Evaluating the Impact of an Interprofessional Practice Experience Involving Pharmacy and Dental Students on Medication Histories within an Urban Academic Dental Admissions Clinic

Alexander Radovanovich, PharmD Candidate, Rachel von Vital, PharmD Candidate,
Melissa E. Rotz, PharmD, BCPS, Jacqueline M. Theordorou PharmD, BCPS, Shannon Myers Virtue PsyD, Chizobam Idahosa, BDS, DDS, MS,
Laurie A. MacPhail, DMD, PhD, Huaqing Zhao, PhD

TEMPLE UNIVERSITY SCHOOL OF PHARMACY

TEMPLE UNIVERSITY SCHOOL OF DENTISTRY

Background

- Interprofessional education and collaboration is suggested as a means to improve the quality and efficiency of healthcare, while reducing costs.[1]
- In order to prevent medication errors to improve patient safety, accurate medication histories are necessary across all healthcare settings.
- Within the dental practice setting, there is a lack of research regarding the frequency and type of medication discrepancies that occur during medication histories, as well as the clinical impact of these discrepancies in the context of dental treatment.

Interprofessional Practice Experience:

- Interprofessional teams of third professional year pharmacy and junior and senior dental students collaborated to conduct health and medication histories for patients seeking dental treatment within a dental admissions clinic.

Objectives

Primary Objective:
▪To compare interprofessional (IP) care versus standard care on medication history clarifications in dental patients.

Secondary Objectives:
▪To assess the clinical significance of these clarifications with regards to the potential impact on dental treatment plans.
▪To describe the interventions provided by IP care to clarify discrepancies and/or resolve medication-related problems.

Methods

Design: Quasi-experimental, single-center, retrospective study

Inclusion criteria
▪All charts from IP care days at the dental admissions clinic between 9/8/15-12/2/15 (fall semester) and 2/2/16-4/28/16 (spring semester).
▪IP care: charts seen by a dental and pharmacy student team with a pharmacy medication history note.
▪Standard care: charts seen only by the dental student from the IP care (matched-control). If there were multiple matched-controls, the chart with the most medications on intake was chosen for inclusion.

Exclusion criteria
▪Charts of pregnant women and individuals <18 years of age
▪Charts that met inclusion criteria, but without a matched-control

Data collection
▪Demographic data, medication clarifications (number, type, and drug class of clarification), source of information, and pharmacy interventions to resolve discrepancies were collected.

Data analysis
▪Demographics, medication clarifications, clinical significance, and pharmacy interventions were analyzed using descriptive statistics.
▪Between-group differences were analyzed using chi-squared, Student's t-tests, and Wilcoxon signed-rank tests as appropriate.
▪A p-value of <0.05 was considered statistically significant.

Results

Demographics
- 257 patient charts were included from the Fall 2015 (n=133) and Spring 2016 (n=124) semesters
- A majority of patients were female (62.3%), African-American (54.5%), with a mean age (SD) of 51.1 (±17.3) years

Demographics	IP Care n=126	Standard Care n=131
Semester		
Fall	68 (54.0%)	65 (49.6%)
Spring	58 (46.0%)	66 (50.4%)
Gender		
Female	74 (58.7%)	86 (65.7%)
Male	52 (41.3%)	45 (34.4%)
Age (years)*	54 (SD 15.3)	48 (SD 16.9)
Race		
AA	70 (55.6%)	70 (53.4%)
Caucasian	32 (25.4%)	23 (17.6%)
Hispanic/Latino	10 (7.9%)	16 (12.2%)
Other/Asian	7 (5.6%)	13 (9.9%)
Unknown	7 (5.6%)	9 (6.9%)
Patient-reported medications on intake (#)	3.8 (SD 4.2)	3.3 (SD 3.7)
PMH		
Diabetes**	36 (28.6%)	19 (14.5%)
Heart failure	6 (4.8%)	6 (4.6%)
COPD	3 (2.4%)	3 (2.3%)
CAD***	9 (7.1%)	2 (1.5%)
CVA	7 (5.6%)	4 (3.1%)
High-risk medications associated with AEs		
Antiplatelet agents****	35 (27.8%)	22 (16.8%)
Oral anticoagulants	7 (5.6%)	2 (1.5%)
Loop diuretics	7 (5.6%)	3 (2.3%)
Other diuretics†	25 (19.8%)	11 (8.4%)
Insulin	10 (7.9%)	8 (6.1%)
Oral corticosteroids	8 (6.4%)	3 (2.3%)

