

Short Communication

Mobile Technology in Veterinary Clinical Medicine

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Submitted: 21 December 2014

Accepted: 05 April 2015

Published: 07 April 2015

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Keywords

- Mobile Devices
- Clinical Veterinary Medicine

Abstract

Background: The need for convenient ways to access technology is expanding. A plethora of apps now exist to make daily life easier for the common person. The medical field has begun to integrate apps into the diagnostic tool set in order to improve human medicine. This form of personal care not only makes patient visits easier for both patient and practitioner because tests and check ups are performed at only one location, physicians believe apps will also enhance their interaction with patients.

Purpose: One may then wonder about the effect of mobile technology in the delivery of veterinary clinical medicine. While human medicine incorporates the use of mobile devices for human disease, their use in veterinary medicine is lagging.

Methods: Through use of an online survey a sampling of veterinarians were queried to investigate whether or not they believe use of mobile technology will improve their practice.

Results: Veterinarians believe there is a strong desire for mobile technology in veterinary medicine and the use of this technology will allow them to practice more effectively. Results showed mobile devices are prevalent and widespread among veterinarians with more than sixty percent surveyed strongly agreed mobile technology will advance patient care, client communication, and improve access to clinical data and medical literature.

Conclusion: Gaining insight from veterinarians on mobile technology will help ignite the creation of veterinary apps and other mobile devices to improve the quality and delivery of veterinary clinical medicine.

INTRODUCTION

The uses of mobile devices are growing at alarming rates. It is projected by 2018 mobile technology numbers will have not only exceeded the earth's population, but Wi-Fi will become the past and 4G will control all mobile technology. This indicates the vast abilities and advances mobile devices will have [1]. Mobile devices are becoming a readily more popular tool in human health care. It is estimated that mobile devices could save \$197 billion dollars within the next 25 years in the United States alone. These devices range from everyday real time monitoring to chronic disease management [2].

While human medicine is more advance with actual monitoring systems for physiological problems the veterinary field is not far behind. Currently there have been several veterinary apps and devices made to help veterinarians treat patients to their greatest potential, a few including; text book apps, such at the Merck Veterinary Journal, programs to run a practice

via mobile devices, and medical references. Despite the rapidly growing number of advancements in mobile human healthcare technology, utilization in the field of clinical veterinary medicine is not widespread. New apps are being created everyday for both human and veterinary medicine, while human medicine may be farther along in numbers the veterinary world is not far behind. With that said these technologies have the potential to improve the quality of patient care as well as their outcomes, they just need to be put to use.

A quick review on PubMed reveals that when searching the terms "medical" and "smartphone," 140 hits are obtained as compared to the search of "veterinary" and "smartphone," where only 1 hit results and is in fact an article on smartphone use in human medical applications [3].

There is a clear need for the development of mobile apps and devices for veterinary medicine. We developed a survey to assess why these powerful devices are not being utilized to their full

potential amongst practitioners in clinical veterinary medicine. The survey was created to look at the current and potential uses of mobile devices, their impact and whether veterinarians thought these devices would improve overall care of their patients. The survey investigated current views on the usage of mobile devices in clinical veterinary medicine. In addition, reasons for the devices lack of wide spread use in clinical veterinary medicine was assessed.

MATERIALS AND METHODS

To investigate the impact of mobile devices in the clinical veterinary medicine a survey was conducted to assess how mobile technologies are currently used in a veterinary setting. The survey focused on mobile devices' effectiveness in the profession, current views on their use in the clinical veterinary medicine and areas of limitation. This survey was distributed to more than 100 licensed veterinarians throughout the state of South Carolina using the American Veterinary Medical Association website. Surveys were used as previously described [4,5] modified for use by veterinary health care professionals. No informed consent form was signed by any individual responder of the survey because their participation in completing the questionnaire was voluntary and as such neither their identity or location nor the location of their employment was made available to any members of the research team. Individuals were contacted through email lists based upon the professional affiliations for a specific group of practitioners, for example, veterinarians licensed in the State of South Carolina; however, for any one specific veterinarian practitioner responding to the survey, their identity was not known to the authors as the surveys were collected by using Qualtrics, an online survey software program. The survey collected demographic data first, including the participant's job title, name, years of experience in this field, and place of employment. The Qualtrics program also collected the responses and performed data analysis, while the remaining statistical testing was performed using Microsoft Excel. The

responses were categorized as follows: strongly agree through to strongly disagree. The results were analyzed to make qualitative data that supported the theories established in the introduction. Only the survey responses not the demographic data were made available to the authors.

