Transformational leadership in nursing and medication safety education: a discussion paper

Short title: Transformational leadership and medication safety

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Authors' contributions

MV, PG, HT, and SJ designed the study. All authors were responsible for writing the article and agreed with the final version to be published.

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Abstract

Aims: This paper discusses the application of transformational leadership to the teaching and learning of safe medication management.

Background: The prevalence of adverse drug events (ADEs) and medication-related hospitalizations (100,000 each year in the USA) are of concern.

Evaluation: This discussion is based on a narrative literature review and scrutiny of international nursing research to synthesise pedagogical strategies for the application of transformational leadership to teaching medication safety.

Key Issues: The four elements relating transformational leadership to medication safety education are: ‘‘Idealized influence’ or role modelling, both actual and exemplary, ‘Inspirational motivation’ providing students with commitment to medication safety, ‘Intellectual stimulation’ encouraging students to value improvement and change, and ‘Individualized consideration’ of individual students’ educational goals, practice development, and patient outcomes. The model lends itself to experiential learning and a case-study approach to teaching, offering an opportunity to reduce nursing’s theory-practice gap.

Conclusion: Transformational leadership for medication safety education is characterized by a focus on the role of nurse educators and mentors in the development of students’ abilities, creation of a supportive culture, and enhancement of students’ creativity, motivation and ethical behaviour. This will prepare nursing graduates with the competencies necessary to be diligent about medication safety and the prevention of errors.

Implications for nursing management: Teaching medication safety through transformational leadership requires the close collaboration of educators, managers, and policy makers. Investigation of strategies to reduced medication errors and consequent patient harm should include exploration of the application of transformational leadership to education and its impact on the number and severity of medication errors.

Keywords: leadership; medication errors; education, nursing; patient safety; transformational leadership (MeSH checked, October 31, 2015)

Introduction: Patient safety and medication error

The problem

Strategies to reduce the incidence of adverse drug events, and provide safer and higher quality healthcare services, require clinicians' engagement with preventive as well as reactive measures (Aggarwal et al. 2010, DeBourgh 2012, Office of Disease Prevention & Health Promotion [ODPHP] 2016). 'Adverse events' research came to prominence when the Institute of Medicine reported that in-hospital medical errors alone killed more people than HIV/AIDS, breast cancer or motor vehicle accidents (Kohn et al. 1999). In a healthcare industry struggling to improve productivity and cost effectiveness, responding to public concern regarding the impact of errors on patients' well-being, remains an enduring challenge (Brown et al. 2010, Gabe et al. 2011).

Adverse drug events (ADEs) account for nearly 700,000 emergency department visits and 100,000 hospitalizations each year in the USA (Agency for Healthcare Research and Quality [AHRQ] 2015), 5-8% of unplanned hospital admission in the UK (National Institute for Health and Care Excellence [NICE] 2015), and 2-3% of all admissions in Australia, costing $1.2bn (Australian Commission on Safety and Quality in Health Care 2013). They also affect nearly 5% of hospitalized patients, making them one of the most common types of inpatient errors; ambulatory patients may experience ADEs at even higher rates (AHRQ 2015).

Medication errors are preventable events that may cause or lead to inappropriate medication use or patient harm while the 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 Co-ordinating Council for Medication Error Reporting and Prevention [NCCMERP], 2015). Medication errors and health-care related adverse events occur in 8-12% of hospitalizations in European Union Member States (World Health Organisation [WHO] 2015). It is estimated that medication errors cost the USA between $15 and 28bn each year (Aitken & Valkova 2013, European Medicine Agency [EMA] 2015). The cost of medicines' mismanagement is much higher. In 2012, the USA spent $213bn (8% of total healthcare spend) on the additional healthcare needed as a result of non-adherence, delayed evidence-based treatment, antibiotic misuse, medication errors (prescribing, dispensing, administering and monitoring), use of branded products, and mismanaged polypharmacy (Aitken & Valkova 2013).

