INVESTIGATING
MEDICATION ERRORS
IN THE
TRANSFER OF CARE WITHIN
MENTAL HEALTH SETTINGS

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Contents

1. Abstract

Medication errors are commonplace within healthcare and increase during times of care transfer, however, this has been under-investigated within mental health settings. Therefore, in line with the World Health Organisation's Third Global Safety Challenge, the aim of this literature review was to investigate the types of medication errors found in mental health settings during care transfers, the most common care transfers and to develop potential audit standards.

The literature search was conducted in the following electronic databases: PsychINFO, Embase, Medline, Scopus, Web of Science and Cochrane on two separate dates. Papers were included if they had been undertaken within mental health settings.

More studies need to be conducted within mental health settings, looking at both medication and care interfaces. Extensive gaps in the literature reflect how mental health services have been side-lined for many years, with absolutely no studies in certain specialist settings, such as; forensic services or psychiatric intensive care units. This highlights areas in need to further research. Additionally the sheer number of care interfaces presented to patients in mental health undoubtedly increased risk of medication errors. Most significantly, improvement in communication between different care sectors is essential for effective and safe continuity of care.

2. Aims

2.1 To assess the literature and research with reference to errors and safety in transfer of care within in Mental health inpatient units

2.2 To improve the safety of those within inpatient mental health services

2.3 To understand where further research should be undertaken

3. Objectives

3.1 To understand the breadth of research already taking place in this field

3.2 To develop standards which can be audited against in inpatient mental health settings

3.3 To use the literature review to develop an audit

4. Introduction

The World Health Organisation (WHO) Third Global Safety Challenge has set the goal of reducing severe, avoidable harm related to medication by 50% over five years globally (1). Within this, one area which has been highlighted is; transitions of care (1). It is known that patients accessing mental health services will encounter a high number of care transfers and are usually on a variety of medications. Therefore, this review aims to evaluate the literature analysing medication errors which take place when care is transferred. From this information an audit will be designed to investigate ways in which errors can be reduced within inpatient mental health settings.

Medication is one of the most common areas where errors are made during a person's care (2, 3). This can be in primary and secondary care settings with the burden of these errors resulting in cost to the NHS, poorer outcomes for those patients affected and in some cases, fatalities (2, 4). Additionally, medication errors can contribute to an increased length of hospital stay, thus increasing cost of care and burden on the already stretched NHS (2).

Safety around medication was first recognised as an area for improvement in the sixties, with studies showing that over 5% of all hospital admissions are due to adverse drug reactions (ADRs), including medication errors (1, 5). Historical studies have shown the global burden of ADRs to have remained at the same level despite changes in systems and interventions (5). This highlights the importance of further development needed in this area and demonstrates the significance of The WHO Third Global Safety Challenge (1).

There are a variety of definitions offered in the literature to specify a medication error (6-8). As per the Policy Research Unit in Economic Evaluation of Health and Care Interventions (EEPRU) a medication error can be defined as 'a preventable event that may lead to inappropriate medication use or patient harm' (2).

It is known that polypharmacy and co-morbidities can increase the risk of a person being subjected to a medication error during their care. These are two giants when considering the population receiving mental health care in the UK, making an already vulnerable group more at risk (3). It is predicted that 46% of people living with a mental health condition also live with a long term health condition (9). This statistic can be partly attributed to a reduced motivation and personal ability to effectively self-manage health. Thus potentially contributing to poorer lifestyle choices, such as diet and smoking, which can impact upon health as well as poor adherence to medical care plans and treatments (10). However, it is also fact that many of the medicines used to treat mental health problems are associated with side effects such as weight gain, metabolic syndrome, diabetes and tachycardia. Therefore it is a fine balancing act to keep someone both mentally and physically well, and often leads to polypharmacy and additional prescribing to manage side effects of key psychotropic medications.

It is also known that medication errors occur more frequently when care is transferred (3, 11, 12). This can be between wards during inpatient care, during admission and discharge and within the community between specialists (12). However, people accessing mental health services are often faced with an extensive range of service interfaces making them more likely to have their care transferred (3, 13, 14). This is in addition to the fact many service users are known to present

repeatedly to psychiatric services, sometimes referred to as the 'revolving door' phenomenon (15). This increases the likelihood of them experiencing a medication error in their care.

The mental health setting is different to that of acute health trusts in many ways, but especially when considering medication. The range of medications used is smaller and more specialised, and ambulatory patients means coordination of drug rounds differ vastly to those in acute trusts (16). When reviewing the literature, it is clear that the outcomes cannot be applied straight to mental health settings due to differences in medications and care transitions.

It is imperative that studies conducted in mental health settings, investigating medication errors and care transfers are analysed to see where medication errors occur, and to identify compounding factors. The outcome of this literature review will be used to design an audit to identify medication errors during care transfer in a London Mental Health trust and improve service users experience of mental health services.

