproving) assumptions about the outcome of a selected change, and whether that change has the intended effect as outlined in the aim statement (Langley et al. 2009); (2) Change should be framed as a pulling strategy: pulling people or attracting them toward promising objectives rather than pushing or pressuring to move away from negative behavior ((MacPhee, 2007); (3) Resistance to change should be viewed as a rational and generally acceptable consequence of any change process. Hence, its source, reason and intensity must be discovered and dealt with appropriately (Pearce, 2007); (4) Planning is critical to the successful implementation of a change project and this could achieved by developing an action plan which link together disparate parts of a change process, establishing priorities, timelines, responsibilities and mechanisms for review ((Smith, 2008); (5) Rules, procedures and guidelines are insufficient for limiting medication administration errors; rather, the ward climate needs to change, to become mindful and alert to any deviation from best practices and behaviours ((Drach-Zahavy and Pud, 2010); (6) Nurse leaders can model team-learning-oriented behaviours, either directly by developing mechanisms and settings for team learning, such as staff meetings, or indirectly by setting the ground rules, norms and opportunities for team members to engage in team learning; (7) Healthcare
managers should aim to purchase computerized systems for data collection and medication administration devices to support integrated team-based learning mechanisms for service quality improvement (Drach-Zahavy and Pud 2010).

5.4 Recommendation for future improvement

Based on the lessons learnt during the implementation of this change project, the following recommendations are made for future improvements. Firstly, evidence has shown that nurses are not reporting medication administration errors for fear of losing their registration, jobs or confidence to practice. It is recommended that medication errors should be reported anonymously to HIQA so that lessons could be learnt to improve care and safety of residents (Agyemang & While, 2010). Secondly, the use of technology should be facilitated in all nursing homes for error reporting and administration of medication such as web based error reporting tool and electronic medication administration record (eMAR) system. Thirdly, the use of compliance aids should be discouraged in nursing homes particularly those homes whose residents are not self administering medication as the primary purpose of the compliance aid is to improve adherence in residents who self administered not for professionals who are trained and competent in administering medication. Fourthly, nursing homes owners should be mandated to employ adequate staff in order to minimize errors resulting from work interruptions. Fifthly, given that Pharmacists and G.P’s are offsite in nursing homes and the stress nurses may experience when an error occurs, a system should be put in place to facilitate the ease of access to local G.P’s between 8am and 10am during working days in order to get prompt advice. Fifthly, as stated by (Cassidy et al. 2011) that medication error prevention efforts have mainly targeted healthcare professionals especially those working in the hospital setting, it is therefore recommended that a framework of collaboration between nursing homes, regulatory bodies and government agencies should be
established to raise awareness of medication errors and drive prevention initiatives. Finally, evidence suggests that nurses lack adequate pharmacological skills for practice leading to drug name confusion which could result in medication error (Brady et al. 2009), it is recommended that assessment of nurse’s competencies in relation to safe medication administration be included in the induction/orientation package in nursing homes and an up to date pharmacology reference book such as British National Formulary (BNF) and/or MIMS should be accessible to healthcare professionals working in nursing homes.

5.5 Conclusion

All professionals who are involved in medicine management are governed by a legal and professional accountability to follow best practice when prescribing, dispensing and administering medication. It was the aim of this project to implement best practice in managing medication in a nursing home, thus reducing the risk of error. The writer has discussed how this change project was implemented successfully using a mixture of change and improvement model coupled with management tools such as force field analysis to overcome barriers encountered during the implementation. Findings from evaluation have demonstrated that medication errors do occur and these can be minimized by a change in practice and behaviour of those involved in medication use process.

In addition to this, various change models were explored and critiqued. Also, reviewing the literature on the change topic, the writer have been able to discuss relevant themes including nursing homes profile; prevalence, type and causes of medication error and adverse drug event in nursing homes and in hospitals; various medication supply system used in practice; barriers to implementation of medication safety and error detection methods.

In conclusion, leading change involves ability to build a shared vision, encourage participation/motivation, share information and enable trust through team working, deal with
unexpected issues, role model through behaviours and goal setting (Yoder-wise, 2003). To ensure that the new practice is sustained, a plan was put in place to carry out medication management audit every 3 months.
REFERENCES

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Esmail R, Cummings C, Dersch D., Duchscherer., G., Glowa, G. & Liggett, G.et al.(2005). Using healthcare failure mode and effect analysis tool to review the process of ordering and
administrating potassium chloride and potassium phosphate. Healthcare Quality, 8(sp), 73-80.