Nurses and safe medication management

Medication safety depends on multi-disciplinary input and collaboration; with nursing as constituting the largest number of health professionals involved in medication safety. Nurses have a prominent role in the administration of medicines, and good nursing practice can reduce adverse events that result from suboptimal prescription, administration or monitoring of medicines. Whilst the challenges of safe medication practice require the involvement and collaboration of all healthcare staff (Härkänen et al. 2014, Mendes et al. 2014, Vaismoradi et al. 2014c), medication safety is a central element of nursing practice, requiring both theoretical and practical knowledge of nursing science (Pohl et al. 2009, Richardson & Storr 2010) and competency frameworks (Hemingway et al. 2011a,b).

Medication safety is a routine but complex intervention and errors sometimes have serious consequences (Brady et al. 2009, Hewitt et al. 2015, Vaismoradi et al. 2014a,b): for example, administering diamorphine instead of morphine has proved fatal (National Patient Safety Agency [NPSA] 2009). Drug non-availability, wrong dose, wrong route, unauthorized drug, extra dose, wrong formulation, late dose, missed dose, failure to check patients for allergies or potential adverse effects, and failure to interpret vital signs in the light of medicines administered are common forms of medication errors committed by nurses (Donaldson et al. 2014, Jordan & Kyriacos 2014).

Nurses have focused on creating a safe environment performing the five "Rights" of medication administration-the right drug, the right dose, the right time, the right route to the right person (Adhikari et al. 2014). However, this traditional demarcation of responsibility fails to account for all aspects of the NCCMERP definition of errors or ensure that nurses contribute to the multidisciplinary team's role in preventing medicines' mismanagement. The distance between these realities of clinical practice and educational realities merit exploration and articulation (Jordan 1998, Smeulers et al. 2014), and novel approaches to medication safety (Hoefel et al. 2008, Brady et al. 2009).

Medication safety in nurse education

Diligence regarding safe practice, skill in determining the root causes of error, and leadership are core nursing competencies that contribute to a healthcare culture that emphasises patient safety (Neudorf et al. 2008). Ensuring that nursing students have sufficient knowledge and skill for practice requires appropriate teaching time and strategies to ensure students are able to manage

medication safely (Jordan 1997, DeBourgh 2012, DeBourgh & Prion 2012), and avoid further failures of service provision (Andrews & Butler 2014, Francis 2013).

Several models based on the required competencies of graduates have been developed to guide nurse educators and describe required educational interventions (Gordon et al. 2012). For example, the QSEN [Quality and Safety Education for Nurses] (2014) and the NONPF [National Organization of Nurse Practitioner Faculties] (2011), competencies aim to: minimize the risk of harm to patients and healthcare providers through both system effectiveness and individual performance; recognize human factors and patient safety principles; evaluate how organizational, structural, financial, and policy decisions impact quality; and manages risks to individuals, the public and health care system (Forbes & Hickey 2009, Pohl et al. 2009). Even if nursing students are familiar with the principles of medication safety, they can lack practical knowledge of safe practice. Such absence of the main tenets of patient safety, and insufficient focus on holistic medication safety, may serve to highlight the limitations of nursing education (Steven et al. 2014).

Leadership in nurse education

Improvement of medication safety and safe healthcare depends on the definition and expansion of nursing roles (Jordan & Kyriacos 2014). Demonstration of commitment to patient safety, reformation of outdated structures, creation of a strategic plan and appropriate quality standards, and advancing the quality agenda are all necessary to improve medication safety (Feng et al. 2011, Ginsburg et al. 2010).