5. Methods

The literature search was conducted in the following electronic databases: PsychINFO, Embase, Medline, Scopus, Web of Science and Cochrane on two separate dates December 5th 2019 and June 14th 2019. The following key terms were used to conduct the search in combination: (1) medication, medicines, medicines management, drugs, therapy, medication errors, drug errors, drug administration errors; (2) care transfer, transitions of care, transfer, transition, care interface, interface; (3) mental health, psychiatry, psychiatric, psychiatric unit, psychiatric ward, mental illness, mental disorder. Reference lists of included publications were also reviewed for additional sources. Google scholar was also used to obtain background information from peer reviewed studies and papers.

Papers were screened for eligibility at the title, abstract and full text levels. Papers were included if studies had been conducted in mental health settings and looked at medication errors. Additionally opinion pieces were excluded as well as papers that were not written in English or if the full paper was unavailable.

6. Main

It is clear from the literature analysing medication errors at care transfers in mental health that there are five main themes; care interfaces, admission and discharge, prescribing practices, challenges faced by nurses and differing infrastructure across services. Findings will be grouped under these headings for ease.

6.1 Care interfaces

Care transfers includes both inpatient and outpatient services. Mental health NHS care in the UK includes a range of specialist teams, which creates additional points of care transfer (3). This includes teams such as; Home Treatment teams, early intervention teams, community mental health teams and so on (17). Furthermore, the selection of different specialist teams can vary across different mental health trusts. This adds to the already established problem of care being transferred between secondary and primary care (14, 17).

Many chronically unwell and acutely ill patients often go between these specialist teams and can be under many different services (3, 17). If a patient is transferred between unfamiliar services, the teams may not know the patient's usual presentation (18). This may result in late recognition of ADRs or paradoxical side effects (3). This demonstrates the importance of effective communication between health care professionals when transferring care. Additionally, patients who become more violent or aggressive, which can be a symptom of poor continuity of care, are more likely to receive higher doses of medication (3, 19). This increases their risk of ADRs and harm, thus highlighting the risk of care transitions for patients accessing mental health services.

Even within inpatient mental health services, patients may experience a range of care transfers; within the same hospital but to another ward (because of an inappropriate ward environment), to a specialist Psychiatric Intensive Care Unit (PICU), to specialist rehabilitation wards, to and from prisons and so on (3). Patients may also be transferred to private mental health hospitals when there are bed pressures or to other mental health hospitals which may be closer to the patients home.

PICUs were set up to manage the most unwell patients within mental health services (19). They also take numerous transfers of patients from prison services, forensic services and court (20). PICU transfers are common within inpatient mental health units and is a time of increased stress for both patients and staff. This is clearly evidenced by aggression being the most cited reason for PICU admission (19). Due to the variable manor of PICU transfers, the priority is to maintain the safety and dignity of both staff and patients. On occasion, this means drug charts and medications can be left behind on the previous ward, resulting in the potential for drug omissions. Despite this transfer of care being very common in mental health settings, there are almost no studies investigating the rate of medication errors in PICU settings or surrounding the transfer. This lack of information is also true for care transfers within all inpatient mental health services and community based services; showing a shocking gap in the literature and a key area for future research.

6.2 Admission and discharge

Accessing care services means an admission and discharge for each patient, thus these events are most frequently experienced. As these transfer events pose the greatest risk of medication errors, it is imperative we gain a better understanding of how these errors occur (3, 12, 21, 22). This is not only true for the mental health setting, but all hospital settings.

On admission to hospital, it is mandatory that medication reconciliation is conducted for each patient. This requires using at least two sources of information to confirm and match the medication the patient was taking prior to admission (23).

The 2007 Quality Improvement Programme (QIP) on medicines reconciliations confirmed that medication errors due to discrepancies are common on admission (23). They received data from 45 mental health trusts regarding their medicines reconciliation process and showed that at re-audit, most of the 79% of patients that had a medicines reconciliation, had it done within 24 hours (23). Of the medicines reconciliation conducted using at least two information sources, 31% identified discrepancies which is comparable to that in the wider literature (21, 23). Interestingly, physical health medications were most commonly implicated in the errors found, showing that physical health medications are often omitted on admission to mental health settings (21, 23, 24).

Overall Paton et al. demonstrated improved use of sources and increased medicines reconciliations in mental health trusts across the UK upon re-audit. Despite this success, it is imperative to acknowledge the difficulties in obtaining accurate medicines reconciliations within mental health settings. Patients are often a key primary source of information when compiling a medicines reconciliation however, patients in mental health services can be poor historians often admitted with acute mania or psychosis (23). Therefore, using alternative sources of information may be more important in mental health settings when comparing the process to other care settings. On re-audit, it was shown that there was an increased number of GPs contacted for information (23).

Medication errors on admission can be further compounded by the fact that many patients often self-medicate with over-the-counter products, including herbal and vitamin compounds (3). There is also a high level of substance misuse amongst the mental health population and this can offer additional areas of drug-drug interactions (3). Patients may not always know about the importance or risks of drug-drug interactions and therefore may not divulge this information regularly to their care provider (3). Pharmacists and clinicians involved in patient care should be skilled in educating the patient to enable them to disclose all relevant drug and medical history. Although it has been shown that pharmacists are superior to other healthcare professionals in obtaining an accurate medication history, due to reduced pharmacy services in mental health trusts, pharmacists may not always be available to complete medication histories and discharge counselling (17).

