APhA Foundation 2020-2021 Incentive Grant Interim Report

Title:
Evaluating Community Pharmacists' Perceptions of Pharmacist-Led Pharmacogenomic Tests

Introduction:
The advent of personalized medicine is moving us closer to more precise, predictable, and effective healthcare.[1] Pharmacogenomics, the study of how genes affect a person's response to drugs, is an important component of the field of personalized medicine. Recent advances in pharmacogenomics have enabled healthcare providers to better understand variances in drug response. By combining pharmacology (the science of drugs) and genomics (the study of genes and their functions) to tailor treatment options to an individual to achieve better response, this approach can be utilized to fill in gaps in patient care and lead to improved outcomes.[2] In special populations where treatment guidelines may not provide clear recommendations, there is value in providers' ability to integrate pharmacogenomics into drug selection and therapy optimization.

By utilizing patient-specific genetic information, health care providers can overcome some of the limitations of traditional medicine. The benefits stemming from a growing understanding of genomics – and how they drive health, disease, and drug responses in each person – can be observed from both the provider's and patient's perspective.[1] For providers, pharmacogenomic testing can provide valuable pharmacokinetic and pharmacodynamic information to influence therapy decisions to tailor drug therapy, and thereby improving effectiveness and avoiding use of drugs with predictable side effects.[1] For patients, pharmacogenomic testing provides psychosocial benefits, which include the belief that knowing and understanding one's genetic predispositions would improve one's quality of life and bring peace of mind.[3] Confirming that a patient is taking an effective medication based on their genetic information provides reassurance and confidence.

Due to their extensive knowledge in pharmacology and the opportunity to develop strong patient and provider relationships, pharmacists can play a prominent role in the clinical application pharmacongenomics.[4] The American Society of Health-System Pharmacists (ASHP) has defined pharmacist's responsibilities to include promoting optimal use and timing of pharmacogenomic tests, recommending testing to aid the process of drug and dosage selection, providing clinical guidance and translating results into actionable information for the patient and provider, designing and optimizing patient-specific drug and dosage regimen, and educating patients and other health care professionals about the utility of pharmacogenomic testing.[5] However, execution and implementation of these services has remained low. A web-based survey conducted by Tuteja et. al. showed that while 87% of pharmacists believed that pharmacogenetic testing was valuable, 68% of pharmacists lacked the appropriate tools in the pharmacy to aid in pharmacogenomic counseling.[6] Moreover, in a nationwide survey assessing pharmacist perception of pharmacogenomics, Bank et. al. found that only 14.1% of pharmacists felt adequately informed, while 88.8% would like additional training.[7] Lastly, in a recent cross-sectional survey, Surofchy et. al. demonstrated that 62% of patients preferred their pharmacist as a provider of pharmacogenomic services and that 88% of patients expressed interest in participating in a pharmacogenomics test.[8] Our study will not only highlight the value of pharmacogenomic testing, but will also assess baseline knowledge, characterize prior training of community-based pharmacists, evaluate what barriers exist, and determine areas of training needs to build confidence and comfortability. This insight will enable the development and implementation of education methods and tools for the delivery of pharmacist-led pharmacogenomic services in the community setting.

The primary objective of this study is to assess community pharmacists' knowledge, intent, motivating factors, and barriers to recommending pharmacogenomic testing, interpreting the results and providing patient consultation. The secondary objectives of this study are to 1) identify pharmacists' needs for training and preferred methods in receiving education, and 2) assess pharmacists' perception of the importance of pharmacogenomic testing in clinical decision-making.

Methods

Study Design:

A cross-sectional, nationwide survey was sent out via email. The 27-question, 46-item survey instrument was inputted into the Qualtrics Survey Software and disseminated electronically. The survey items utilized branch logic to filter out and exclude inappropriate responses. Basic demographic data was collected at the end of the survey. Questions measuring pharmacists' perceptions of and interests in providing pharmacogenomic services were evaluated and rated on a 5-point Likert scale. The remainder of the survey questions consisted of multiple choice, select all that apply, yes/no, and free response questions.

Survey Composition:

The survey was distributed to various community pharmacists who were members of Albertsons Companies, California Pharmacist Association, and Colorado Pharmacist Society. To account for demographic and workflow variables that affect pharmacist perception and incorporation of pharmacogenomic testing, baseline characteristics were collected: demographic data (age, gender, degree, advanced training/certification, role in pharmacy, years of experience) and average prescription volume of their pharmacy. The survey was divided into five sections:

- Section 1: Background Information
- Section 2: Pharmacists' Knowledge and Training in Pharmacogenomics
- Section 3: Motivations, Self-Confidence, and Barriers
- Section 4: Training Opportunities
- Section 5: Demographic Data

Study Population and Respond Recruitment:

The study recruitment letter was distributed via email to the respective members. Distribution dates for the following entities are listed below.