Nurse leaders from both education and practice are vital to the management of risk and provision of competent and safe nurses (Huston 2008, DeBourgh 2012). The increasing challenges confronting nurse leaders in healthcare organisations demand adaptive and flexible styles of leadership. Leadership styles can be considered across an autocratic–democratic dimension (Handy 1999), with the style adopted playing a vital role in organizational effectiveness. Autocratic leadership styles that focus on task completion alone, with limited scope to challenge the *status quo*, are less suited to achieving optimum outcomes in today's evolving and complex healthcare organisations (Cummings et al. 2010). However, overly democratic and *laissez faire* styles do not offer the support and direction that nurses require when learning new approaches and skills and undertaking 'high risk' activities, such as medicines' administration. A core difference between transformational leadership and other styles of leadership is the leader's

flexibility and focus on the improvement of the healthcare organization and commitment towards organizational objectives (Stone et al. 2004). Transformational leaders motivate nurses by appealing to moral values and provide supportive environments where responsibility is shared (Doody & Doody 2012). Utilisation of a transformational leadership style has been associated with increased job satisfaction, increased staff well-being, decreased workplace stress, burnout, and staff turnover (Clavelle et al. 2012, Cummings et al. 2010, Weberg 2010).

Commentaries on leadership models in healthcare education in the early part of the 21st century support the widespread belief that leadership skills enhance both the student's learning and quality of patient care (McFadden et al. 2009, Kirch & Boysen 2010, Clarke 2013), particularly transformational leadership (Hutchinson & Jackson 2013, Wong 2013). It is suggested that realising the vision of transformational leadership will create a sense of urgency, set a clear direction, reinforce expectations, and provide support for changes leading to enhancement in the quality of care and improved patient outcomes (Porter-O'Grady 2011, McFadden et al. 2009). It is noted that the leadership behaviour in transformational leadership is characterized by the assignment of activities and sharing of responsibilities to both leaders and followers (Künzle et al. 2010). Therefore, transformational leadership is appropriate for the education of patient safety and requires a shared commitment by nurse educators, nursing students, and nurse managers (Clarke 2013, Middleton 2013, Salminen et al. 2010).

Despite theoretical emphasis on transformational leadership and its potential to improve patient safety, the mechanisms to action this leadership style in patient safety education are under-theorized (Cummings et al. 2010, Künzle et al. 2010). Therefore, this paper will discuss how the application of transformational leadership can influence medication safety education.

Search strategy

A narrative literature review was conducted to gain understanding of the topic of transformational leadership and to provide information on current practice, policies and leadership strategies related to medication safety. By using this type of review, a body of literature from all empirical and theoretical data sources was selected to enhance a holistic understanding of transformational leadership and medication safety. Conclusions were drawn, summarized and synthesized (Cronin et al. 2008). A literature search was performed using published peer-reviewed research papers in the electronic databases PubMed (including Medline), CINAHL, SCOPUS, OVID, Wiley Online Library, and Science Direct. The following

key terms were included in the search 'transformational leadership'; 'Adverse Drug Events (ADE)'; 'medication safety' 'patient safety', 'nursing education', and 'medication error'. Inclusion criteria were studies that considered a) ADE; b) medication safety; together with c) leadership or transformational leadership; only papers published in English and available in full text were considered. There was no time limit on inclusion. Exclusion criteria were: a) papers not available in English and b) non-empirical papers. Focussing on the study topic reduced potentially relevant papers from 28573 to 150. The researchers evaluated the sources according to relevance and general quality and duplicated papers were removed. 60 sources were excluded based following this process. 90 Papers were then scrutinised to provide an overview of the study topic.

The search was extended to identify additional related sources. National, and international websites - key contributors to research on medication safety and safe care education - were reviewed and 10 further references were included: World Health Organisation [WHO], Quality and Safety Education for Nurses [QSEN], European Medicines Agency [EMA], Office of Disease Prevention & Health Promotion [ODPHP], National Organization of Nurse Practitioner Faculties [NONPF], National Institute for Health and Care Excellence, [NICE], National Co-ordinating Council for Medication Error Reporting and Prevention [NCCMERP], Australian Commission on Safety and Quality in Health Care, Agency for Healthcare Research and Quality [AHRQ], Institute for Healthcare Informatics [IMS]. The exhaustive nature of this search convinced the authors that acquiring new information from more searches would be unlikely (**Figure 1**).