RESULTS AND DISCUSSION

Views of mobile devices

Overall most veterinarians strongly agreed that mobile devices are useful in accessing collective medical literature (48.86% ± 0.89), accessing treatment protocols (45.45% ± 0.93), accessing clinical data (53.41± 0.83), scheduling appointments (36.78%± 0.98), and monitoring and preventing public health crisis (42.53% ± 0.86). Most veterinarians agreed that mobile devices are useful in distance or remote monitoring (34.9% ± 1.08), viewing electronic records on mobile devices (45.98% ±0.88), and training new employees (41.38% ±1.02). Figure 1 shows these responses.

Usage of mobile devices

Most veterinarians often will use mobile technology to access collective medical literature (67.39%±0.57), access treatment protocols (63.74%±0.59), and accessing clinical data (54.35%±0.68). Veterinarians who were less likely to use mobile technology for distance monitoring of patient vitals (71.74% ±0.56), viewing electronic records (50.55% ±0.68), training employees (51.09% ±0.54), scheduling appointments (48.91%±0.92), monitoring and preventing public crisis (66.67% ±0.50). 74.18% believe that using mobile devices will enhance the patient care and treatment. Veterinarians who disagreed gave the following reasons; mobile devices do not replace hands on interaction and that small mobile devices make it hard to see some images needed for diagnostics. Other health practitioners also have stated this response when referencing age related sight problems or the size of the screens in such devices may be a contributing issue in this regard. With that said technology