- Albertsons Companies: March 29, 2021 and April 12, 2021
- California Pharmacist Association: April 12, 2021 and April 22, 2021
- Colorado Pharmacist Society: March 29, 2021

The study recruitment email introduced the study objectives, outlined how deidentified responses will be used, and mentioned the gift card drawing incentive. Participation in the study was not required to be eligible for the gift card drawing. Contact information of the faculty advisor and principal investigator were included at the recruitment letter's closing. Respondents gained access to the survey instrument by clicking the Qualtrics link embedded in the study recruitment letter.

Respondents answered one initial question to acknowledge the study's terms and regulations. This response served as voluntary consent for participation. Those who did not agree to our terms were excluded from the study. Respondents whose primary practice environment was not community pharmacy were also excluded.

Data Collection:

The study received approval by the University of California, San Francisco Investigational Research Board (IRB) prior to distribution of the survey. Data was collected and stored using the web-based survey via Qualtrics. The survey was accessible from March 29, 2021 – May 7, 2021. Any survey responses still in progress at the close of the survey were omitted. As an incentive for participation, all recipients of the study recruitment letter were eligible for a gift card drawing. This gift card drawing incentive consisted of 12 gift cards -- $25 (6), $50 (5), $100 (1). Completion of the research study was not required to be eligible. At the end of the survey, respondents had the opportunity to provide their contact information.

Data Analysis:
Data analysis was conducted in a qualitative manner. Descriptive statistics were used to evaluate pharmacists' knowledge, intent, self-confidence, skills, and barriers to recommending pharmacogenomic testing and providing consultation on test results. Further subgroup analyses were performed to determine variations among age, gender, degree, and years of experience.

Results

Since the survey was distributed electronically to all members of Albertsons Companies, California Pharmacist Association, and Colorado Pharmacist Society, it is unknown how many emails were returned to sender or failed to send. Between March 29, 2021 and May 7, 2021, 248 survey responses were recorded. A total of 17 responses were omitted – 2 failed to provide consent and 15 reported not working in the community pharmacy setting. In total, 231 responses (93.1%) were included in data analysis.

The total number of responses differed for each question. Since respondents were not required to answer all questions to successfully complete and submit the survey, they skipped questions of their own choosing.

Background Information

This section focused on the availability of pharmacogenomic services and the involvement of pharmacists in these services in the community pharmacy setting. 41.12% (81/198) of community pharmacists reported that pharmacogenomic services are offered at their pharmacy. Sub-analyses revealed that pharmacogenomic services were offered most in health-system outpatient (76.47%) and chain drug pharmacies (68%) and offered least in grocery/supermarket pharmacies (16.36%). 36.20% (80/221) of community pharmacists reported providing pharmacogenomic services in the past. Sub-analyses showed that pharmacy fellows (80.77%), PGY-2 pharmacy residents (75%) and BS Pharmacy graduates (54%) had more experience and exposure than PGY-1 pharmacy residents (35.71%) and PharmD graduates (25.41%).

Pharmacists' Knowledge and Training in Pharmacogenomics

This section asked respondents to correctly identify the following: the common definition of pharmacogenomics according to the National Human Genome Research Institute, the implication of the Genetic Information Act of 2008 (GINA), and the roles and responsibilities of the pharmacist in providing pharmacogenomic services according to the American Pharmacist Association. A total of 82 respondents selected all correct answers. This population represented 50% of PGY-1 pharmacy residents, 43.44% of PharmD graduates, 30% of BS Pharmacy graduates, 25% of PGY-2 pharmacy residents, and 15.38% of pharmacy. Respondents also reported that they learned about pharmacogenomic services provided by pharmacists primarily through required content in the pharmacy school curriculum and through continuing education after obtaining licensure.

Intent/Motivations

53.03% (105/198) of respondents agreed or strongly agreed that community pharmacists should provide pharmacogenomic services. 14.15% (28.198) of respondents disagreed or strongly disagreed with this statement. The agreement to this statement was represented by 64% of chain drug store, 52.63% of independent, and 49.1% of grocery store pharmacists. Moreover, greater than 75% of respondents agreed or strongly agreed that by providing pharmacogenomic services, pharmacists can practice at the top of their license, advance the community pharmacist role, fills in gaps in patient care, optimize patient-specific drug therapy, and strengthen pharmacist-patient relationships. Roughly 70% believed that pharmacogenomic services would strengthen pharmacist-provider relationships.

Confidence

37.19% (74/199) of respondents agreed or strongly agreed to the following statement: "I am confident in providing pharmacogenomic services with my current level of training." 48.75% (97/199) disagreed or strongly disagreed with this statement, while the remaining 14.07% (28/199) remaining neutral.