Themes were extracted from the remaining sources based on their relatedness to the dimensions of the theory of transformational leadership with regard to the education of medication safety in nursing. The four dimensions of transformational leadership: 'Idealized influence'; 'Inspirational motivation'; 'Intellectual stimulation'; and 'Individualized consideration' (Bass, 1985, Burns, 1978) structure this discussion paper.

Table 1 summarizes the elements of transformational leadership and their application to medication safety and the main educational requirements for medication safety, as set out by the Pharmacovigilance Risk Assessment Committee [PRAC] (2015).

Idealized influence

This refers to the nurse educator's behaviour as someone who role models safe and ethical care behaviours. The educator leads nursing students to reach their educational goals through the provision of opportunities to practice safe care, and so instilling shared values and objectives and commitment to safe medication practice (Menon 2010, Ross et al. 2014). This includes understanding and internalizing the values to minimize patient harm and so guarantee students' commitment to act against any acts or omissions violating safe care principles (DeBourgh 2012, Vaismoradi et al. 2011). Motivation to value a culture of medication safety can be supported by educational goals aligned with the explicit goals of healthcare settings and supporting of clinical excellence. For example, the creation of a clinical-educational statement mission as a non-punitive error reporting policy can help experienced staff teach how to disclose errors and share stories using a case study with medication errors can assist in this learning (Jordan 1997). Regular error reporting allows for trending and analysis of errors and near misses, and creates a culture in which clinicians, nursing faculty and students can learn from mistakes and so help prevent such errors in the future (Barnsteiner & Disch 2012, Kirch & Boysen 2010).

Educational goals should include: understanding the roles of other healthcare professionals; peer education; interprofessional continuing education; interprofessional collaboration, awareness of personal responsibility for patient safety; proactive rather than reactive responses to medication errors; awareness of high risk situations; critical reasoning and judgment skills; and monitoring and leading the performance of healthcare team members (DeBourgh & Prion 2012, Hoffman et al. 2008, Künzle et al. 2010, NICE 2015, Porter-O'Grady 2011).

Also, the internalization of the values that prevent patient harm requires the establishment of patient safety goals and their frequent communication to students (DeBourgh & Prion 2012, Feng et al. 2011, Vaismoradi 2012). Beside the formal objectives, the activities of the members of the healthcare team as observed by students during clinical education need consideration (Pingleton et al. 2010). As students learn the fundamentals of medication safety during classroom education, they are also imprinted by the practice they see in clinical settings, thereby creating a powerful informal curriculum through the observation of care delivery (DeBourgh 2012, Vaismoradi et al. 2011, Tella et al. 2015a). Therefore, the nurse educator, in both academic and clinical settings, can serve as a role model for socialization and can enhance student willingness to collaborate and teach one another by the nature of the informal student-to student

relationship. This also offers students a sustained exposure to the progression of knowledge and skill with a focus on medication safety (Hoffman et al. 2008, Pappas 2007).

Inspirational motivation

Nurse educators inspire students by providing meaning and challenge through education. A transformational leadership style can provide a learning environment by challenging the current patient safety structure to develop competent and committed nurses, who are optimistic about the future, aspire to excellence, and embrace continuous learning for safe practice (Bamford-Wade & Moss 2010). The application of the language of challenge in nurse education requires the modification of curricula and teaching styles, and the translation of lessons learnt into clinical practice (Forbes & Hickey 2009, Jordan 1998, Jordan & Reid 1997, Neudorf et al. 2008). A teaching strategy to enhance such learning is the inclusion of challenging scenarios that students might face as qualified nurses in order to improve their awareness of the possibilities of medication errors (Jordan 1997, Jordan et al. 1999).

Feedback on medication safety, potential errors and near misses, should be integrated into routine classroom teaching and continuous reflective learning encouraged (Kvist et al. 2013, Vaismoradi et al. 2014a). Students should be asked to read the reports of medication errors, compile structured Adverse Drug Reaction Profiles with their patients (Jordan et al. 1999), and examine critically their own and their peers' medication errors or near misses and identify previously unrecognised ADEs (Kirch & Boysen 2010). A consistent feature of this process is root cause analysis, in which students challenge the current condition, analyse adverse events occurring in practice and identify strategies for the prevention of future practice errors (Dolansky et al. 2013, ODPHP 2016). Presenting results from reporting system, and disseminating their findings can be the key features of the medication safety agenda in nurse education (Neudorf et al. 2008, Pearson et al. 2010).

