

Cross-National Comparison of Pharmacist Knowledge, Perceptions and Training Opportunities Regarding Maternal-Fetal Medicine in Canada, Qatar, and Uganda

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Background

- Maternal-Fetal Medicine (MFM) is a rapidly developing clinical specialty around the world
 - World Health Organization reports more than 350,000 women die from preventable complications related to pregnancy and childbirth each year
 - Approximately 134,000 infants are born each year in North America with a congenital abnormality. About one percent of congenital anomalies are attributable to medications
- Pharmacists are:
 - Specialized in broad knowledge of medications: mechanisms of action, pharmacokinetics, clinical application of evidence and assessment of adverse events
 - Equipped with tools to counsel patients on risks and benefits of prescription, herbal, and over-the-counter medications
 - Accessible to public, can screen patients for therapeutic interventions, and determine those at increased risk of experiencing co-morbid conditions in pregnancy such as gestational diabetes mellitus, depression, anemia, etc.
 - In a position to modify drug therapy in breastfeeding mothers to avoid compromising therapeutic efficacy and maintain the safety of the infant
- Despite these skills and benefits to pregnant and breastfeeding women, pharmacists do not appear to be optimally fulfilling this role
 - Studies have described reasons for lack of pharmacist action, including uncertainty regarding safety of medications in pregnancy and lactation, belief that women should receive care from physicians instead, and concerns regarding personal liability
 - Additionally, a lack of training opportunities in MFM for pharmacists has been documented

Objectives

- Primary:** To determine pharmacists' knowledge and perceptions of the therapeutic management of maternal-fetal medicine in Canada, Qatar, and Uganda
- Secondary:**
 - To determine factors associated with pharmacists' knowledge of MFM in Canada, Qatar, and Uganda
 - To characterize training opportunities and resource utilization in MFM available to pharmacists

Methods

- Design:**
 - Literature Review
 - Questionnaire Development
 - 35 questions (demographics, knowledge assessment, current practice)
 - Survey reviewed by experts in the field and piloted in target population (N=3)
 - Cultural adaptation for Qatar and Uganda
 - Electronic online questionnaire (SurveyMonkey®) distributed to hospital and community pharmacists in BC via an electronic link sent in e-mail and/or organizational newsletters. Survey to remain open for 8 weeks. Goal of 300 participants.
 - Population:** All practicing pharmacists and resident pharmacists in each region (Province of British Columbia, Canada; Qatar; Uganda)
 - Inclusion Criteria:** Literate in English and holds an active pharmacy license
 - Analysis:**
 - Used descriptive statistics to report baseline characteristics and characterize the results of the questionnaire.
 - Kruskal-Wallis and Mann Whitney U tests were conducted to determine if knowledge scores differed between countries and if scores differed according to the following factors: availability of training opportunities, practice sites, clinical experience and parental status

Table 1: Characteristics of Study Participants in Canada, Qatar and Uganda

Gender	Female	63%	Years of Experience	5+	56%
Highest Level of Education Obtained	Bachelor Degree in Pharmacy	63%	Parental Status	Yes	44%
	Post-Bachelor Degree Residency	20%	Area of Primary Practice	Hospital/Institutional	60%
	Entry-Level PharmD	1%		Community	29%
	Post-Graduate PharmD	9%		Primary Care	2%
	Masters in Pharmacy	4%		Academia	4%
	PhD	0.1%		Combination	6%

No pre-defined factors (gender, years of practice, practice area, parental status) were found to be statistically significant in determining knowledge score (p>0.05)