Keers et al. conducted a study across three NHS mental health trusts in the UK looking at errors on discharge (22). They showed that 81% of the discharges contained an error (22). Medication was often missed off of discharge letters leading to patients not having the correct medication when they leave hospital and GPs not continuing to prescribe the correct medication (22). This was also shown by Raynsford et al. who conducted a study looking at errors made in the community amongst patients with a severe mental health issue (25). Both studies also showed that information regarding

discontinued medications and prescribing directions were often missed off in communication to GPs. Again, leading to incorrect prescribing for patients when in the community (22, 25). Interestingly, Raynsford et al. also identified a lack of understanding of shared care guidelines between primary care prescribers and secondary care prescribers leading to omissions in medication which should have been continued upon discharge (25).

Both Keers et al. and Raynsford et al. highlight the increased risk of errors at the discharge interface and the primary and secondary care interface when considering mental health. It is key to keep up communication between this interface and provide additional support to prescribers, especially in the community. Raynsford et al. highlighted the role of specialist mental health pharmacists and technicians in supporting both primary and secondary care prescribing and their role in reducing errors (25).

6.2.1   Reducing errors at admission and discharge

The role of pharmacy in reducing medication errors during admission and discharge has been proven multiple times. On admission, effective medicines reconciliations completed by pharmacy have shown to be more effective than when they are completed by any other healthcare professional (3, 23, 26). Brownlie et al. also showed the when undertaken by a pharmacy technician, the reconciliation is more timely and can therefore be more cost effective as estimated by NICE (3, 26, 27). This ensures that the correct medications are prescribed and supplied to the patient during their admission. As part of the medicines reconciliation, pharmacy staff are able to contact all prescribers and suppliers of a patients medication (23). This is essential in mental health as specialist psychotropic medication may be supplied by different mental health registered pharmacies, community teams as opposed to the usual GP or community pharmacy (3, 25, 26).

Similarly when preparing patients for discharge, it is imperative that they are counselled on their medication. It has been shown that when discharge counselling and medication education is given to patients, the risk of medication errors decrease (12, 28, 29). Furthermore, it has been shown that discharge counselling leads to reduced readmission rates, which in turn, reduces the number of care transfers a patient is exposed to thereby reducing the risk medication errors. (3, 12)

Discharge counselling empowers the patients to take charge of their own medication and allows them to monitor the prescribing when they leave inpatient settings. Discharge counselling also screens for any discrepancies and issues which may lead to non-adherence (3, 28).

Although every patient should receive medication counselling, it can often be missed. The 2018 Adult Inpatient Survey revealed that almost half of patients had not been advised about medication side effects upon discharge (30). Therefore, when this is considered along with the fact patients commonly have poor insight to their condition, it is not surprising that so many patients living with mental health issues have problems taking medication as prescribed. Lack of adherence has a clear link with relapse and readmission rates; people with schizophrenia are one and a half times more likely to use inpatient services with non-adherence (31-33). This clearly highlights a clear area for improvement as well as demonstrating the importance of patient education and continuity of care in the community (31-33).

6.3 Prescribing practices

It has already been shown that errors on discharge can be due to omissions and lack of understanding of the shared care guidelines. However, when considering prescribing errors which can lead to medication errors it is important to consider all points of care transitions.

In one study of 43 patients, it was shown that 91% of medication prescribing errors occurred at one or more points of care transfers with 69% occurring at the point of admission (21). This reiterates the dangers that admissions can pose. Of the errors found across all of the care transitions investigated, complete drug omissions were the most common, followed by incorrect frequency or dose (21). Potential harm was shown in over 80% of the errors seen on admission and on over 30% of the errors on discharge, demonstrating just how dangerous these errors can be (21). This study investigated patients who were discharged from one hospital and therefore may not be reflective of all care transitions within mental health. However, it does provide insight into the types of errors which occur and the risk this can pose to patients.

Clarke et al. showed that medications were omitted from clinic letters and communications to GPs, as well as on prescriptions (24). Over 80% of these errors made by psychiatrists involved physical health medications (24). This supports the fact that psychiatrists often fail to screen for physical side effects which can be consequences of antipsychotics and antidepressants (3, 17). Procyshyn et al. and Morcos et al. also commented on the lack of screening and monitoring. Most physical health monitoring can be done easily in the community by GPs. However, when medication is omitted, GPs cannot be expected to monitor something they do not know is prescribed. This can result in harm to the patient through toxicity or reduction in lifespan due to the development of various conditions such as metabolic syndrome. Although the study by Clarke et al. may be somewhat outdated, it represents one of the only studies looking at medication errors in outpatient psychiatry settings and still reflects common errors seen in prescribing practises between primary and secondary care.

Interestingly a number of papers have shown that physical health medication is more likely to be omitted by psychiatrists and psychotropic medication is more likely to be omitted by GPs or doctors working in acute services (3, 21, 23, 24). This is unsurprising as Raynsford et al., as previously mentioned, identified a lack of understanding of shared care guidelines (25). However, Keers et al. showed that information outlining continued prescribing responsibility and prescribing instructions was often left off discharge letters (22). This demonstrates a common clerical error which may have caused reduced confidence in prescribing due to lack of support.