Appendix 1-Blister pack (old medication administration system)
## Appendix 2: Audit Tool

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Audit Objective and Scope</td>
</tr>
<tr>
<td>2</td>
<td>Audit Planning</td>
</tr>
<tr>
<td>3</td>
<td>Audit Evidence Collection</td>
</tr>
<tr>
<td>4</td>
<td>Audit Findings and Recommendations</td>
</tr>
<tr>
<td>5</td>
<td>Audit Report</td>
</tr>
</tbody>
</table>

*Note: Detailed sections for each item are not provided in the image.*
Appendix 3-New medication administration system
Appendix 4-Action plan

<table>
<thead>
<tr>
<th>Aim</th>
<th>Objective</th>
<th>Action</th>
<th>Who’s responsible</th>
<th>Time frame</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>To implement best practice in medication management</td>
<td>a) To reduce medication error by 90%</td>
<td>1) Carry out an audit of the current medication administration system</td>
<td>Change agent</td>
<td>First week in September 2011</td>
<td>1) Medication management audit tool, Review resident’s record, direct observation and incident report form.</td>
</tr>
<tr>
<td></td>
<td>b) To increase staff compliance to the nine rights of medication management by 90%</td>
<td>2) Obtain baseline data</td>
<td>Change agent</td>
<td>Week 2-3</td>
<td>2) Repeat review of resident’s record, direct observation and incident report form.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3) Consult with Key stakeholders (proprietor, pharmacist and nurses), finalise and agree plan</td>
<td>Change agent/key stakeholders</td>
<td>Week 4</td>
<td>2) Repeat review of resident’s record, direct observation and incident report form.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4) Review literature and relevant document and results of the audit and baseline data</td>
<td>Change agent/key stakeholders</td>
<td>Week 5-7</td>
<td>3) Staff satisfaction questionnaire</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5) Attend online training on medication management</td>
<td>All nurses</td>
<td>Week 7-8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6) Manage feedback and set implementation date</td>
<td>Change agent/key stakeholder</td>
<td>Week 9</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 5 - Forcefield analysis

Driving forces                              Resisting forces
Government legislation                     Lack of resources
Leader’s commitment                        Fear of punishment
Training                                   Increased workload
Provision of resources                     Interruption
Appendix 6- Self reporting questionnaire

<table>
<thead>
<tr>
<th>Administering medications</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I check the dose on the medication chart and the dispensing bottle.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I check the dose when placing the medication into the cup.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I check the dose when I close the medication bottle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I confirm the identity of the resident before given the medication by calling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>the resident’s name prior to administration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I check the route of the drug administration at least three times before giving</td>
<td></td>
<td></td>
</tr>
<tr>
<td>the medication.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I give the medication at (or not more than 30mins prior) to the time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>medication is due.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I challenge/confirm all medication orders that are unusual/abnormal frequency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>of administration/potential interaction/low dose/high dose.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. I notify the nurse manager when an error occurred and complete an incident report</td>
<td></td>
<td></td>
</tr>
<tr>
<td>within 8 h of a suspected or known medication error/incident.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. At the end of my shift, I check that I have signed correctly for all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>medications given.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 7-Sample medication administration pro forma data collection sheet

Administering nurse: Nurse F                                                  Date: 20/01/12

Time medication round commenced: 4pm                                         Completed: 4.30pm

<table>
<thead>
<tr>
<th>Resident name</th>
<th>Time</th>
<th>Medication given</th>
<th>Dose</th>
<th>Dosage formulation</th>
<th>Route</th>
<th>Recorded on chart (signed as ‘given’)</th>
<th>Observer’s comments/unusual administration comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.P</td>
<td>4.15pm</td>
<td>Seroquel</td>
<td>50mg</td>
<td>Tablet</td>
<td>Oral</td>
<td>Yes</td>
<td>One tablet(25mg) given</td>
</tr>
</tbody>
</table>

Instruction: Compare medication recorded on pro forma with medication recorded on the resident’s chart following the medication round. Check there is valid prescription for each item. When tablets are crushed, check that this has been authorized by the prescriber, and that the authorization is not itself contradicted. Ensure that when medicines are omitted a valid reason has been given. Ensure that the chart has been signed for each administered dose.

Adapted from Dickens (2007, p.169).
Appendix 8-Medication error reporting form

Medication Error Report Form

(Adapted from the AMNCH Medication Safety Incident Report Form)

<table>
<thead>
<tr>
<th>Medication(s)/Dose(s) involved:</th>
<th>Route given:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td></td>
</tr>
<tr>
<td>2)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Profession of staff that discovered incident (tick)</th>
<th>Nurse</th>
<th>Doctor</th>
<th>Pharmacist</th>
<th>Technician</th>
<th>Other (specify)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resident's GMS number</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stage(s) of the process where incident/near miss occurred:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribing □  Ordering □  Dispensing □  Storage □  Administration □  Monitoring □</td>
</tr>
</tbody>
</table>

