KAP STUDY

Use of portable gadgets in radiology clinical and academic activities: A questionnaire-based, cross-sectional study

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Abstract

Objective: To assess knowledge, attitudes, practices and perceptions of healthcare professionals regarding use of portable gadgets in daily clinical practice and for academic purposes.

Methods: The questionnaire-based, cross-sectional study was performed at Aga Khan University Hospital, Karachi, from February to March, 2015, and comprised healthcare professionals recruited using convenience-based sampling. A self-administered questionnaire was used for data collection. Items in the instrument pertained to use of portable gadgets, knowledge of radiology applications and perceptions regarding benefits/drawbacks of such gadgets. 'Portable gadgets' referred to any handheld electronic device, such as mobile phones, tablet or personal digital assistants. SPSS 20 was used for data analysis.

Results: Of the 100 subjects, 38(38%) were radiology residents, 34(34%) consultant radiologists 28(28%) were radiographers. The overall mean age was 32.7±8.66 years. Overall, 80 (80%) subjects possessed a portable gadget. Although 64(64%) participants commonly used the gadgets for clinical and academic activities, only 46(46%) had heard of radiology smartphone applications. Majority 80(80%) preferred hardcopies for studying books as opposed to digital formats. However, 78(78%) believed that portable gadgets had a positive impact on their clinical practice.

Conclusion: Portable gadgets were being used by a substantial proportion of healthcare professionals for clinical and academic activities.

Keywords: Digital devices, Portable gadgets, Radiology, Pakistan, Knowledge, Attitudes, Perceptions, Practice. (JPMA 69: 864; 2019)

Introduction

With advancements in information technology and widespread availability of electronic devices, portable gadgets are being increasingly popular in every field of life. In medicine, use of portable gadgets has been steadily increasing over the past decade.[1] Clinical decision support systems have been developed to assist clinicians and junior doctors in reaching diagnoses and formulate appropriate management plans.[2] Electronic resources and databases are now available for every handheld device that can be regularly consulted during daily clinical work.[3] Electronic pharmaceutical references and applications have been developed that can screen and detect drug-drug interactions, potential contraindications and possible alternative options.[4]

The field of radiology has also seen its fair share in terms of usage of portable gadgets and electronic applications.[5] Tablet computers and handheld devices have been used for interpreting radiological images during after-work hours and for providing teleradiology consultations.[6] A previous work evaluated the use of tablets for the diagnosis of acute appendicitis on computed tomography (CT) and demonstrated that its accuracy was comparable to that of standard Picture Archiving and Communication System (PACS) workstation.[7] Moreover, computer-aided reading (CAR) of radiological images is becoming increasingly popular and a number of applications have been developed to this end.[8,9] A study evaluated the use of textural analysis for automated detection of pulmonary abnormalities in plain chest radiographs, and reported a sensitivity of 97% and specificity of 90% for the diagnosis of interstitial lung disease.[10]

While the developed world continues to explore novel uses of portable gadgets, the developing countries have been slow to adopt their use in both clinical practice and academic activities. Limited data is available regarding the use of portable gadgets by healthcare professionals in Pakistan.[11] The current study was planned to assess the knowledge, attitudes, perceptions and practices of healthcare professionals in the department of radiology of a tertiary care hospital.

Subjects and Methods

The cross-sectional study was carried out at the radiology

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department of Aga Khan University Hospital AKUH, Karachi, from February to March, 2015. Healthcare professionals, including residents, fellows, consultants and radiographers, working in the department were eligible to participate in the study. Non-probability consecutive sampling methodology was employed to raise the sample. The residency programme of Diagnostic Radiology at AKUH was a 5-year programme until 2015, but from 2016, the programme was changed to a 4-year residency programme.

For the purpose of the study, the term 'portable gadgets' referred to any handheld electronic device, such as mobile phones, smartphones, tablets, hand-held computers or personal digital assistants (PDAs). A self-administered questionnaire was used as the instrument for data collection. This instrument was prepared in the English language on the basis of consensus among the investigators. Prior to performing the actual study, pilot-testing of the questionnaire was performed in a different institution in order to identify any potential discrepancies or ambiguities in the instrument. Subsequently, changes in the wording of some items were made to improve the structure and clarity of the questionnaire.

Items in the questionnaire pertained to knowledge, attitudes, practices and perceptions of healthcare professionals with regards to portable gadgets. To assess knowledge, questions were asked from participants regarding their knowledge of portable gadgets and available radiology applications and resources. To determine attitudes of healthcare professionals, questions were asked regarding their preferred method for reading books and/or journals. To evaluate practices, participants were asked if they possessed a portable gadget, and, if so, how frequently they used it during their daily clinical work and/or for academic purposes. To gain insight into their perceptions, we asked healthcare professionals what impact portable gadgets have had on clinical practice and academics. Questionnaires were excluded from analysis if data was missing or responses were incomplete.