Keers et al. also investigated prescribing errors amongst different seniority of doctors. They found that middle grade, senior and locum doctors had the highest level of prescribing errors (22). However senior doctors were less likely to make an error when prescribing psychotropic medication, but more likely to make an error when prescribing non-psychotropics (22). This perhaps supports the fact that errors are made when prescribers are less familiar with the medication they are prescribing. Additionally, they found that more errors were associated with higher levels of polypharmacy (22).

A study in which Robinson et al. compared day care and GP records showed that 55% of patients had discrepancies between the two (34). Of these errors psychotropic drugs were most commonly implicated, including the omission of lithium on the GP records (34). To ensure clear communication

regarding medication changes, Robinson et al. introduced a letter which could be easily completed by the day centre and sent to the GPs. However, on re-audit only minimal improvement was seen, with dangerous errors still being made. This may support the fact GPs and doctors may feel less confident in prescribing medication originally prescribed by a specialist. It could also suggest that medication is not added to records when it is believed that the medication is prescribed and monitored by someone else. This highlights the importance of prescribers understanding their role and responsibility for each medication their patient is on. Omitting medications from GPs records or specialist records can lead to interaction errors at the very least. This again emphasises the importance of communication across care interfaces and the role of services, such as pharmacy, in supporting the correct prescribing practices.

6.4 Challenges faced by nurses

When looking at where medication errors usually take place, it has been shown that errors are most commonly made during the administration of medications (35, 36). Nurses are tasked with understanding the prescribers instructions, choosing the correct medication and ensuring that the right medication goes to the right patient at the right time in the right form. Since nurses are the last barrier between a patient and their medication in an inpatient setting, it is imperative that this area and nurses role in medication is reviewed within mental health settings (37).

Hemingway et al. investigated nurses perceptions to barriers of safe administration of medicines in mental health (38). Although seven themes were identified, those which could be compounded by transfer of patient care were; pharmacological understanding, poorly written and incomplete drug charts and acutely ill patients. These themes were reflected in a qualitative study conducted by Keers et al. (18).

Procyshyn et al. also recognised the responsibility of nurses to be able to make a clinical decision around the administration of 'as required' (PRN) medication (3). Without clear instructions from the prescriber, the nurse has to rely on their pharmacological knowledge and experience to decide whether the drug is needed by the patient and if it is safe and appropriate to give it (3, 18). PRN administration has led to a higher rate of errors, with nurses contributing their lack of pharmacological knowledge to medication errors (3, 16, 18, 38, 39). Harrington et al. and Nirodi et al. also found that the quality of prescribing of PRN medication was of poorer quality than the regular medications (39). Additionally, when new patients are transferred, nursing staff may not know the patient well and will have to make a judgement on the appropriateness of PRN medication. This highlights the importance of doctors and pharmacists making sure that medication is prescribed explicitly and that guidelines are available and accessible to nursing staff. Keers et al. describe the challenges faced by nurses who are not familiar with the patients leading to medications being administered to the wrong patient (18). This is despite nurses following the policy and checking the patients name and date of birth before giving medication (18).

Although Haw et al. recognise that significantly more PRN medication errors were found in their study than expected, the nurses involved did not attribute lack of knowledge or training to the errors (37). Ward environmental factors, poor staffing and personal factors were identified as the main precipitators by both Keers et al. and Haw et al. (17, 37). Additionally, poor prescribing practises were identified as contributing factors and suggested that prescribers have a clear role to play in the

reduction of errors (16, 18, 37). This supports findings by both Hemingway et al. and Procyshyn et al. who also identified poorly written and incomplete drug charts as a source of error (3, 18, 37, 38, 40).

Acutely unwell patients impact upon the ward environment. This has been identified in most studies conducted in mental health settings (3, 17, 18, 37, 38). Acutely unwell patients can often contribute to a volatile ward environment which can lead to an increased number of incidents on the ward. This can mean that medication rounds are often disturbed and interrupted which can promote medication errors.

Additionally, acutely unwell patients are less likely to engage and adhere to medication which puts a greater responsibility on the multi-disciplinary team to educate patients about their medication (3, 17, 38). People accessing mental health services often come in and out of services regularly and have complex health needs (32). This often leads to polypharmacy and very low adherence rates amongst the population due to a combination of poor insight and lack of medication counselling (3, 41).

6.5 Differing infrastructures and systems

Communication is the basis of any health care provider, especially in mental health where there are so many interfaces. It has been shown that communication breakdown contributes to two thirds of treatment errors (13). This is perhaps an unsurprising finding following previous discussion about medication omissions and prescribing responsibilities.

In mental health, specialist medications are often supplied by mental health services, meaning they can often be missed off of primary care records (3, 21, 24). For example, clozapine has to be prescribed and dispensed by an approved centre, and depot medications are often supplied by community teams who also administer the medication (17, 26). A breakdown in communication between these different sources can cause therapy to be duplicated or completely omitted, interactions left unassessed and drug monitoring forgotten; thereby increasing the chance of inpatient admissions (3, 22, 24). This is also true of secondary care records; often showing a lack of regular medication which may be prescribed by different teams (3, 17, 24).

