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Original Research

Assessing pet owner and veterinarian perceptions of need for veterinary compounding services in a community pharmacy setting

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Abstract

Background: Pets, pet owners (referred to as clients in veterinary medicine and throughout this article), veterinarians, and community pharmacies may all benefit from veterinary compounding services provided in community pharmacies, but the benefits of this service are not well-documented in the literature.

Objectives: This study identified perceived benefits and barriers and evaluated the need for veterinary compounding services in community pharmacies; it also evaluated current business practices related to veterinary compounding services.

Methods: A cross-sectional survey was administered to three groups: 1) clients who filled a pet prescription at a study pharmacy, 2) clients who had not filled pet prescriptions, and 3) local veterinarians. Eligible participants were 18 or older; clients must have owned a pet in the past five years. The surveys collected demographic information and assessed benefits, barriers, need, and business practices regarding veterinary compounding services. Demographics were evaluated through descriptive statistics. Responses to Likert-scale items were compared between groups using the Mann-Whitney U test. Qualitative responses were assessed for emerging themes.

Results: One hundred eighteen clients and 15 veterinarians participated in the study. Seventy-two of 116 clients (62%) and eight of 10 veterinarians (80%) agreed that clients would benefit from veterinary compounds provided in community pharmacies. Only 40% of veterinarians agreed that community pharmacists have the knowledge to compound pet medications, compared to 67% of clients (P=0.010). Similarly, 47% of veterinarians agreed that community pharmacists have the skills to compound pet medications, compared to 72% of clients (P=0.016). Forty-eight of 118 clients (41%) would travel 10 miles or more out of their way for veterinary compounding services at community pharmacies.

Conclusions: This study assessed client and veterinarian perceptions of veterinary compounding service benefits, barriers, and need in community pharmacies. Clients identified more opportunities for veterinary compounding services in community pharmacies when compared to veterinarians. Both groups identified a need for veterinary compounding services and agreed community pharmacies providing these services would benefit pets and clients.

Keywords

Drug Compounding; Pets; Community Pharmacy Services; Pharmacies; Pharmacists; Veterinarians; Health Knowledge, Attitudes, Practice; Surveys and Questionnaires; Kansas

INTRODUCTION

Sixty-eight percent of American households are estimated to have at least one pet, with 63% of clients considering their pets to be members of the family.[1] In 2016, the American Pet Products Association (APPA) reported that clients in the United States spent nearly USD 16 billion on veterinary care, including routine veterinary visits and prescription medications.[2] With recent advances in medicine, pets are living longer, just like their human counterparts. A longer life expectancy means more animals develop chronic diseases, which can be costly to manage.[3,4] In 2015, the average amount of money spent on veterinary care per pet in the United States was about USD 1,300.[2]

Pets develop many of the same chronic diseases as humans, including hypothyroidism, arthritis, diabetes, and cardiovascular disease.[3-5] Veterinary medications play a significant role in the management of these diseases, yet one study showed more than one-third of clients find administering medications to their pet to be challenging.[5] Pets injuring their owners at the time of administration, avoiding medications due to lack of palatability, and refusing to swallow tablets or capsules are all barriers to effective medication adherence.[6]

Community pharmacists are uniquely positioned to help clients find solutions to medication issues and to collaborate with local veterinarians to provide the best care for their mutual patients.[7] Prescription filling trends show that clients increasingly seek to fill their pet's medications at community pharmacies.[8] In many cases, pets are prescribed generic human medications which are available at low cost from community pharmacies. In addition, some

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veterinary medications can be compounded by a pharmacist into a dosage form that is more clinically appropriate for both pet and client than commercially available products. Pharmacies that specialize in compounding regularly serve pets and their owners, but most community pharmacies do not currently offer this service. Additionally, community pharmacies often offer more convenient locations and hours of operation than compounding pharmacies and veterinary practices. Therefore, community pharmacies offering veterinary compounding services could offer low cost medications, solutions to medication administration challenges, and convenient hours and locations to clients.[1,2] Veterinarians could benefit through decreased drug inventory costs by outsourcing medication dispensing to a community pharmacy.[9] Veterinarians may also benefit by partnering with a community pharmacy to address therapeutic gaps and overcome drug shortages for their mutual patients.[8,10] Thus, all parties involved may benefit from community pharmacies providing veterinary compounding services, but the benefits of this service are not well documented in the literature.

