Identifying and improving drug diversion protocols through behavioral drug diversion identification

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Identifying and improving drug diversion protocols through behavioral drug diversion identification

An integrated review of literature

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Abstract

Background: Drug diversion can be a multi victim crime that negatively affects the safety and health of patients, healthcare workers, and the community at large. Patients may be harmed by an impaired provider when they are denied pain relief or by blood-borne pathogens introduced through tampering.

Purpose: Finding new protocols to prevent the spread of blood-borne pathogens from drug diversion are needed as Automatic Dispensing Cabinets (ADC’s) technology such as the pyxis are implemented. As technology advances diverters find new ways of diverting drugs. This includes drawing out meds from viles and replacing them with saline so the viles are not lacking of any medication.

Method: A literature search was done using two of Rosalind Franklin’s University Boxer library literature databases. These databases included Cumulative index to nursing and allied health literature (CINAHL) and health source. Multiple text combination searches were done using the key words: Drug diversion, drug diversion policy, behavior, and nursing.

Result: There are three main ways drug diversion protocols are consistent. This includes through the use of ADC’s (automatic dispensing cabinets), Monitoring use of MAR/AIM to identify use, and high number of tightly regulated controlled substances. Six of the studies spoke about automatic dispensing machines. Seven articles spoke about drug diversion behaviors. One article spoke about both automatic dispensing machines and drug diversion behavior.

Conclusion: Implications of this literature search show the gap in research of drug diversion protocol from the drug diversion behaviors. The current drug diversion
protocols show a definite continuous trend on improving current protocol and not adding new ones.

**Introduction**

**Background and significance**

An integrative review was utilized to identify the gap between current drug diversion protocols and drug diversion behavioral indicators for healthcare providers. Babor (2015) explains how “problem-focused integrative literature reviews of alcohol and drug literatures have had a positive influence on the promotion of evidence based public policies, including how their policies extend beyond the interest of researchers and include that of policy makers, leaders, and non governmental organizations” (pp. 45). The information on protocols and the ability to prevent blood borne pathogen transference from drug diversion will help in strengthening policies already in the general public. This hopefully will also bring awareness to the issue of drug diversion to the general public as well.

**Literature search strategies**

A literature search was done using two of Rosalind Franklin’s universities Helixnet boxer library literature databases. These databases included Cumulative index to nursing and allied health literature (CINAHL) and health source. Multiple searches were done using the key words: Drug diversion, drug diversion policy, behavior, and nursing.

**Literature Sample**

Inclusion criteria: Drug diversion protocols, drug diversion policy, Behavior of diversion, nursing. Articles were from between 2010 – 2017. They are peer reviewed, academic
Exclusion criteria: Exclusion criteria excluded any article that did not have any focus on drug diversion, drug diversion policy, or blood borne pathogens. This included patient addiction, drug testing, and drug withdrawal in patients. Duplicates were removed as well to ensure true numbers. This excluded studies that discussed street drugs. This also excluded pain control in the hospital setting. Adverse effects of medications were also removed. All studies were removed through manually going through all studies presented.
Drug diversion, behavior, and nursing

Number of studies found using keywords

Number of studies meeting inclusion criteria

Number of studies after excluding duplicates

Number of studies after using exclusion criteria

Data analysis
Data will be categorized into two sections. The sections are Drug diversion protocol and drug diversion behavior. The main objective is grouping the data on the protocols in place currently, adding in behavioral identification, and how this information will reduce diversion. Articles for the research were limited to peer reviewed academic journals only from 2007 to present, with the exception of Sayers & Pearson (1980).

Chapter 3

Results

With a lack of new protocols building off of the American Society of Health-System Pharmacists (ASHP’s) protocol there was a need for improvement. Sets of behavioral identifications were found in all hospital settings. These behavioral signs are an addition to current drug diversion protocols. The addition falls under monitoring and surveillance as well as education. The monitoring is of health care providers and staff. Nursing is a part of the surveillance during administration and disposing of medications. Side note- the ASHP gives the ways in which the diverters divert, but doesn’t give recognizable ways of noting behaviors of diverters who will divert. Like People offering to help with medications controlled substance (CS) or coming regularly on their day off.