Figure 1: Survey Question Results

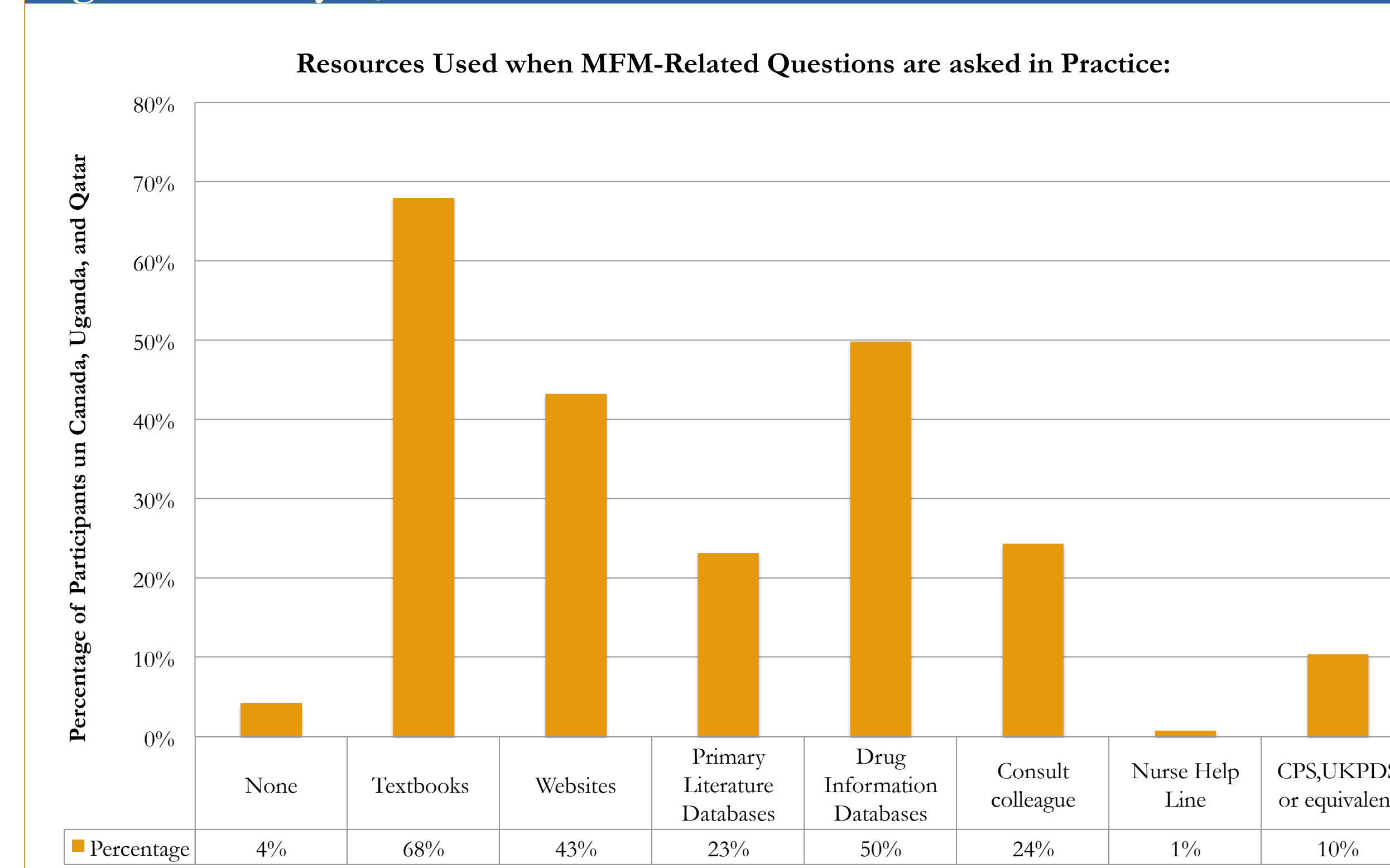


Figure 2: Knowledge Assessment Results

	Canada	Qatar	Uganda
# Respondents	147	100	26
Mean	62.9%	53.3%	57.1%
Median	65.4%	53.8%	57.7%
Inter-Quartile Range	53.8%-74.1%	45.1%-65.3%	50.0%-69.2%

Null Hypothesis: The medians of scores are the same across categories of country

- All three countries: $p < 0.001$
- Canada vs Qatar: $p < 0.001$
- Canada vs Uganda: $p = 0.057$
- Qatar vs Uganda: $p = 0.357$

Figure 3: Sample Survey Questions.

Pregnancy

- What is the normal risk of major abnormalities in a newborn of a mother who did not take any medications during pregnancy?
 - a) There is no risk b) <5% c) 5-10% d) I don't know
- If a mother with a chronic medical condition avoids taking her regular medications during pregnancy then:
 - a) Both baby and mother would remain safe b) Baby would remain safe and mother may be at risk of harm from uncontrolled maternal disease c) Baby could be at risk of harm and mother would remain safe d) Both baby and mother may be at risk of harm from uncontrolled maternal disease e) I don't know

Breastfeeding

- How often in practice should you tell mothers to breastfeed before their medication or take their medications after breastfeeding because this is safer?
 - a) Never b) Occasionally c) All the time d) I don't know
- If the Relative Infant Dose (RID) if a medication is <10% then the drug is generally considered compatible for breastfeeding. RID Definition: Daily infant dose(mg/kg/day)/Daily maternal dose(mg/kg/day) x100
 - a) True b) False c) I don't know

Case

- RL is a 24 year old female with a history of allergies to cats and dogs. She is going on a 2-week vacation and staying with relatives who have multiple pets. She has previously used loratadine to control her allergy symptoms. Is loratadine suitable while exclusively breastfeeding her 3 month old girl? MW = 383 Daltons Protein Binding=97% M/P Ratio=1.17 RID=0.3-1.2%
 - a) I would tell the mother she can continue to breastfeed while taking this medication
 - b) I would tell the mother to pump and discard her breast milk and feed her infant formula while taking this medication
 - c) I would tell the mother she can breastfeed while taking this medication and advise to monitor for sedation
 - d) I would tell the mother she can breastfeed while taking this medication only if drug levels are done
 - e) I would advise the mother to not take medication and continue breastfeeding

Results

- Eighty-six percent of pharmacists agreed or strongly agreed that if Continuing Education opportunities were available for maternal-fetal medicine related matter they would be interested in participating
- Fifty-two percent of pharmacists in Canada disagreed or strongly disagreed that their entry-to-practice degree provided sufficient training in the area of maternal-fetal medicine
- Most preferred references by country were:
 - Canada: Briggs: Drugs in Pregnancy and Lactation (97%), Motherisk (73%), LexiComp (61%), UpToDate (30%), and Hale: Medications and Mother's Milk (23%)
 - Qatar: LexiComp (57%), UpToDate (50%), and Briggs: Drugs in Pregnancy and Lactation (48%)
 - Uganda: Other Healthcare Workers (48%), Briggs: Drugs in Pregnancy and Lactation (26%), Posters and Pamphlets (22%), and Newspaper (15%)

Limitations

- Survey tool has not been validated yet. No studies found that reported a previously validated tool
- Definition of "low" knowledge assessment score not defined prior to study
- Target sample size not reached in Uganda; this limits the ability to draw conclusions when comparing the knowledge assessment scores between countries

Conclusions

- Pharmacists in British Columbia scored significantly higher on the knowledge assessment when compared to pharmacists in Qatar
- Pharmacists desire continuing education related to maternal-fetal medicine
- Entry-to-practice degree and continuing education programs curricula should be reviewed to determine what modifications are needed to fill knowledge gaps of student pharmacists and pharmacists' with respect to maternal-fetal medicine