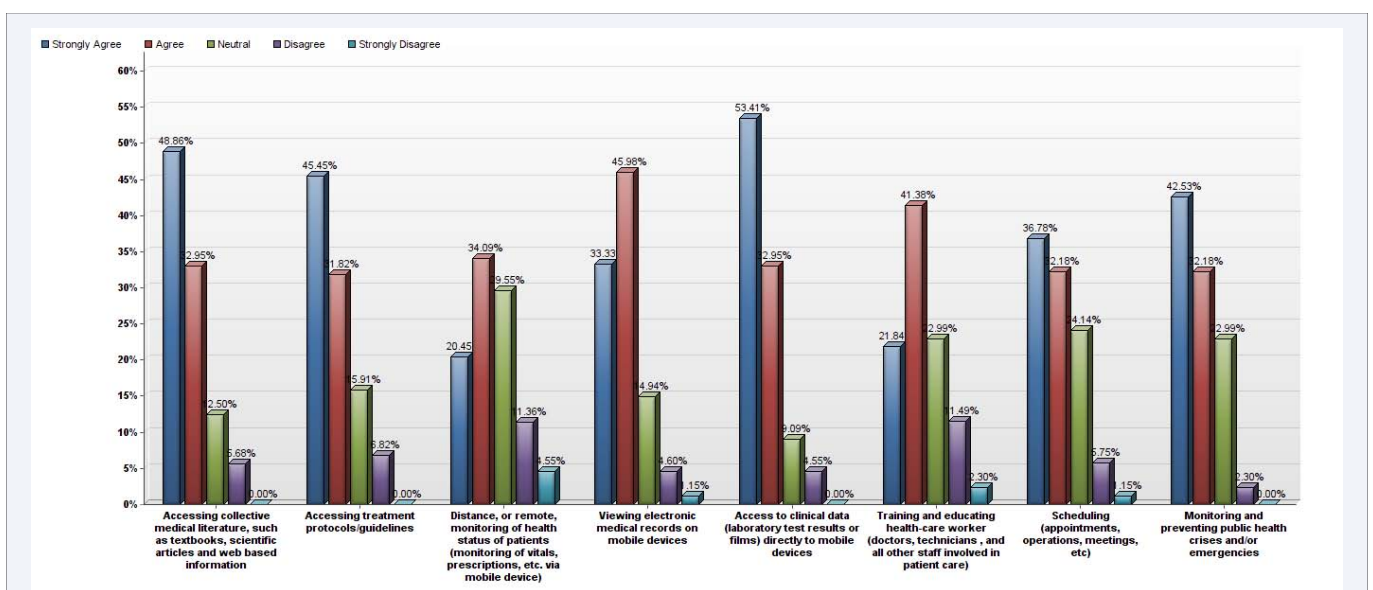


Figure 1 Views on mobile technology.

providers are now producing larger devices with larger screens (e.g., iPhone 6 or 6s and Android devices).

Views of mobile devices and clinical data

Most veterinarians agree the use of mobile devices are an effective way to transmit data (42.22%) quality of patient care is enhances by transportation of clinical data through mobile devices (43.33%), the use of mobile devices to transmit clinical data will allow quicker, more efficient retrieval of these results (58.43%). If it were shown that mobile.

Devices lead to the more rapid retrieval of clinical data; this would allow the veterinarian to provide better quality veterinary care (50.56%). Allowing clinical data to be disseminated using mobile devices will make the job of the clinical laboratory scientist easier and more efficient (49.44%). Most veterinarians disagreed that using a mobile device regularly to receive patient results will be a distraction to the veterinarian (42.70%), transmission of clinical data by mobile devices will endanger patient privacy (40.45%), allowing clinical data to be disseminated using mobile devices will eliminate the need for employees in the field of clinical laboratory science (48.31%) and the use of mobile devices to transmit lab data will lower the cost of veterinary services (40.45%), The use of mobile devices to transmit lab data will increase the cost of veterinary services (41.57%). Figure 2 shows full responses on clinical data and mobile devices working together.

DISCUSSION

Overall the results show promising news for the future of mobile technology in clinical veterinary medicine. Most veterinarians believe that mobile technology is the future, but many have not experienced personal use of mobile devices themselves. Their lack of involvement comes either from lack of available options or fear to change.

The data presented gives hopeful results for the future of mobile devices in clinical veterinary medicine through the positive feedback seen in the results. Veterinarians either agreed

or strong agreed that mobile technology would be helpful in all categories of clinical medicine. Most notable in accessing information from literature references and viewing treatment protocols, and accessing clinical data these areas already have the most mobile devices and apps readily available for veterinarians to use. VMD technology outlines the top applications available and every app they list falls into one of these two categories [6].

When asked if veterinarians themselves use these mobile devices the results were slightly disappointing. In all areas very few veterinarians stated they used certain mobile technologies “always”. Most responses were never or sometimes. Areas that were more alarming were use in medical literature, treatment protocols, and clinical data, since these areas already have so many apps available for veterinarians to use. Some areas that are more easily understood include training employees or monitoring public health crises. Equally disappointing, but more easily understood are the areas of monitoring vitals from a distance, viewing medical records and scheduling appointments because options are not as readily available even though these areas are the future of mobile technology. Monitoring vitals from a distance would allow veterinarians to monitor their patients even after the return home. While these devices may not be well know in the veterinary world they are readily becoming popular in human medicine. Accessing medical records using mobile technology, but there seems to be a gap. Not all veterinarians are on board for the complete all mobile world, preventing veterinarians that are ready from moving forward. Scheduling appointments should be very easy yet there are not lot of available programs that would work on mobile devices.

The results suggest the clinical laboratory will operate as normal if not more efficiently and potentially more cost-effective with the use of mobile devices. A positive result from the advancement of mobile technology shows that veterinarians do not believe mobile technology will hurt clinical laboratory data. Mobile technology will help enhance veterinary care by decreasing wait times without raising the cost for clients; therefore, their impact may improve the bottom line for veterinarians and their practices.