There are three main ways drug diversion protocols are consistent. This includes through the use of ADC’s (automatic dispensing cabinets), Monitoring use of MAR/AIM to identify use, and high number of tightly regulated controlled substances. Six of the studies spoke about automatic dispensing machines. Seven articles spoke about drug
diversion behaviors. One article spoke about both automatic dispensing machines and drug diversion behavior.

**Protocols**

(Brummond, 2017) has one of the most comprehensive set of drug diversion protocols. This includes major risk points of when diversion occurs. The basis being procurement, preparation and dispensing, prescribing, administration, and waste/removal. Procurement talks about the purchase order and packaging slip order being removed from records, unauthorized individual orders, or product container being compromised. Preparation and dispensing is where controlled substances are replaced with ones of similar appearance, removing volume from premixed solutions, multivial overfill diverted, and prepared syringe content are replaced with saline. Prescribing issues are when prescription pads are diverted or forged to obtain controlled substances, prescribers self prescribing, verbal orders created, but not verified, and written prescriptions altered by patients. Administration is where controlled substances are removed from automatic dispensing machines on discharged patient, medications documented as given, but not administered, waste not adequately witnessed, and substitute drug is removed and administered while controlled substance is diverted. Finally waste and removal talks about controlled substances being removed from unsecure waste container, or waste syringe replaced with saline, to expired controlled substances diverted from holding area.

(Brenn, 2015) talks about the use of automatic dispensing cabinets (ADC) and their use in detecting patterns of the ADC’s in detecting diversionary patterns. This is
done through the use of the reports of use to spot outliers in dispensing and
documentation of medication waste processing. (Mandrack 2012) adds on the focus of
the staff around the ADC’s and data. That there is a multidisciplinary team in managing
the current processes in looking to improve. This includes identification of opportunities
for improvement on medication processes, workflow processes, defining delivery times
and refill procedures, identifying the best practices and regulatory requirements to help
achieve the highest patient safety level, and conduct follow up assessments to ensure staff
members are maximizing the benefits of the ADC’s. This includes switching databases
to eMARs for comprehensive access as well as decreased ability to hide medication
errors/diversions. (Incardi, 2009) breaks down the RADARS (Researched Abuse
Diversion and Addiction Related Surveillance) system as a diversionary revealer. The
basis is a system that collects timely and geographical data on abuse and diversion of
prescribed stimulants/opioids. This data is then used to identifying drug diverters.

(Bozmowski, 2014) focuses in on the reports of diversion in nurse
anesthesia students in the incident reports of diversion and their analysis used. Of the 113
programs 111 responded of which only 23 responded with complete information on the
prevalence and demographics of diversion. These surveys include the incidence and
demographics (age, gender, ethnicity, and year in school). (Coleman, 2012) identifies the
top controlled substances used in the US from 2004-2009. These include
Oxycodone/combinations, Alprazolam, Hydrocodone/combinations, Methadone,
Clonazepam, Lorazepam, Morphine/combinations, Carisoprodol, Diazepam,
Fentanyl/combinations, Buprenorphine/combinations, Hydromorphone/combinations,
Propoxyphene/combinations, Amphetamine-dextroamphetamine, Codeine/combinations,
Methylphenidate, Temazepam, Chlordiazepoxide, Phenobarbital, Meperidine/combinations, Oxazepam, and Clorazepate. (Vrabel, 2012) reinforces the idea of surveillance as a way of identifying drug diverters. With the use of identification software along with ADC data hospitals can stay one step ahead in identifying diverters. (New, 2015) gives the rundown on the penalties of drug diversion. Diversion by substitution of fentanyl patches of 15 patients and infecting them with hepatitis C leads to 41 months in federal prison. Diversion of fentanyl by substitution leads to 30 years in prison for tampering with a consumer product. Substituted saline and tap water for fentanyl and returned them to stock leads to 54 months in prison for tampering with a consumer product. Substituted stolen syringes saline for fentanyl leads to 39 years in prison for obtaining controlled substance by fraud.