Intellectual stimulation

Intellectual stimulation occurs when the nurse educator encourages students to be creative and innovative, and to be critical in relation to existing assumptions and traditions of practice. The nurse educator and students are open to re-examination of their own beliefs and perspectives regarding safe practice, and to put a high value on improvement, learning and change (Jordan 1994). The nurse educator in the role of a transformational leader influences the students'

innovation behaviour via the mediation of the climate of safe practice teaching (Weng et al. 2015).

Teaching approaches and positive patient safety outcomes, such as fewer medication errors may be linked (Jordan et al. 1999, Jordan & Reid 1997, Wong 2015). Discussions in small groups and reviewing key medication safety principles lead students through the application of medication safety's principles to problems faced in practice (Forbes & Hickey 2009, Kim et al. 2010).

A variety of technologies including virtual reality, simulated patients, and manikins make creative and effective teaching tools for teaching medication safety (Aggarwal et al. 2010, Aura et al. 2015), and numeracy (Hemingway et al. 2011a, Ramjan et al. 2014) and minimise the risk of medication errors (PRAC 2015). Also, informatics-based approaches and the application of technologies such as use of palm-based drug formulary software, chart audits, response to video clips, simulated charts and standardized patient interviews have significant roles to play in the pedagogical methods when teaching pharmacology and drugs' side effect assessment (Bakken et al. 2004, Jordan et al. 1999, 2015, Singh et al. 2005).

Individualised consideration

Students' individual educational needs are fostered by one-to-one teaching, where students are encouraged to design personal goals and so be motivated to engage in their own development in safe medication practice. Students' self-confidence and medication competence are inter-related (Sulosaari et al. 2012). Students need to be allowed to be fully involved in medication administration and management to improve their self-confidence to their own practice. Fear of errors often discourages students from gaining sufficient experience in medication administration to become expert, self-confident or even fully competent, which set the scene for future mistakes. Therefore, development of students' self-confidence and capacity to rely on their own abilities and knowledge (Vaismoradi et al. 2014a,b) should be balanced with adequate supervision is the cornerstone of safe medication education (Brady et al. 2009, Reid-Searl et al. 2010).

The establishment of the concept of a learning organization, viewing medication error as a system failure rather than blaming individuals is at the heart of patient safety education (Mansour 2012). Thus, students can be guided to utilize reporting systems, to feel safe to disclose their errors or near misses and reflect upon such errors and take new learning into future patient encounters (Andrew & Mansour 2014, Brady et al. 2009, Steven et al. 2014, Tella et al. 2015b).

Transformational leadership and teaching strategies

The expansion of nursing roles requires a higher level of leadership, critical thinking, clinical judgment skills and practical experiences to prepare nurses to meet the needs of increasingly complex healthcare systems. Kolb's experiential learning style (Kolb 1984) guides students' education in terms of the creation of durable changes in behaviour through practising what they have been taught (Bergsteiner et al. 2010, Frankel 2009, Jordan 1994) (**Figure 2**).

The transformational leadership model for the education of medication safety emphasises setting educational goals that are achievable through the provision of experiential learning situations in clinical practice. As described the transformational leadership model of medication safety education used with used learning tools such as the Kolb experiential learning style, case studies, scenarios, patient simulators and problem-based learning on one-to-one or small group situation can help bring together theoretical knowledge and psychomotor skills and facilitate the development of the student's critical thinking ability (D'Amore et al. 2012, Frankel 2009, Jordan 1994, 1997, Lisko & O'dell 2010) (Table 1).

Conclusion

The transformational leadership for medication safety education is characterized by a focus on the role of the nurse educator in developing nursing students' abilities and educational resources, creating a supportive culture, and enhancing students' creativity and motivation.