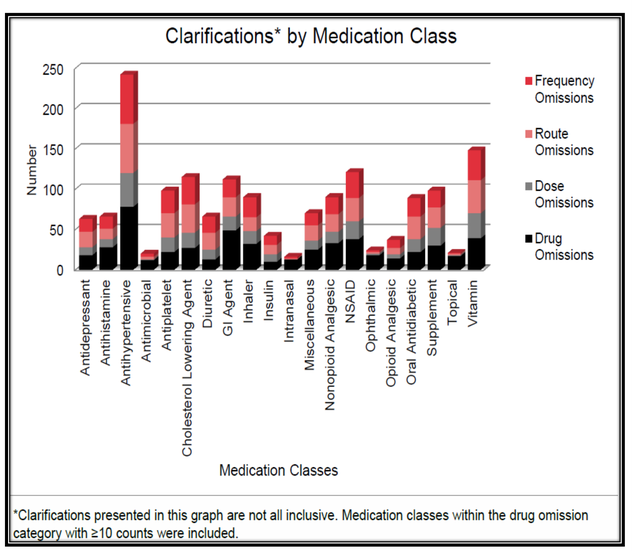
*p=0.003; **p=0.006; ***p=0.026; ****p=0.034; †p=0.008; AEs=adverse events

Primary and secondary outcomes	IP Care n=126 median (IQR)	Standard Care n=131 median (IQR)	p-values
Total clarifications	9 (5-14)	1 (0-6)	<0.001
Drug omissions	2 (1-5)	0 (0-1)	<0.001
Dose omissions	1 (0-2)	0 (0-0)	<0.001
Route omissions	2 (0-5)	0 (0-0)	<0.001
Frequency omissions	2 (0-4)	0 (0-1)	<0.001
Commission	0 (0-0)	0 (0-0)	<0.001
Incorrect dose	0 (0-0)	0 (0-0)	NS
Incorrect route	0 (0-0)	0 (0-0)	NS
Incorrect frequency	0 (0-0)	0 (0-0)	NS
Source of information			
Patient-report only	51 (40.5%)	121 (96.2%)	
Pharmacy called	75 (59.5%)	0 (0%)	
Provider contacted	0 (0%)	4 (3.1%)	
Subjects receiving pharmacy intervention	77 (61.1%)	NA	

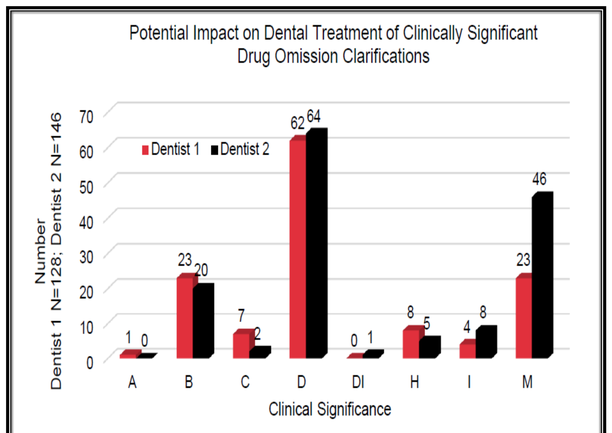
IQR=interquartile range; NA=not applicable; NS=non-significant

Clinical Significance from Dentist Perspective	IP Care	Standard Care
Charts with ≥1 drug omission clarification	97 (77.0%)	55 (42.0%)
Dentist 1		
Clinically significant	50 (51.5%)	33 (60.0%)
Not clinically significant	47 (48.5%)	22 (40.0%)
Dentist 2		
Clinically significant	49 (50.5%)	33 (60.0%)
Not clinically significant	48 (49.5%)	22 (40.0%)