(Strobbe, 2017) Identifies alternative methods to drug diversion consequences including alternative to discipline action, which includes treating nurses and nursing students substance use disorder with the goal of retention, rehabilitation, and re-entry into safe professional practice. This is under the idea that drug diversion in the context of personal use is a symptom of a curable disease.

**Diversion behavior**

(Rigg, 2012) Says how individuals on the streets end up with drugs are through connections in the hospital. They will be friends with the hospital workers who “turn a blind eye”. They will have items like prescription pads being stolen or medications gone missing. This is usually covered up by healthcare fraud where Medicare and Medicaid are
heavily targeted. Where prescribers would use the insurance to gain the medications costs to cover the loss through fraud.

(Palo, 2015) Shows that demographics factors (age, gender, tenure, and marital status have little impact on drug deviance. (McKelllly, 2014) explains that signs and symptoms of healthcare professional who are diverting drugs do many of the following actions: coming to work on days off, volunteering to administer medications, waiting alone to open narcotic cabinets, and not having witnesses to verify waste of unused medication. As well as talking about the negative impacts as a result including impaired judgment, slowed reaction time, diverting drugs from patients who need them, and fraud. (New, 2015) also explains other behaviors including consistently coming to work early and leaving late, volunteering for overtime, constantly choosing their preferred medications, and frequent trips to the bathroom. Also explained are outward signs including deteriorating work performance and passing out at work, which are later signs of diversion.

(Berg, 2012) explains one of the best ways to act once drug diversion is suspected. Proper action is done by making the entire workforce aware of the fact there is possible diversion, and not just healthcare workers with access to the medications. New employees should be educated and should be reinforced over time to discourage diversion.

Discussion

Drug diversion is constantly changing in the ways in, which people divert drugs. The protocols will constantly be updated year to year. Unfortunately the updates are
focusing on the actions and not the person behind it. The numbers of the medications being withdrawn and how often is a bigger focus than the behaviors of the people withdrawing them. The biggest thing revealed is the lack of behaviors additions to any standard protocol.

If the behavior can be identified this will allow for the action to be prevented preemptively. If a person diverts medications for a year and they catch them through the vast numbers of medication withdrawn that is good, but what if one can start to understand the behaviors and catch them before the year occurs. For a health care provider to be able to spot the signs and then to bring attention to the issue. Either the action will stop or eventually the individual will be caught. Yes there will still be the end of the year check, but the addition of behaviors of drug diverters is another safety.

Nursing implications

If applied to nursing then you gain over half a million eyes that can prevent diversion from occurring. There are over three times the number of physicians and pharmacists in nursing. This will allow diversion behaviors to be taught and will create communication. If incorporated in nursing education this can create a nationwide increase in general knowledge in drug diversion as well as surveillance. As nurses work with patients they are able to double check orders or physicians or medications gone to patients from pharmacists. So if medications are not in the appropriate location or said they were given, but weren’t given then notice can be given to the department. This is
will hopefully deter the possibility of actions or future actions of diverters in the hospital setting.

**Limitations**

There are a few limitations to this study including the lack of efficacy of drug diversion behaviors. No research has given a number on how effective drug diversion behavior protocols can actually reduce drug diversion incidence. There was also the limited number of studies to use. Many of the articles were repeats or updated versions of past protocols. Information pulled from articles were limited to the information needed to carry out the purpose. There was limited time to expand upon all ideals of the research and it’s connections. A implication regarding the lack of articles supporting the connection of drug diversion and the behaviors. As well as good evidence supporting the use of protocols to define the basis in protocols.