Despite these possible benefits, working relationships between pharmacists and veterinarians may be less established than pharmacists' professional relationships with other prescribers.[8] As more clients fill pet prescriptions, including compounds, at community pharmacies, the pool of patients being mutually cared for by veterinarians and pharmacists grows.[7,8] As clinical practice evolves, education for pharmacy professionals must adapt to continue providing the best possible care for these patients. Increased access to veterinary resources and education may help decrease pharmacist errors when preparing veterinary prescriptions and aid in the removal of this barrier to effective community pharmacist-veterinarian collaboration.[7,8,11-13]

The purpose of this study was to identify perceived benefits, barriers, and need for veterinary compounding services in community pharmacies and to evaluate current veterinarian business practices regarding veterinary compounding services.

METHODS

Study Setting

Study pharmacies included three Balls Food Stores Pharmacies; Balls Food Stores is a supermarket chain operating 27 supermarkets with 21 pharmacies in the Kansas City metropolitan area. Balls Food Stores Pharmacies offer compounding services, but currently fill very few veterinary compounds; thus, it is an area for possible business expansion.

Study Design

Two cross-sectional surveys were distributed in person, via mail, or via e-mail to eligible participants. Clients and veterinarians were analyzed separately. The project was granted exemption by the University of Kansas Medical Center Human Subjects Committee prior to commencement of the study.

Inclusion and exclusion criteria

Participants were eligible if they were 18 years of age or older. Clients were eligible if they had owned a pet at any time between January 1, 2012 and February 28, 2017. Two groups of clients were targeted: those who filled a prescription for a pet at a study pharmacy between January 1, 2012 and February 28, 2017 and those who had never filled a prescription for a pet at a study pharmacy. Pharmacy staff designated any type of animal as a pet when adding them to the dispensing system, while a free-response item on their survey allowed clients open interpretation of the term "pet". All practicing veterinarians in the Kansas City metropolitan area were also eligible. Clients were excluded if the contact information on their pet's prescription in the pharmacy system was inaccurate and they could not be reached for survey distribution.

Survey Tools

Two separate but similar surveys were developed, one for clients and one for veterinarians. The surveys both collected demographic information in addition to assessing perceived benefits, barriers, and need for veterinary compounding services through multiple-choice, free-response, and five-point Likert scale (1=Strongly Disagree to 5=Strongly Agree) survey items. The veterinarian survey also assessed current business practices regarding

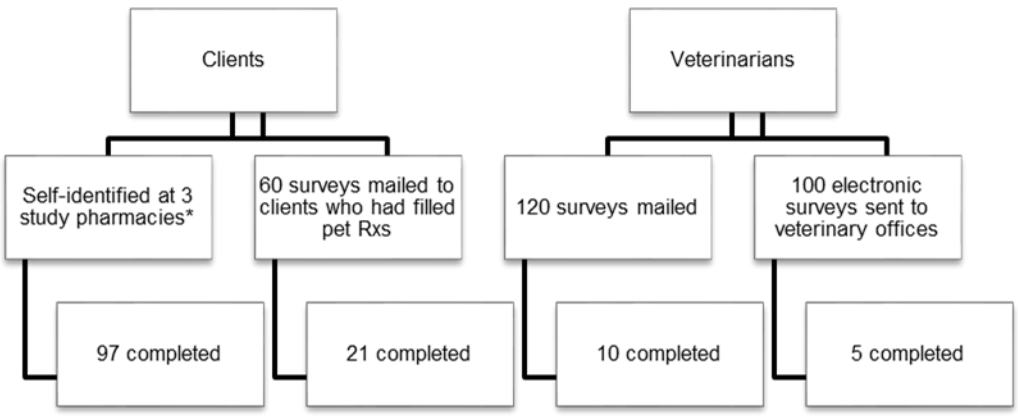

Figure 1. Survey Distribution and Completion.
*Total number of surveys distributed using this method was not measured.