Medication incident/near miss related to:

| Adverse Drug Reaction □ | Allergy □ | Wrong resident □ | Wrong medication □ | Wrong dose (over/under/intra dose) □ | Omission (no. of episodes, .......) □ | Wrong route □ | Wrong time □ | Wrong dosage form □ | Wrong diluent/ method of constitution □ | Non-compliance with unit policy □ | Wrong rate □ | Wrong frequency □ | Contra-indication to use of medication □ | Resident's BMI recorded incorrectly □ | Wrong duration □ |
|-------------------------|----------|------------------|-------------------|--------------------------------------|---------------------------------------|----------------|--------------|-------------------|---------------------------------------------|------------------|-----------------|------------------|-------------------------------|------------------|
| Unauthorised self-administration □ | Drug-drug interaction □ | Drug-food/interaction □ | Drug-disease interaction □ | Incorrect storage/security □ | Expired drug □ | Unclear/incomplete documentation □ | Unclear/incomplete prescription □ | Unclear/incomplete/incorrect labelling □ | Wrong strength/concentration □ | Medication on Admission/ Discharge □ | Transfer incorrect or not recorded □ | Duplicate therapy □ | Infusion Pump Incident □ | Other □ |

Outcome of incident/near miss:

<table>
<thead>
<tr>
<th>Reached the resident (note on displacement does reach the resident)?</th>
<th>Yes □  No □  Uncertain at time of reporting □</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resulted in harm (e.g. Pain, injury, symptoms)? Yes □  No □</td>
<td></td>
</tr>
</tbody>
</table>

Action required due to the incident/near miss (tick all that apply):

<table>
<thead>
<tr>
<th>No action required □</th>
<th>Observation □</th>
<th>Vital signs monitored □</th>
<th>Tests performed (lab/ x-ray etc) □</th>
<th>Drug therapy added or changed □</th>
<th>Initial hospitalisation □</th>
<th>Prolonged hospitalisation □</th>
<th>Intervention necessary to sustain life □</th>
<th>Intensive care □</th>
<th>Other (specify): □</th>
</tr>
</thead>
</table>

MEDICAL PRACTITIONER notified? □ Yes □ No □ Not Applicable □

Patient aware? □ Yes □ No □ Not Applicable □

Please complete details of incident/near miss overview.
Description of Incident/Near Miss:

Follow-up and actions:

Please describe any follow-up or actions identified ☐ or taken ☐ to reduce the chance of this incident recurring:

Note: Do not delay submitting the report to fill out this section

Name of Reporter __________________________ Contact phone number/bleep/e-mail __________________________

Note: Name of reporter and contact details are optional; however it can facilitate follow-up and feedback if they are provided.

Please fill out the form as completely as possible, and action accordingly in line with local risk management policy appropriate to your setting.

In addition if there are adverse drug reactions/ events identified please also complete the Adverse Reaction Report Form and send to:

FREEPOST
PHARMACOVIGILANCE UNIT
IRISH MEDICINES BOARD
EARLSFORT CENTRE
EARLSFORT TERRACE
DUBLIN 2
Appendix 9

| Medication Administration System-Nurses Assessment of Satisfaction(MAS-NAS) Scale |
|-------------------------------|-----------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| **Items**                     | **Strongly agree**                | **Moderately agree** | **Slightly agree** | **Slightly disagree** | **Moderately disagree** | **Strongly disagree** |
| 1. Efficacy                   |                                   |                  |                  |                  |                  |                  |
| a) The current medication administration system helps me to be efficient at medication administration |                                   |                  |                  |                  |                  |                  |
| b) The current medication administration system is effective in reducing and preventing medication errors |                                   |                  |                  |                  |                  |                  |
| 2. Safety                     |                                   |                  |                  |                  |                  |                  |
| a) The current medication administration system makes it easy to check active medication orders before administering medications. |                                   |                  |                  |                  |                  |                  |
| b) The current medication administration system makes it easy to check that I am following the “9 rights” when I administer medications. |                                   |                  |                  |                  |                  |                  |
| 3. Access                     |                                   |                  |                  |                  |                  |                  |
| a) The current medication administration system promotes two-way communication between clinicians (GP, Pharmacist, RN) about medication orders. |                                   |                  |                  |                  |                  |                  |
| b) The drug information available through the current medication administration system is easy to get when I need that information. |                                   |                  |                  |                  |                  |                  |
| c) Information available through the current medication administration system helps me to know what to do should my patient have any bad reactions from a medication. |                                   |                  |                  |                  |                  |                  |
| d) Because of information available through the current medication administration system, I know both the intended actions and side effects of medications I administer |                                   |                  |                  |                  |                  |                  |

Adapted from Hurley et al (2006, p.299)