**Future implications**

Moving forward if more research is done implementing this into general protocols this may gain more awareness. As talking to peers and professors drug diversion isn’t even a major issue discussed in all education of nurses. More research is needed to see what set of behaviors are the best to follow as well. There are many different behaviors and this may be a limitation that no one is following other researchers in identifying key behaviors made by drug diverters. This manuscript has laid out a good outline for future researchers to start new research on, or to get incorporated into various systems.
Hopefully this manuscript creates a new demand for the desire to not only build onto current protocols, but to incorporate it into nursing.

**Conclusion**

Implications of this literature search show the gap in research of drug diversion protocol from the drug diversion behaviors. The current drug diversion protocols show a definite continuous trend on improving current protocol and not adding new ones. (Brummond, 2017) showed that good protocol can include measures that implement drug diversion behaviors, but needs to specify it as an individual problem and not as a part of a process in how one diverts drugs. The drug diversion behavior is spread over the years, but shows a solid frame of reference to where protocols can implement behaviors into protocols. Additionally how they can include them to target the identification through health care providers like nurses. This opens the Segway for open communications about issues and help resolve major issues as a result of drug diversion. Specifically the loss of good care due to diversion of needed medications. Further research will need to see the efficacy of behavioral protocols and then the need to implement behaviors into protocols will become more relevant.

**References**


<table>
<thead>
<tr>
<th>Article</th>
<th>Drug diversion protocol</th>
<th>Drug diversion behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palo, S.; Chawla, A</td>
<td></td>
<td>• Males are more prone to stealing than women.</td>
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<tr>
<td></td>
<td></td>
<td>• Older nurses are more likely than younger nurses.</td>
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<tr>
<td></td>
<td></td>
<td>• Tenured nurses are more likely than newer nurses</td>
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<tr>
<td></td>
<td></td>
<td>• Married nurses are more likely than unmarried nurses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Low paid nurses are more likely than higher paid nurses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Leaving early</td>
</tr>
</tbody>
</table>
| Brozimowski, G.; Groh, C.; Rouen, P.; et al (2014) | • Taking excessive breaks  
• Intentionally working slow  
• Wasting resources  
• Sabotaging equipment  
• Accepting kickbacks  
• Lying about hours worked  
• Stealing from the company  
• Blaming others  
• Competing nonbeneficially  
• Sexual harassment  
• Verbal abuse  
• Stealing  
• Engineering others  

Females were reported to have higher incidence rates, but the males only made up 36% of the student body used  
There is a (.65%) prevalence of student rna substance abuse among Nurse anesthesists |
|---|---|
| Mandrack, M.; Cohen, M.; Featherling, J.; et al (2012) | • Provide ideal environment conditions for the use of automatic dispensing cabinets (ADC)’s  
• Ensure automatic dispensing cabinets (ADC) system security  
• Identify information that should appear on automatic dispensing cabinets (ADC)  
• Select and maintain automatic dispensing cabinets (ADC) inventory  
• Select appropriate automatic dispensing cabinets (ADC) configuration  
• Define automatic dispensing cabinets (ADC) restocking process  
• Develop procedure to  