Table 1. Survey Respondent Demographics

	Client n (%)	Veterinarian n (%)
Gender	n=114	n=14
Female	86 (75.4)	12 (85.7)
Age (years)	n=112	n=14
18-29	9 (8.0)	0 (0)
30-39	16 (14.3)	5 (35.7)
40-49	13 (11.6)	2 (14.3)
50-59	34 (30.4)	4 (28.6)
60-69	30 (26.8)	3 (21.4)
>70	10 (8.9)	0 (0)
Race/Ethnicity	n=109	n=14
White	98 (89.9)	13 (92.9)
Spanish, Hispanic, or Latino	7 (6.4)	0 (0)
More than one race	2 (1.8)	1 (7.1)
Black or African American	2 (1.8)	0 (0)
Education	n=101	
High School/GED	15 (14.9)	
Some College	26 (25.7)	
Undergraduate Degree	29 (28.7)	
> Master's Degree	31 (30.7)	
Annual Household Income	n=84	
< USD25k	9 (10.7)	
USD25k - USD49k	18 (21.4)	
USD50k - USD74k	15 (17.9)	
USD75k - USD100k	15 (17.9)	
USD100k - USD125k	10 (11.9)	
USD125k - USD150k	8 (9.5)	
> USD150k	9 (10.7)	

Abbreviations: GED = general education development; k=thousand dollars. Some numbers may differ from text due to omitted responses from survey participants. Percentages may not equal 100% due to rounding.

veterinary compounding services. The client survey contained 26 items (online Appendix 1), while the veterinarian survey contained 28 items (online Appendix 2). Pet owners are referred to as "clients" throughout this article to follow current veterinary medical terminology. Both surveys were pilot tested by five people prior to distribution.

Recruitment

Signs were posted at the study pharmacies to encourage clients to self-identify and participate in the survey. Prescription fill history through myDataMart® (Columbia, MD), a data analysis tool, was also used to identify prescriptions filled for pets at the study pharmacies. Pharmacy dispensing software allows designation of a patient as a pet; these reports included all prescriptions, whether compounded or commercially available prescriptions, and were used to mail surveys to identified clients. In addition, in-person surveys were given to clients at study pharmacies. Surveys were distributed via mail and email to veterinarians.

The Yellow Pages™ (Glendale, CA) was the primary source used to identify area veterinarians for the survey. Investigators also reached out to three local veterinary medical associations to recruit veterinarians to participate in the survey; investigators did not receive confirmation from any of these associations that the survey link had been distributed. Additional surveys were distributed to veterinarians via mail and e-mail at their practice sites by the primary investigator to encourage increased participation.

For all participants, a cover letter was provided containing information about the survey and instructions for survey completion. Hard copy surveys were distributed with pre-numbered envelopes and cover letters; participants were instructed to return the survey to the pharmacy or primary investigator in the sealed, numbered envelope. Participants identified in-person were encouraged to complete the survey onsite, but take-home surveys were allowed on a case-by-case basis. Upon receipt of a sealed envelope, pharmacy staff awarded a USD 5 incentive to the participant. Veterinarians also received a link to an electronic survey created using Qualtrics® (Provo, UT). Veterinarians who completed the electronic survey had the opportunity to enter their contact information into a second survey so that a USD 5 incentive could be mailed to them.

Statistical Analysis

Veterinarians and clients were analyzed as separate subgroups. To adequately power the study and obtain statistical significance, 105 client surveys and 60 veterinarian surveys needed to be completed. Participant demographics were evaluated through descriptive statistics. Responses to survey items utilizing five-point Likert scale and multiple-choice formats were compared between groups using Mann-Whitney U with an a-priori alpha value of 0.05. SPSS v.22 (Armonk, NY) was used for quantitative analysis. Qualitative responses to open-ended survey items were assessed for emerging themes.

RESULTS

One hundred eighteen clients and 15 veterinarians participated in the study (Figure 1). Incomplete surveys were included in data analysis (nine client surveys and five veterinarian surveys). The most common section not completed by survey respondents was the demographics section.