The questionnaire-based survey was exempted from approval by the institutional ethics committee. Informed consent was obtained from all the subjects. We did not record any personal identifiers or other confidential information. The questionnaires were given a unique code and great care was taken during the distribution phase to ensure that duplication did not occur. The self-administered nature of the questionnaire ensured privacy and provided study subjects an opportunity to record their responses in a non-judgmental manner. The completed questionnaires were returned to a designated box located in the department.

Questionnaires were stored in a secure manner and access to data was restricted to strictly relevant personnel. Data entry and statistical analysis was performed using SPSS 20 and GraphPad InStat 3.06. Frequencies and percentages were computed for categorical variables and mean ± standard deviation was calculated for quantitative variables. Chi-square or Fisher's exact test was used for comparison of proportions with Bonferroni post-test correction applied. $P<0.05$ was considered statistically significant for all comparisons. All electronic data was stored in a password-protected computer with 64-bit encryption.

Results

Of the 100 subjects, 38(38%) were radiology residents, 34(34%) consultant radiologists 28(28%) were radiographers (Figure-1). The overall mean age was 32.7±8.66 years. Among the residents, 6(15.7%) were first-year residents, 7(18.4%) second-year, 5(13.15%) third-year, 9(23.6%) fourth-year, 3(7.9%) fifth-year residents, 5(13.15%) graduated final-year residents from the preceding year, and 3(7.9%) fellows.

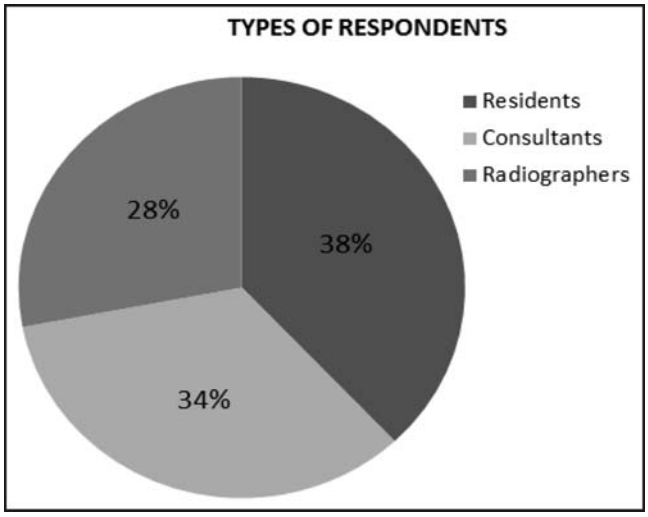

Figure-1: Composition of study sample.

Overall, 80(80%) subjects possessed a portable gadget. Of them 46(57.5%) had smartphones, 6(7.5%) had tablets and 28(35%) had both these gadgets. Among the 28 radiographers, 10(35.7%) had neither smartphone nor tablet compared to 4(10.5%) of the 38 residents and 6(17.6%) of the 34 consultants (p=0.024) (Figure-2).

Although 64(64%) participants commonly used the gadgets for clinical and academic activities, only 46(46%)

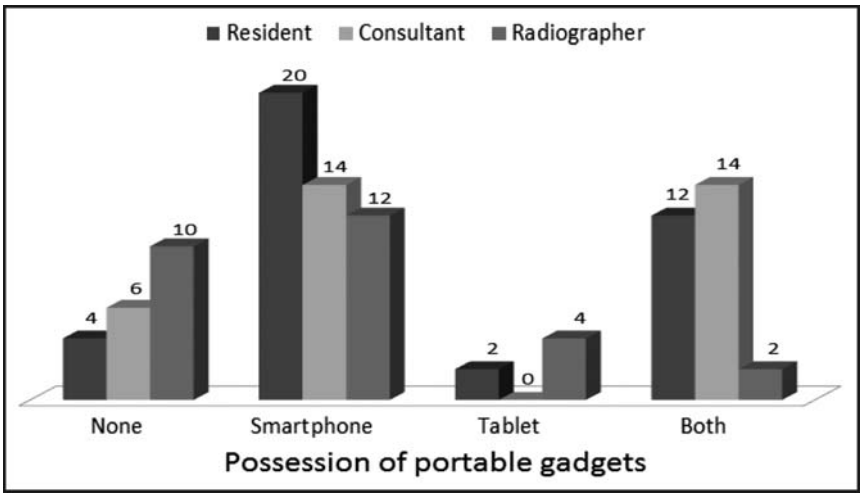

Figure-2: Portable gadgets possessed by study participants.