Barriers

This section focused on the impact of certain barriers to providing pharmacogenomic services in the community pharmacy setting: time, clinical resources and support, and comfortability in addressing ethical considerations with patients. 54.28% (108/199) of respondents agreed or strongly agreed that the lack of necessary clinical resources and support was the biggest obstacle. 53.27% (106/199) of respondents agreed or strongly agreed that there was not enough time in pharmacy workflow, while only 28.14% (56/199) felt uncomfortable discussing ethical considerations about pharmacogenomic testing.

Training Opportunities

The focus of this section was to determine what methods pharmacists preferred to receive education and training regarding the provision of pharmacogenomic services. In order of most to least favorable, pharmacists preferred self-study written modules (57), shadowing pharmacist from beginning to end of clinical service (50), recorded lecture (33), and live webinar (28). The numbers indicate how many times each method was ranked first out of the four.

Demographic Data

In 55% of the respondents, a Doctorate of Pharmacy was the highest professional degree. This is followed by Bachelor of Pharmacy at 22% and fellowship at 12%. Only 11% pursued either PGY-1 or PGY-2 training. Moreover, 85% of the responses were comprised of those whose role was ether staff pharmacist, pharmacy manager, or float pharmacist. The majority of pharmacists have practiced anywhere between 1 and 10 years; this portion represents about 65% of respondents. Moreover, 76% of respondents currently practice in a grocery store or independent pharmacy. Lastly, information about average number of prescriptions dispensed per week was acquired. The most common amount ranged from 500-1000 (47.18%) and 1001-1500 (25.13%).

Discussion

The overarching goal for community pharmacists is to become more engaged in providing clinical services, increasing access to patient care, and maximizing patient outcomes. One way for pharmacists to make a difference is through personalized medicine, specifically pharmacogenomic consultation services. Regardless of community pharmacy setting, there is sound agreement that pharmacists should be providing pharmacogenomic services. The idea of advocating for the profession, optimizing patient care, and strengthening relationships resonates strongly with all respondents.

However, this desire to provide pharmacogenomic services is met with certain challenges and barriers. Many pharmacists report a lack of confidence, and the most common barriers appear to be adequate time and the lack of clinical resources and support. It is evident that more comprehensive training designed to address gaps in knowledge is vital before pharmacogenomic testing can be better integrated into community pharmacy practice. This comprehensive training should include pharmacists' roles and responsibilities, such as identifying patients eligible for pharmacogenomic testing, recommending pharmacogenomic services, interpreting test results, providing patient consultations, recommendation therapy change to the health care team, and strengthening pharmacist-patient relationships. It should also elaborate on how pharmacogenomic services advance the pharmacy profession, the benefits and clinical impact of pharmacogenomics, strategies to incorporate pharmacogenomic services into pharmacy workflow, the implication in various disease states, information about pharmacokinetic and pharmacodynamic gene variants, and how results are utilized in clinical therapy decision-making.

Those with further post-graduate training, specifically the completion of a PGY-2 residency or fellowship, were more likely to have provided pharmacogenomic counseling services in their career. This further demonstrates that post-graduate training prepares pharmacists to take on more diverse opportunities in their workplace. However, it was surprising that these same cohorts were least capable of correctly answering all pharmacogenomic knowledge check questions. Moreover, Bachelor of Pharmacy graduates were more involved than Doctorate of Pharmacy and PGY-1 residency graduates. This is most likely attributed to how long they've been in practice and various opportunities through their previous positions.

A limitation of this study is the distribution of our study recruitment email. Although sent to all members in Albertsons Companies, California Pharmacist Association, and Colorado Pharmacist Society, there is no guarantee that the outreach was successful and that our recruitment letter was not found in the spam or junk mailbox. Another limitation of this study is the short distribution phase for our online survey. Data collection occurred over a span of 5 weeks instead of the intended 3 months.

A challenge of incorporating pharmacogenomic services in the community setting is access to comprehensive electronic health records, which include past medical history, laboratory data flowsheets, and treatment-plan progress notes. Although community pharmacists have access to drug files, without more comprehensive health information, it may be difficult for community pharmacists to confidently recommend pharmacogenomic testing and make therapeutic adjustments based on these results. It would have been valuable to evaluate whether the inaccessibility of electronic health records is a perceived limitation and whether ensuring this access to valuable health information will motivate pharmacists to more likely recommend pharmacogenomic testing.

Conclusions

The insight from understanding pharmacists' perceptions and barriers will allow for implementation of educational strategies for the successful delivery of community pharmacist-led pharmacogenomic services. In order for recent graduate pharmacists to feel more comfortable understanding pharmacogenomic services, there is a great opportunity for the pharmacy school curriculum to be more comprehensive. For practicing community pharmacists to more confidently provide pharmacogenomic services, training will need to encompass more than clinical content. This training for community pharmacists should be delivered with self-study modules and in-person shadowing.

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