The majority of survey respondents in the client and veterinarian groups were female, 75% and 86% respectively (Table 1). Additionally, the overwhelming majority of survey respondents identified themselves as being white [98 of 109 (90%) clients, 13 of 14 (93%) veterinarians]. Age was more evenly distributed between groups. Client education and income demographics were also evenly distributed. Veterinarian education and annual household income were not assessed as these were not likely to contribute meaningful information to the study.

Client and veterinarian responses to Likert-scale survey items were compared (Figure 2). While all comparisons seemed to show a difference between the two groups, only two of these comparisons reached statistical significance. Seventy-eight of 116 (67%) client respondents agreed or

Table 2: Emerging Themes From Client Comments (n=30)

Theme	n (%)
This service would be beneficial	6 (20)
My pet's medications come from the vet's office	5 (16.7)
Cost would be a factor in my decision to use this service	4 (13.3)
Convenience would be a factor in my decision to use this service	3 (10)
Other	12 (40)

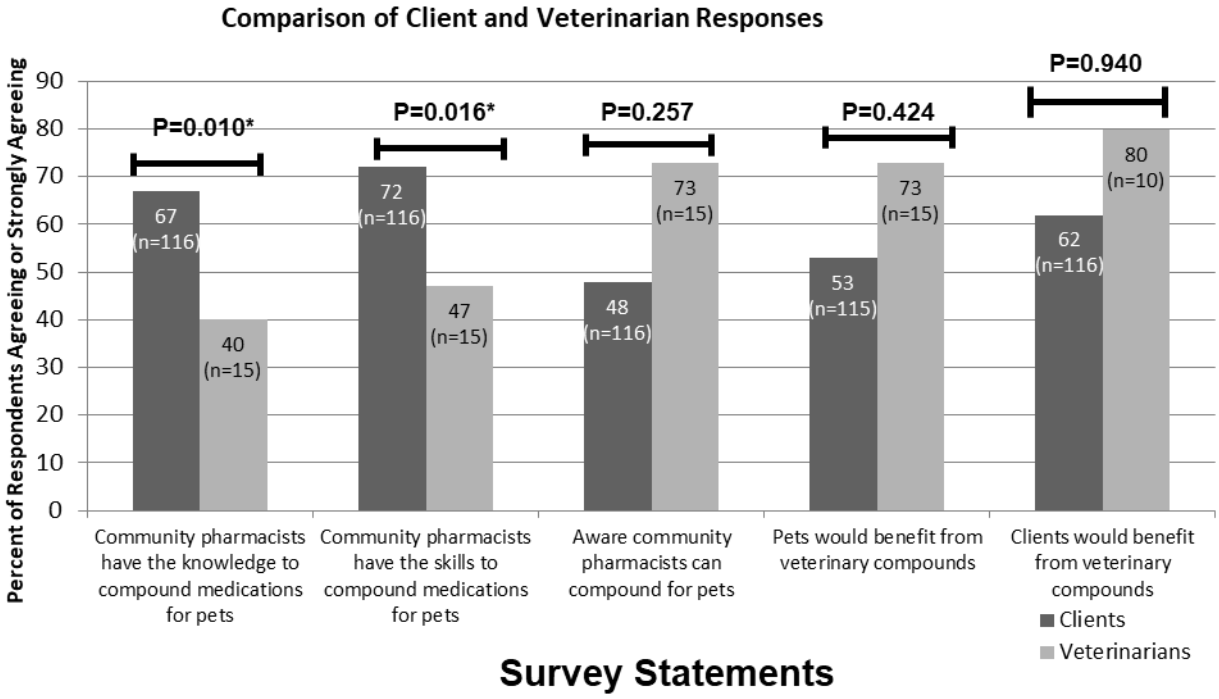

Figure 2. Comparison of Client and Veterinarian Responses. Compares responses to the same Likert-scale survey items. *denotes statistical significance (P<0.05).

strongly agreed that community pharmacists have the knowledge to compound medications for pets, compared to only six of 15 (40%) veterinarian respondents (p=0.010). Eighty-three of 116 (72%) client respondents agreed or strongly agreed that community pharmacists have the skills to compound medications for pets, while only seven of 15 (47%) veterinarian respondents shared the same view (p=0.016).