Different teams use different systems and working practices which can often contribute to errors, especially when patients are transferred across systems (17). Both Procyshyn et al. and Maidment et al. highlighted the issue of different system infrastructure across mental health settings, both inpatient and outpatient services (3, 17). Procyshyn et al. highlighted the benefit of using integrated electronic infrastructures for prescribing, medical notes and laboratory results (3). This would enable timely access to records across the board enabling the range of prescribers involved in an individual's care to see the medications prescribed, the management plans and monitoring. This would also reduce medication errors at the point of transfer as medication details would be available at the point of contact (21). Maidment et al. highlighted the role of pharmacy in reducing the errors caused by poor infrastructure (17).

As discussed previously, pharmacists are highly skilled in finding and managing medication errors, however, Maidment et al. also commented on the limited and often understaffed pharmacy services (17). The lack of pharmacy intervention may increase the number of errors seen in certain teams and

especially when compared to acute health trusts. This shows the importance of streamlining communication infrastructure across teams and settings to empower clinicians to prescribed accurately.

7. Discussion

Care transfers in the mental health setting are common and patients are faced with a variety of care interfaces. Despite this, there has not been many investigations on how care is safely transferred at these interfaces and less so on the effect of care transfers on medication errors. Similarly, medication errors in mental health settings have been investigated but, not as widely as in acute trust settings and not looking at specific care settings within mental health. This again has resulted in a lack of information on the types of medication errors which commonly happen when care is transferred.

It is clear that there are certain themes in medication errors in mental health settings on a whole. PRN prescribing shows an area for improvement, as well as ensuring the correct prescribing of physical health medication and correct medication monitoring. Additionally, nurses feel unsupported and understaffed in busy, noisy wards. This leads to errors in administration which may be compounded when acutely ill patients, unknown to the staff are transferred to their care. To improve this, pharmacists should ensure that charts are clearly written, and that PRN medication is explicit especially when patients are admitted or transferred to a new team. Administration errors should be investigated in relation to care transfers as no papers had reviewed these types of errors or even if they are increased when patients are transferred.

When looking at medication errors particularly when care is transferred, it can be seen that errors are usually due to poor medication reconciliations, inaccurate discharge letters, poor patient understanding and insight, and poor communication. Medicines reconciliations should be done within 24 hours of a patient being admitted to a ward or service. This should be done by a member of the pharmacy team as they have been shown to be much more effective in obtaining an accurate medication history (42, 43). Medicines reconciliations are more commonly completed when patients are admitted as an inpatient. However, if these were to be completed when patients accessed any mental health service or when they have been transferred, more errors may be avoided.

The lack of pharmacy services available in mental health compared with acute health trusts demonstrates a gap in the service. In one study, increasing the number of clinical pharmacists reduced medication errors by almost 300% (44, 45). This is worth considering as it has also been shown that pharmacists are most effective at stopping errors when doing so face to face as opposed to leaving the prescriber an email (46). This demonstrates the importance of having a well-staffed, present, pharmacy team.

Poor communication leads to ambiguous understanding of responsibility between clinicians. It has been shown numerous times in the literature that psychiatrists and general practitioner's omit medication that they do not feel responsible for. Therefore, it is essential that on discharge a complete list of all medications the patient was receiving whilst under the care of the discharging clinician is communicated effectively to the next care provider. Within this, it is imperative that plans for

prescribing specialist medications are made clear as well as monitoring requirements. This will help to ensure that clinician responsibility is clearly outlined.

Communication is also key for inpatient care transfers. This will allow transfers to be properly planned for and ensure that information and medication is transferred effectively along with the patient. Engaging the MDT will ensure that everyone caring for the patient will be involved. This includes the pharmacy team who will be able to ensure that information about medication is correctly handed over to the next team.

Effective communication will help to overcome the difficulties posed by care services employing a range of IT platforms and technological infrastructure. Although the changeover to electronic notes and prescribing has been shown to reduce medication errors, this can take a long time to implement and therefore it is imperative that all healthcare practioners participate in effective communication across services. Interestingly shared care records for patient with mental health conditions have been shown to be ineffective in providing accurate information (21). However, sending discharge summaries to community pharmacies may be a way of ensuring patients are prescribed the correct medications following discharge, and empowers community pharmacists to follow up discrepancies with the GP.

It is also essential for education and conversation to maintained amongst healthcare professionals including both prescribers and medication administrators. Ensuring regular training and guidance around safe medication practices is essential. When working within a service for a long time it can be difficult to differentiate good practice from workplace culture. As professionals, we must always challenge our practice.

Finally, empowering patients to understand and take responsibility for their health and medicines may lead to a reduction in medication errors on admission and transfer as well as improved adherence and fewer admissions. This is not easy as inpatients are often too unwell to effectively engage in conversations around medication. However, perhaps this demonstrates the importance of having these conversations at multiple points in healthcare and in the community where patients are often more stable.