The application of the transformational leadership to medication education and its impact on medication errors, adverse drug events and patient outcomes merits research to ascertain its effect on addressing the number and severity of medication errors in comparison to other leadership styles.

Implications for nursing management

Teaching medication safety through transformational leadership requires close collaboration between educators, managers, and policy makers. Closing the gap between health care demands and nursing education (Jordan 1994) needs policymakers and nurse managers to influence nursing curricula to strengthen investment in medicines' management so as to give nurses the knowledge, skills and attitudes to ensure competent and safe medication practice. Leaders are responsible for ensuring that the content and delivery of the theoretical components of educational programmes, and the experiential learning gained during contemporary clinical practice, are fit for practice and purpose. The reported care deficits (Francis 2013, Andrews &

Butler 2014) offer opportunities for transformational leadership as a model of strong leadership in to nurse education to ensure effective student learning. Its principles can be applied in nursing education to not only to prepare effective health care leaders, but also to ensure that medication safety is taught so effectively that medication management improves and fewer people are hospitalised as a result of ADEs and medicines' mismanagement.

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Table 1. The application of transformational leadership in medication education and main medication safety educational outlines according to PRAC (2015)

Transformational leadership elements	Medication safety aspects	Medication safety educational outlines according to PRAC (2015)
Idealized influence	Role modelling by educators of ethical, professional behaviour Setting goals; Internalising values; Adding goals to courses; Integration of educational goals to clinical excellence; Education in the healthcare setting; Involvement of practical nurses in teaching; Interprofessional education; Peer education	Teaching safe prescribing, dispensing, administration, monitoring and provision of information; Obligating students to read and update their knowledge of medication errors using periodic safety update reports; Learning medicines' similarities and differences in terms of nomenclature, posology, appearance, method of administration, strength and packaging; Proactively identifying and assessing the risks of medication errors; Avoiding common drug administration errors such as wrong drug, dose, strength, indication, route of administration, formulation, timing or duration of treatment, dose calculation, infusion rate and immediate/slow release formulations, dilution or reconstruction of parenteral drugs prior to use; Avoiding misspelling of drug names and misapplication of similar abbreviations; Seeking patient participation through to checking that the drug is the product generally recommended; Giving sufficient verbal and written information of
Inspirational motivation	Articulation by educators of a vision and a challenge to provide care delivery of a high standard; Questioning existing practice; Revising teaching process; Using challenging scenarios and case studies; Giving feedback; Examining error reports; Discussing the circumstances surrounding errors;	

Intellectual stimulation	Re-examining and challenging assumptions and traditions; Encouraging creativity; Applying technology in education;	medication to patients and their caregivers; Learning the most common trade names and the possibility of misunderstanding through 'look alike sound alike' errors; Checking expiry dates of drugs and ensuring correct storing conditions; Avoiding errors of omission due to failure of communication between staff when transferring the patient; Checking allergies and drug interactions; Conducting RCA for any medication error detected; Applying internet-based and new technologies such as smart phones and software to keep abreast of new developments; Appropriate use of computerized systems such as EHR to support safe medicines' management; Considering variations in age, and also background diseases influencing drug dosage; Using reporting mechanisms - what and how to report; Monitor patients for any potential adverse effects of their medicines, using structured profiles or checklists; Interpreting patients' vital signs with reference to their prescribed medicines, including general anaesthetics, diuretics, beta blockers, alpha blockers or antidepressants.
Individualized consideration	Providing mentorship to individual student needs; Improving students' self-confidence and intrinsic motivation; Being fully involved in practice; Applying direct supervision; Advocating for students and patients; Monitoring individual patients	