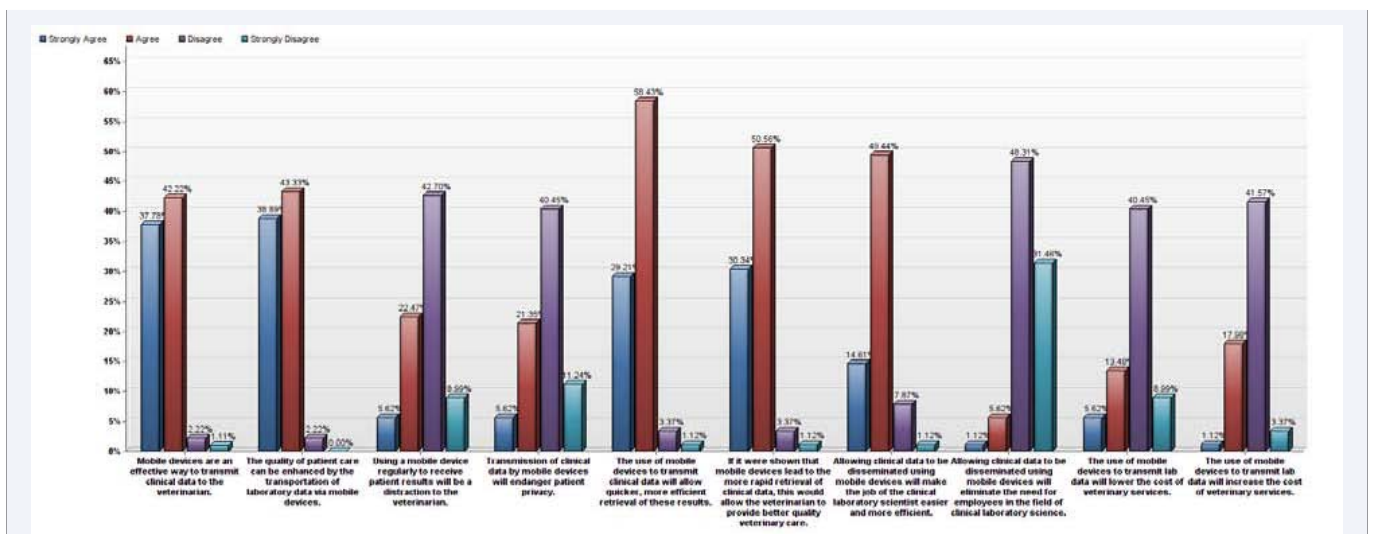


Figure 2 Clinical data and mobile technology.

Most veterinarians surveyed had been practicing for over 20 years suggesting that they could be slightly behind the times. If the survey results showed a majority of younger veterinarians the result could be shifted to a more positive opinion on mobile technology. This could also apply to the type of veterinarians surveyed. The majority were small animal's veterinarians who can easily access their patients when they are in the office, but these results could change if mainly equine or large animal's veterinarians were surveyed. Most equine veterinarians are ambulatory veterinarians and therefore have to travel to patient farms using mobile technology could be of greater benefit to them compared to small animal veterinarians since they are not at a main office.

CONCLUSION

While this survey was able to assess the current use and views of mobile technologies, further research must be conducted to determine what factors are preventing complete usage of mobile technology. Important questions remain to be investigated - what is preventing mobile technology use, given the positive impact they can have on clinical veterinary medicine. The biggest lack is educating veterinarians about the options available and discovery of more technologies that can be widely used to improve the field.

ACKNOWLEDGEMENTS

This research was made possible through financial support provided by Clemson University's Creative Inquiry Program.

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Cite this article

Andrews CM, Bulloch L, Dennison T, Elder J, Mitchell A, et al. (2015) Mobile Technology in Veterinary Clinical Medicine. *J Vet Med Res* 2(1): 1017.