8. Limitations

This literature review has limitations including studies conducted in mental health settings outside of the UK may mean that findings are not as applicable to NHS mental health services. Additionally, excluding studies which were not set in mental health may mean additionally evidence was missed. All care settings experience medication errors and patient transfers. In the future a literature review comparing care transfers in acute hospital trusts and mental health trusts may provide insight into ways of improving both settings.

9. Conclusion

Following this review, it is clear that there are many areas in which errors are made, especially when we consider the range of care transfers a patient can experience on their mental health journey. As identified, care transfers pose a greater risk of medication errors which can be potentially harmful to the patient. It is therefore imperative that not only is more work is done around medication errors during care transfers in mental health settings, but that there needs to be an improvement in communication and streamlining care interfaces within mental health.

Suicide prevention is currently a priority in the NHS Five year forward view for mental health and features on the NHS Long Term Plan (48). However, none of the literature reviewed here investigated the risk of inappropriate prescribing or medication errors which contribute to attempted and successful suicide.   This is despite the fact that the second most common method of suicide is self-poisoning and implicates prescribed medication, including psychotropics (48). Additionally people with mental health issues can be up to 18 times more likely to die from suicide than those without (49). Public Health England and NICE have recommended local and national approaches to reduce suicide including a multi-agency approach and medicines optimisation (47, 48). Therefore medication errors during care transfers which can contribute to suicides is a very important area which needs to be investigated.

People who live with mental health issues require ongoing therapy and require reliable continuity of care. Their medication plays a very important role in maintaining their health, preventing readmission and to manage their lives well in the community. It is known that with every relapse in mental health a person experiences, the less time they spend well. Ensuring that medication is correct plays a big role in this. People living with chronic mental health issues are a vulnerable group of our society who are often subject to polypharmacy, additional health needs and who die on average almost twenty years earlier (49). It is important that the gaps identified in the research are explored so that there is a strong evidence base in which effective care can be provided and that we can minimise the impact of mental health on life expectancy.

To investigate medication errors within inpatient settings an audit should begin with examining how many care transfers and what specific care transfers a patient has during one inpatient admission. As there are no standards or research identifying the commonest transfers within mental health settings, this will provide the insight needed to identify high risk transfers and to develop standards. Once common transfers have been identified, these can be analysed for medication errors. Once the riskiest transfers are identified, interventions to reduce errors can be introduced. Each intervention should then be re-audited. As medications are so pivotal to the care of patients and can introduce harm when given incorrectly, it is acceptable to set a standard of 0% errors during care transfers. It was identified that the most common medication error in inpatient settings was omission of a medication. It will therefore be interesting to see if this is also the case when patients care is transferred.

Additionally, it is important to consider the effectiveness and comprehensiveness of both medicines reconciliations and discharge letters. Traditionally, medicines reconciliations are only done at the point of admission to an inpatient service. Expanding medicines reconciliations to be done at each

point of care transfer may reduce unintentional errors at that point. to investigate the benefit of this, a pilot could be run on one inpatient ward setting to begin with. Auditing errors at baseline and then post intervention may demonstrate the potential benefit that this intervention may produce.

However, this may be difficult due to the understaffing of pharmacy departments in mental health settings compared to acute health settings and the lack of pharmacy input within community mental health settings as well as other specialist teams.

It is also important to look at the effectiveness of discharge letters. Usually these are given to the patient and sent to their GP but could also be sent to the patients' other care services directly. While creating a greater administrative burden, this would ensure greater clarity between professionals and cut down on errors. Additionally, including community pharmacies in this protocol could create a central point of contact for all health care services, building on the resource gained from the electronic prescribing system. Community pharmacists could therefore help to rationalise prescribing post- discharge. This would also support Public Health England's plan to develop a multi-agency suicide prevention and aide medicines optimisation as set out by NICE (47, 48).

With the closure of so many mental health inpatient beds and redirection of services to the community, it is imperative that mental health interfaces are streamlined. It is also important to ensure that pharmacists and pharmacy teams are well placed to support community services in their prescribing practices as they do in inpatient settings.

Pharmacy staff have been shown to be very successful in reducing medication errors and improving medication education amongst patients, they therefore play a key role in the successful treatment of patients and improving compliance. Mental health pharmacists are however historically based within inpatient settings. Investing in pharmacy services for community teams and settings may improve prescribing as well as improving patient medication counselling. Naylor et al. discussed the need for additional support for mental health commissioning in primary care as well as role and service redesign (9). This could be an opportunity to look at implementing change to reduce the risk of medication errors as well as achieving QIPP outcomes (9).

As mentioned throughout, improved compliance reduces admissions and reduces the number of relapses a person may experience. This is essential in improving overall health outcomes, both mental and physical. Therefore, since mental health will affect at least 1 in 4 of the population and 1 in 6 of us has experienced a common mental health problem in the last week, it is imperative that we act now to ensure services are efficient, safe and effective (9, 47).

Services within mental health are complex and vast. This creates numerous care interfaces in addition to those seen in physical health services. The increased interfaces combined with the complex needs of patients accessing mental health services, intensifies the risk of medication errors. Therefore, to achieve The WHO Third Global Safety Challenge, it is essential that we review our working practices.