EHR: electronic health record

RCA: root cause analysis

Figure 1. A summary of narrative literature review

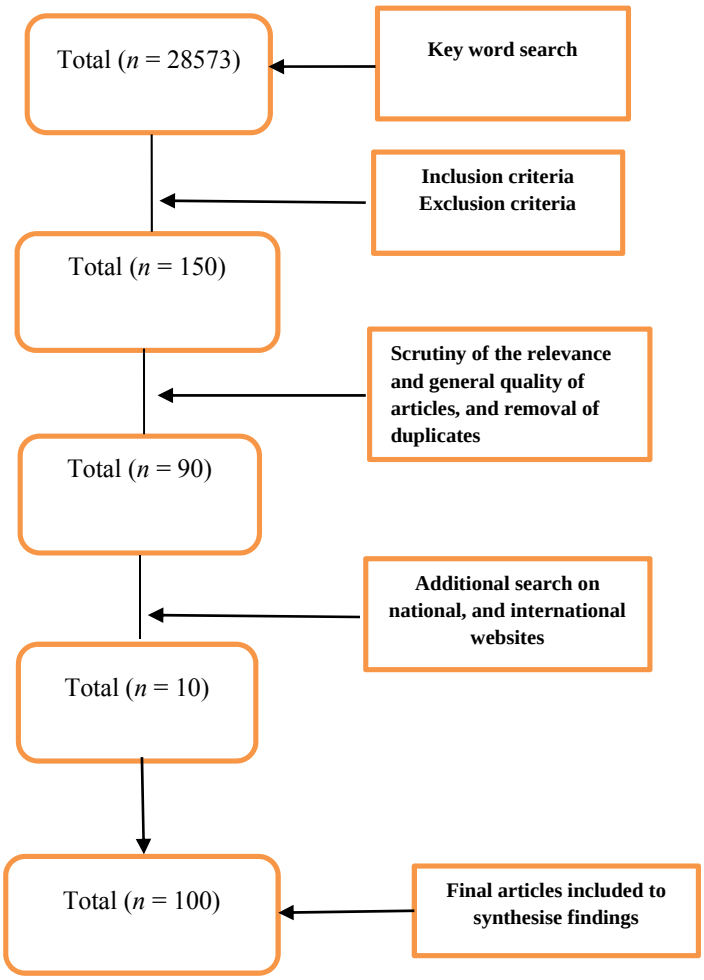
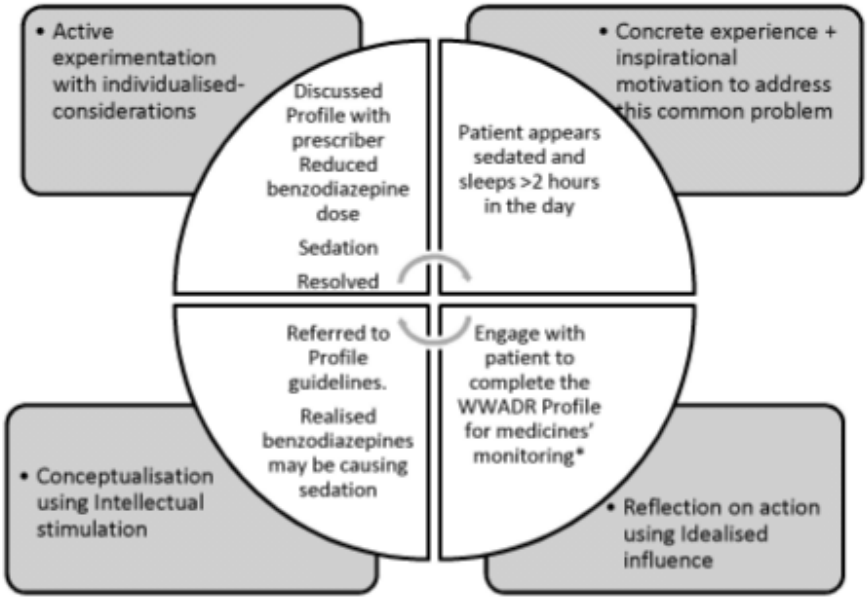


Figure 2. Safe medication management, TFL and the Kolb learning cycle – an example



*The West Wales Adverse Drug Reaction (WWADR) Profile for mental health medicines is an instrument to support nurse-led patient monitoring for the adverse effects of prescribed medicines (Jordan et al 2004, 2014).

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