In addition to the results noted above, three of 15 (20%) veterinarian respondents currently perform compounding at their practice. Ten of 15 (67%) veterinarian respondents would prescribe more compounds if they had a trusted compounding resource. Further, 35 of 89 (39%) clients whose pets had previously taken medications indicated it was "difficult" or "extremely difficult" to administer medications to their pets. Pet refusal to eat or swallow medication was the most commonly reported barrier to giving pets medications. This was reported by 46 of 90 (51%) of clients whose pets took medications and by 14 of 15 (93%) veterinarians. Forty-eight of 118 (41%) client respondents reported they would travel 10 miles or more out of their way to pick up compounded medications for their pets.

Client and veterinarian comments left in the final free-response survey item were assessed for emerging themes (Table 2, Table 3). The item invited participants to write any additional comments they wanted to share. Some themes from clients included: clients believe veterinary compounding services would be beneficial and the decision whether or not to utilize the service would be impacted by cost and convenience. Twelve of 30 (40%) client comments that were left did not fit into a theme; some examples included personal experiences with pet medications, while others were not relevant to study objectives. Two of seven veterinarian comments (27%) did not fit into a theme; one provided clarification on the way a veterinarian chose to respond to a previous item, while another discussed some specific medications that they compound in their practice.

Table 3. Emerging themes from veterinarian comments (n=7)

Theme	n (%)
Community pharmacists lack knowledge of veterinary medications without additional education	3 (42.8)
Our veterinary office uses another pharmacy for our compounding needs	2 (28.6)
Other	2 (28.6)

DISCUSSION

The body of evidence concerning veterinary compounding services in community pharmacies is limited. To the authors' knowledge, this is the first study to evaluate benefits, barriers, need, and business practices regarding veterinary compounding services in the community pharmacy setting. This study showed that the majority of both clients (72 of 116 [62%]) and veterinarians (eight of 10 [80%]) surveyed agreed or strongly agreed that clients would benefit from community pharmacy veterinary compounding services. This may be correlated to the finding that almost 40% of clients with experience administering medications to pets felt it was difficult. This was congruent with Reynolds and colleagues, who demonstrated that medication administration to pets was difficult for over one-third of clients (75 of 221), with nearly 10% (20 of 221) of clients rating it extremely difficult.[5] Veterinary compounding services have the potential to alleviate these administration challenges by providing flavored medications that pets are more likely to take or

medication dosage forms that are easier for clients to administer. However, the current study showed many veterinarians (12 of 15, 80%) do not provide veterinary compounding services. In this study, veterinarians (10 of 15, 67%) indicated they would prescribe more compounds if they had a trusted compounding resource, representing an opportunity for veterinarians and community pharmacists to work together to optimize patient care.

This study also showed there is a perceived need for veterinary compounding services in the urban area studied, as many clients (48 of 118, 41%) would travel out of their way for the service. In comparison, Yen found that adults in urban areas were willing to travel an average of 17.6 miles to receive routine health care for themselves.[14] While clients may be willing to travel fewer miles for healthcare services for their pets than for themselves, the willingness observed by respondents in the current study to travel 10 miles or more out of their way indicates the service is still valuable to the client.