10.   References

1.   Donaldson LJ, Kelley ET, Dhingra-Kumar N, Kieny M-P, Sheikh A. Medication Without Harm: WHO's Third Global Patient Safety Challenge. The Lancet. 2017;389(10080):1680-1.

2.   Elliott R, Camacho E, Campbell F, Jankovic D, St James MM, Kaltenthaler E, et al. Prevalence and economic burden of medication errors in the NHS in England. Rapid evidence synthesis and economic analysis of the prevalence and burden of medication error in the UK. 2018.

3.   Procyshyn RM, Barr AM, Brickell T, Honer WG. Medication errors in psychiatry. CNS Drugs. 2010;24(7):595-609.

4.   Patel K, Jay R, Shahzad MW, Green W, Patel R. A systematic review of approaches for calculating the cost of medication errors. European Journal of Hospital Pharmacy. 2016;23(5):294.

5.   Pirmohamed M, James S, Meakin S, Green C, Scott AK, Walley TJ, et al. Adverse drug reactions as cause of admission to hospital: prospective analysis of 18 820 patients. BMJ. 2004;329(7456):15.

6.   Lisby M. Errors in the medication process: frequency, type, and potential clinical consequences. International Journal for Quality in Health Care. 2005;17(1):15-22.

7.   World Health O. Medication errors. 2016.

8.   Aronson JK. Medication errors: definitions and classification. British Journal of Clinical Pharmacology. 2009;67(6):599-604.

9.   Naylor C PM, McDaid D, Knapp M, Fossey M, Galea A. Long-term conditions and mental health. 2012.

10.   DiMatteo MR, Lepper HS, Croghan TW. Depression is a risk factor for noncompliance with medical treatment: meta-analysis of the effects of anxiety and depression on patient adherence. Arch Intern Med. 2000;160(14):2101-7.

11.   Wheeler AJ, Scahill S, Hopcroft D, Stapleton H. Reducing medication errors at transitions of care is everyone's business. Australian prescriber. 2018;41(3):73-7.

12.   Cortelyou-Ward K, Swain A, Yeung T. Mitigating Error Vulnerability at the Transition of Care through the Use of Health IT Applications. Journal of Medical Systems. 2012;36(6):3825-31.

13.   Woolf SH, Kuzel AJ, Dovey SM, Phillips RL. A String of Mistakes: The Importance of Cascade Analysis in Describing, Counting, and Preventing Medical Errors. The Annals of Family Medicine. 2004;2(4):317-26.

14.   American College of Clinical P, Hume AL, Kirwin J, Bieber HL, Couchenour RL, Hall DL, et al. Improving Care Transitions: Current Practice and Future Opportunities for Pharmacists. Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy. 2012;32(11):e326-e37.

15.   Lertxundi U, Corcóstegui B, Prieto M, Gonzalez U, Arana A. Medication reconciliation in psychiatric hospitals: Some reflections. Journal of Pharmacy Practice and Research. 2017;47(1):47-50.

16.   Cottney A, Innes J. Medication-administration errors in an urban mental health hospital: A direct observation study. International Journal of Mental Health Nursing. 2015;24(1):65-74.

17.   Maidment ID, Lelliott P, Paton C. Medication errors in mental healthcare: a systematic review. Quality and Safety in Health Care. 2006;15(6):409.

18.   Keers RN, Plácido M, Bennett K, Clayton K, Brown P, Ashcroft DM. What causes medication administration errors in a mental health hospital? A qualitative study with nursing staff. PLoS ONE. 2018;13(10).

19.   Bowers L, Jeffery D, Bilgin H, Jarrett M, Simpson A, Jones J. Psychiatric Intensive Care Units: a Literature Review. International Journal of Social Psychiatry. 2008;54(1):56-68.

20.   Bowers L, Hammond N, James K, Quirk A, Robson D, Stewart D. Characteristics of acute wards associated with the presence of a psychiatric intensive care unit, and transfers of patients to it. Journal of Psychiatric Intensive Care. 2012;8(02):66-77.

21.   Morcos S, Francis S-A, Duggan C. Where are the weakest links?: A descriptive study of discrepancies in prescribing between primary and secondary sectors of mental health service provision. Psychiatric Bulletin. 2002;26(10):371-4.

22.   Keers RN, Williams SD, Vattakatuchery JJ, Brown P, Miller J, Prescott L, et al. Medication safety at the interface: evaluating risks associated with discharge prescriptions from mental health hospitals. Journal of Clinical Pharmacy and Therapeutics. 2015;40(6):645-54.

23.   Paton C, McIntyre S, Bhatti SF, Shingleton-Smith A, Gray R, Gerrett D, et al. Medicines reconciliation on admission to inpatient psychiatric care: Findings from a UK quality improvement programme. Therapeutic Advances in Psychopharmacology. 2011;1(4):101-10.

24.   Clarke NA. What the eye doesn't see: drugs psychiatrists and GPs don't know their patients are on. Psychiatric Bulletin. 1993;17(8):469-70.

25.   Raynsford J, Dada C, Stansfield D, Cullen T. Impact of a specialist mental health pharmacy team on medicines optimisation in primary care for patients on a severe mental illness register: a pilot study. European Journal of Hospital Pharmacy. 2020;27(1):31-5.