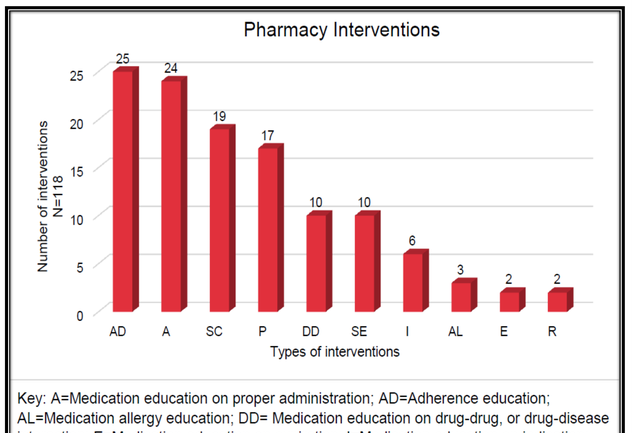
Clinical significance was evaluated globally if ≥1 drug omission clarification was identified for a chart. Inter-rater reliability: agreement between Dentist 1 and 2 was 91.45%; kappa 0.8277; p<0.001



*Clarifications presented in this graph are not all inclusive. Medication classes within the drug omission category with ≥10 counts were included.



Key: A=Drug allergy; B=Bleeding risk; C=Cardiovascular risk; D=Chronic disease control; DI=Drug interactions; H=Hypoglycemia risk; I=Infection risk; M=Drug manifestations



Key: A=Medication education on proper administration; AD=Adherence education; AL=Medication allergy education; DD= Medication education on drug-drug, or drug-disease interaction; E=Medication education on expiration; I=Medication education on indication; P=Medication-related problem identification requiring discussion with provider; R=ADR identification; SC=Smoking cessation education; SE=Medication education on side effects

Discussion

- This study demonstrates that pharmacy students on an interprofessional team increase the accuracy of medication histories, as evidenced by the significant number of medication clarifications compared to standard care.
  - ➢ This finding reinforces previous literature that has demonstrated that pharmacists and pharmacy students are well trained to conduct medication histories in a variety of practice settings.[2-6]
- This study found that a majority (60%) of patients in the dental clinic setting omit at least 1 medication from their medication history.
  - ➢ A majority of these omissions are clinically significant with the potential to impact their dental care from a dentist's perspective.
- Strengths: large sample size, assessment of clinical relevance of medication omission clarifications in conjunction with reporting frequency and type of discrepancies, standard care was matched to IP care by dental student and medication complexity
- Limitations: retrospective design, inability to capture dental student interventions because not routinely documented, clarifications relating to dose, route, or frequency are not routinely collected by dental students and may have inflated the total clarifications comparison

Conclusions

- Interprofessional care had significantly more medication clarifications compared to standard care when conducting medication histories in dental patients.
- For patients with ≥1 drug omission clarification(s), a majority were deemed clinically significant with regards to the impact on dental treatment.
- The most common reasons for the potential impact these drug omissions have on dental treatment included chronic disease control, drug manifestations in the oral cavity, and bleeding risk.
- Interprofessional care received additional pharmacy-related interventions, most commonly, adherence education, education on proper administration of medications, smoking cessation education, and recommendations to follow up with provider for medication-related problems that were identified.

Disclosures

Authors have nothing to disclose.

References

1. World Health Organization. 2010. Framework for action on interprofessional education & collaborative practice. Available at: http://apps.who.int/iris/bitstream/10665/70185/1/WHO_HRH_HPN_10.3_eng.pdf Accessed October 10, 2016.
2. De Winter et al. Qual Saf Health Care. 2010;19(5):371-375.
3. Mergenhagen et al. Am J Geriatr Pharmacother. 2012;10(4):242-250.
4. Becerra-Camargo et al. BMC Health Serv Res. 2015;15:337.
5. Varkey et al. Am J Health Syst Pharm. 2007;64(8):850-854.
6. Salamin et al. J Am Pharm Assoc (2003). 2015;55(5):540-545.