Measure for above average use of automatic dispensing cabinets (ADC) machine |
| Ensure accurate withdrawal of medications  
- Establish criteria for automatic dispensing cabinets (ADC) system overrides  
- Standardize process for medication transportation  
- Provide staff education and competency validation |   |
|---|---|
|   | **RADARS (researched abuse diversion and addiction related surveillance)**  
- Check information on total number of diversion cases, # of cases drug was targeted, and dosage  
- Treatment specialists questionnaires for patients  
- High targeted medication is extended release oxycodone, hydrocodone, immediate release oxycodone, and methadone in that order from high to low priority |
| **Educate staff on signs and symptoms of drug diversion**  
- Should be a highly sophisticated diversion program to deter people from easily learning it for diversion | **Visitors steal medications on visits to patient**  
- Misplaced work key for pca pump, pca pump malfunctioned delivering entire dose, patient had no signs of overdose  
- Nurse had secret pocket in scrubs to place medication and replace syringes with saline syringes |
| Strobbe, A. & Crowley, M. (2017) | • Discipline of diversion includes two approaches  
• State board of nursing reviews the case and if found guilty revoke/suspend the license  
• Alternative to discipline program: the nurse refrains from practice for a specified amount of time and works with a third party for treatment establishing sobriety including, but not limited to narcotics anonymous (NA) or alcoholics anonymous (AA) | • Sharps waste containers were broken and used needles and vials were found hidden around hospital  
• Night custodian rummaged through waste containers |
• Prescription fraud |
| Brenn, B.; Kim, M.; & Hilmas, E. | • Dashboard system uses AIMS and MAR data to analyze the following  
• ADC transaction count by type  
• Unbalanced transactions  
• ADC transaction counts  
• Documented and witnessed medication transfers  
• Documented medication transfers  
• Documentation where information in AIMS didn’t match MAR  
• Identify transactions by practitioners not associated |
<table>
<thead>
<tr>
<th>Authors</th>
<th>With the Case</th>
<th>Legal Consequences of Diversion Examples</th>
<th>Policies</th>
</tr>
</thead>
</table>
| Vrabel, R. (2010) |  | • Falsification of medical records  
• Replacement of vial of controlled substance |  |
| New, K. (2015) | • Diversion by substitution of fentanyl patches of 15 patients and infecting them with hepatitis C → 41 months in federal prison  
• Diversion of fentanyl by substitution → 30 years in prison for tampering with a consumer product  
• Substituted saline and tap water for fentanyl and returned them to stock → 54 months in prison for tampering with a consumer product  
• Substituted stolen syringes saline for fentanyl → 39 years in prison for obtaining controlled substance by fraud | • Typically diverters are high performers in the beginning  
• Frequently come early for their shifts  
• Volunteer for overtime  
• Appear at work when not scheduled  
• Choose a specific medication constantly when others are available  
• Increasing trips to bathroom  
• Volunteer to administer medications for colleagues |
| Coleman, J. (2012) | Medications top in drug use and misuse  
• Oxycodone  
• Alprazolam |  |  |

Outward Signs of Impairment:
• Deteriorating work
| **Mandrack, M; Cohen, M.; Featherling, J.; et al (2012)** | • Education for all nurses on how to use automatic dispensing cabinets (ADC’s) functions and how to increase efficiency  
• Use automatic dispensing cabinets (ADC) reports to find discrepancies |
| AM J health syst pharm (2017) | **Core administrative elements**  
• Legal and regulatory requirements  
• organization oversight and accountability  
**System level controls**  
• human resource management  
• automation and technology  
• monitoring and surveillance  
• investigation and  
**Procurement**  
• Purchase order and packing slip removed from records  
• Unauthorized individual orders for controlled substance (CS) on stolen DEA form 222  
• Product container is compromised  
• controlled substance (CS) are |
### Provider level controls

- Chain of custody
- Storage and security
- Internal pharmacy controls
- Prescribing and administration
- Returns, waste, and disposal

### replaced by product of similar appearance when prepacking

- Removing volume from premixed infusion
- Multi dose vial overfill diverted
- Prepared syringes contents are replaced with saline solution

### Prescribing

- Prescription pads are diverted and forged to obtain controlled substance (CS)
- Prescriber self prescribes
- Verbal orders created, but not verified
- Written prescriptions altered by patients

### Administration

- controlled substance (CS) are drawn from ADD on discharged or transferred patient
- Medication documented as given, but not administered to patient
- Waste not adequately witnessed and subsequently diverted
- Substitute drug is removed and
<table>
<thead>
<tr>
<th>Waste and removal</th>
<th>administered while controlled substance (CS) is diverted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• controlled substance (CS) waste is removed from syringe of unsecure waste container</td>
</tr>
<tr>
<td></td>
<td>• controlled substance (CS) waste in syringe is replaced with saline</td>
</tr>
<tr>
<td></td>
<td>• Expired controlled substance (CS) are diverted from holding area</td>
</tr>
</tbody>
</table>

*Table 1: Literature matrix separating drug diversion protocols and drug diversion behaviors*