Clients (78 of 116, 67%) were more likely than veterinarians (six of 15, 40%) to agree or strongly agree that community pharmacists have the knowledge to compound pet medications. Similarly, 83 of 116 clients (72%) agreed or strongly agreed that community pharmacists have the skills to compound pet medications, while seven of 15 (47%) veterinarian respondents agreed or strongly agreed with the same statement. These results indicate an opportunity for pharmacists to better educate veterinarians about their technical compounding abilities, training, and drug information skills. Congruently, a 2014 National Association of Boards of Pharmacy (NABP) resolution states that all pharmacists dispensing veterinary medications should have access to drug information resources and possess competence in caring for veterinary patients.[13] Accordingly, resources such as the Merck Veterinary Manual, Plumb's Veterinary Drug Handbook, and the International Veterinary Information Service (IVIS) are readily available to pharmacists, including those practicing in community pharmacies.[15-17] As discussed by Theberge and Sehgal, incorporating veterinary pharmacotherapy and veterinary drug information resources into pharmacy school curricula will better prepare the next generation of pharmacists to care for veterinary patients.[8] Practicing pharmacists may also become Board Certified in Veterinary Pharmacy; complete veterinary residencies, rotations, and compounding boot camps; and focus their continuing education on veterinary pharmacy. They may also actively participate in professional organizations such as the American College of Veterinary Pharmacists and the International Academy of Compounding Pharmacists. At the current time, pharmacy education alone does not make a pharmacist competent in veterinary pharmacology. Pharmacists serving veterinary patients have a duty to seek out these additional resources and opportunities to provide the best patient care. Increasing community pharmacist access to these resources can improve veterinary patient safety; veterinarian knowledge of a community pharmacist's training or credentials in veterinary pharmacotherapy and veterinary compounding may foster interprofessional trust.[8,11,12] Therefore, properly trained community pharmacists can collaborate with veterinarians to become a trusted compounding resource in the care of their mutual patients.

Due to the availability of human generic medications for pet use, it is often inexpensive for clients to obtain veterinary medications at community pharmacies.[9] Furthermore, community pharmacies often offer more convenient operating hours than veterinary practices and specialized compounding pharmacies. Emerging themes from this study indicate medication cost and convenience are important factors for clients when making healthcare decisions for their pets. Thus, veterinary compounding services provided in community pharmacies can service their need for veterinary compounding services while creating a new cash-only revenue stream for the pharmacy. This study also demonstrated that pharmacists may be able to fulfill a need for veterinarians as well by reaching out to them to provide veterinary compounding services.

There are several limitations associated with this study. First, the study was completed in a limited geographical area, and all study pharmacies are located within an urban area. The study sample lacked ethnic and gender diversity; therefore, it is uncertain if the study results are generalizable to more diverse or to rural populations. Additionally, the survey period was relatively short and the surveys used only had face validity. To the authors' knowledge, no validated instruments exist to measure perceived benefits, barriers, need, and current business practices regarding veterinary compounding services. Targeted clients were identified by searching pharmacy dispensing software for patients designated as pets; if demographic information was not entered correctly for these patients, clients could have been missed or misidentified. Another limitation of this study is that one Likert scale question present on the paper veterinarian survey was inadvertently omitted from the electronic survey; thus, the five veterinarians completing the survey electronically were not able to complete this survey item. The item asked respondents to identify the degree with which they agreed or disagreed with the following statement: "My patients' owners would benefit from having medications compounded by a community pharmacist." Lastly, a low incidence of completed veterinarian surveys limited statistical power.

Future research should elicit more veterinarian insight on benefits, barriers, and need for veterinary compounding services. Suggestions to accomplish this include extending the data collection window, increasing the number of survey offer attempts to each veterinarian, and increasing the targeted veterinarian population. Additionally, surveying veterinarians before and after an education session on pharmacist compounding skills and knowledge of veterinary medications is another area of interest. More research is needed to determine what factors affect clients' travel and spending habits related to veterinary compounds provided in community pharmacies. Community pharmacies could consider conducting future research into the effectiveness and profitability of establishing business partnerships with veterinary practices who do not offer veterinary compounding services. Measurement of veterinary compounding service benefits and barriers following implementation of veterinary

compounding services in a community pharmacy has yet to be studied.

CONCLUSIONS

This study assessed client and veterinarian perceptions of veterinary compounding service benefits, barriers, and need in the community pharmacy setting. Overall, client respondents identified more strengths and opportunities for veterinary compounding services in the community pharmacy setting when compared to veterinarian respondents. Both clients and veterinarians identified a need for veterinary compounding services and agreed their provision in community pharmacies would benefit pets and clients in the community. Properly trained community pharmacists and their technicians have the potential to expand their business by reaching out to veterinarians to provide veterinary compounding services.

CONFLICT OF INTEREST

None.

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