26.   Brownlie K, Schneider C, Culliford R, Fox C, Boukouvalas A, Willan C, et al. Medication reconciliation by a pharmacy technician in a mental health assessment unit. International Journal of Clinical Pharmacy. 2014;36(2):303-9.

27.   Karnon J, Campbell F, Czoski-Murray C. Model-based cost-effectiveness analysis of interventions aimed at preventing medication error at hospital admission (medicines reconciliation). Journal of Evaluation in Clinical Practice. 2009;15(2):299-306.

28.   Schnipper JL, Kirwin JL, Cotugno MC, Wahlstrom SA, Brown BA, Tarvin E, et al. Role of pharmacist counseling in preventing adverse drug events after hospitalization. Archives of internal medicine. 2006;166(5):565-71.

29.   Shaw H, Mackie CA, Sharkie I. Evaluation of effect of pharmacy discharge planning on medication problems experienced by discharged acute admission mental health patients. International Journal of Pharmacy Practice. 2000;8(2):144-53.

30.   CQC. The 2018 Adult Inpatient Survey. https://www.cqc.org.uk/publications/surveys/adult-inpatient-survey-2018; 2019.

31.   Knapp M, King D, Pugner K, Lapuerta P. Non-adherence to antipsychotic medication regimens: associations with resource use and costs. Br J Psychiatry. 2004;184:509-16.

32.   Bridge JA, Barbe RP. Reducing hospital readmission in depression and schizophrenia: current evidence. Current Opinion in Psychiatry. 2004;17(6):505-11.

33.   Lacro J, Dunn L, Dolder C, Leckband S, Jeste D. Prevalence of and risk factors for medication nonadherence in patients with schizophrenia: A comprehensive review of recent literature. The Journal of clinical psychiatry. 2002;63:892-909.

34.   Robinson J. Discrepancies between GPs' and psychiatrists' medication records. Progress in Neurology and Psychiatry. 2008;12(6):17-20.

35.   Grasso BC, Genest R, Jordan CW, Bates DW. Use of Chart and Record Reviews to Detect Medication Errors in a State Psychiatric Hospital. Psychiatric Services. 2003;54(5):677-81.

36.   Santell J, Hicks R, McMeekin J, Cousins D. Medication errors: experience of the United States Pharmacopeia (USP) MEDMARX reporting system. Journal of clinical pharmacology. 2003;43:760-7.

37.   Haw CM, Dickens G, Stubbs J. A Review of Medication Administration Errors Reported in a Large Psychiatric Hospital in the United Kingdom. Psychiatric Services. 2005;56(12):1610-3.

38.   Hemingway S, McCann T, Baxter H, Smith G, Burgess-Dawson R, Dewhirst K. The perceptions of nurses towards barriers to the safe administration of medicines in mental health settings. International Journal of Nursing Practice. 2015;21(6):733-40.

39.   Nirodi P, Mitchell A. The quality of psychotropic drug prescribing in patients in psychiatric units for the elderly. Aging & mental health. 2002;6(2):191-6.

40.   Procyshyn RM, Barr AM, Brickell T, Honer WG. Medication errors in psychiatry: A comprehensive review. CNS Drugs. 2010;24(7):595-609.

41.   Rothschild JM, Mann K, Keohane CA, Williams DH, Foskett C, Rosen SL, et al. Medication safety in a psychiatric hospital. General Hospital Psychiatry. 2007;29(2):156-62.

42.	Gleason KM, Groszek JM, Sullivan C, Rooney D, Barnard C, Noskin GA. Reconciliation of discrepancies in medication histories and admission orders of newly hospitalized patients. American Journal of Health-System Pharmacy. 2004;61(16):1689-95.

43.	Pronovost P, Weast B, Schwarz M, Wyskiel RM, Prow D, Milanovich SN, et al. Medication reconciliation: a practical tool to reduce the risk of medication errors. Journal of critical care. 2003;18(4):201-5.

44.	Bond CA, Raehl CL, Franke T. Clinical pharmacy services, hospital pharmacy staffing, and medication errors in United States hospitals. Pharmacotherapy. 2002;22(2):134-47.

45.	Hayward RA, Hofer TP. Estimating hospital deaths due to medical errors: preventability is in the eye of the reviewer. Jama. 2001;286(4):415-20.

46.	Stubbs J, Haw C, Cahill C. Auditing prescribing errors in a psychiatric hospital. Are pharmacists' interventions effective? HOSPITAL PHARMACIST-LONDON-. 2004;11(5):203-7.

47.	NICE. Suicide prevention: optimising medicines and reducing access to medicines as a means of suicide Key therapeutic topic [KTT24] https://www.nice.org.uk/advice/ktt24/chapter/Key-points: NICE; 2019 [Available from: https://www.nice.org.uk/advice/ktt24/chapter/Key-points.

48.	Gorton H. What could UK community pharmacy teams learn from the United States and Canada about their role in suicide prevention? Clinical Pharmacist. 2019;11.

49.	Laursen TM. Life expectancy among persons with schizophrenia or bipolar affective disorder. Schizophrenia Research. 2011;131(1-3):101-4.