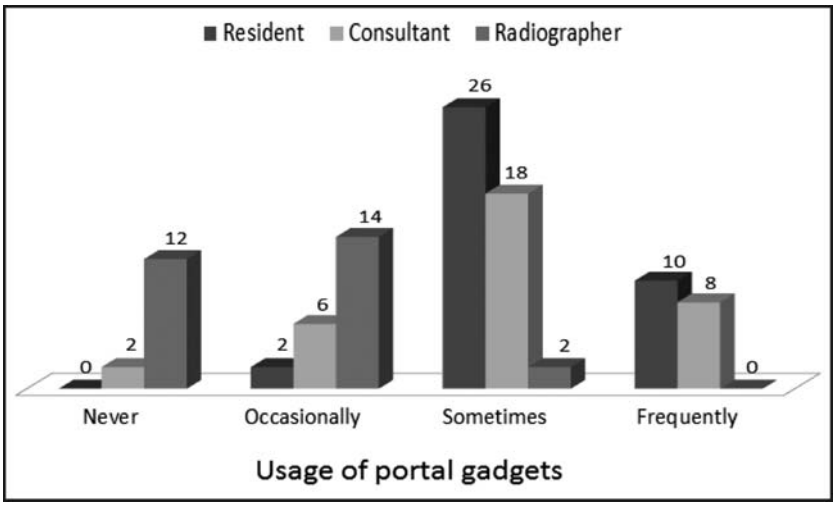

Figure-3: Usage of portable gadgets among study subjects.

had heard of radiology smartphone applications. Only 2(%) of the 28 radiographers had heard of radiology smartphone applications compared to 20(%) of the 38 residents (p<0.001) and 24(%) of the 34 consultants (p<0.001). Majority 80(80%) preferred hardcopies for studying books as opposed to digital formats, like tablets (8%) or smartphones (12%). Overall, 35(35%) had never read journals and 50(50%) had read them only occasionally. The preferred mode of reading journals were hardcopies 35(35%), laptops 38(38%), smartphones 14(14%) and tablets 13(13%). No significant differences were noted in response to these questions among residents, consultants and radiographers (p>0.05).

When asked about the use of portable gadgets, 64(64%) subjects said they frequently used portable gadgets for clinical and academic activities. Of them, 2(3%) were radiographers compared to 36(56.25%) residents (p<0.001) and 26(40.62%) consultants (p<0.001) (Figure-3). Most respondents 78(78%) perceived that portable gadgets had a positive impact on their clinical work. With regards to the advantages of portable gadgets, portability (n=59, 59%) and accessibility (n=52, 52%) were the most frequent responses from the participants. They identified small display size (n=62, 62%), security concerns (n=53, 53%), cumbersome to use (n=31, 31%) and distractions (n=30, 30%) as the four major impediments to using portable gadgets in their clinical practice.

Discussion

The current study explored the knowledge, attitudes, perceptions and practices of healthcare professionals with regards to use of portable gadgets. There was a good mix of consultants, residents and radiographers in the sample cohort. Most participants possessed a portable gadget, but more residents and consultants possessed portable gadgets than radiographers. Moreover, most participants were aware of portable gadgets and acknowledged their usefulness to daily clinical practice. However, most participants did not utilise the gadgets frequently in their daily clinical practice. The reasons for this are manifold.

Most participants mentioned that they did not possess a portable gadget due to security issues, which seems to be a major concern in the city of Karachi. With street crime rates that are alarmingly high,[12] many people simply choose not to buy an expensive portable gadget as mugging would have significant financial and emotional consequences. For some, buying a portable gadget represents a significant financial burden and its cost is beyond their pocket. We feel this is a combined consequence of a low salary package, excessive rate of inflation, and high monthly expenditure.[13] In our study, more radiographers did not possess a portable gadget compared to residents or consultants. This may be attributable to the differences in financial status, education and other factors, but we did not assess those

factors in the present study.

Some participants also mentioned that they did not use portable gadgets as they are cumbersome to use. In the modern era, many portable gadgets have a graphical interface with a touch screen, which has made them much simpler and easier to use when compared to the archaic computers with system consoles from a few decades ago.[14] However, the perception of these devices being "cumbersome" is likely because most people are not taught about computers as part of their basic education and, consequently, they find it challenging to perform simple tasks — such as using a mouse, typing on a keyboard, navigating through the interface and so on.[15] In this regard, increasing the awareness regarding computers in the general population and incorporating them into basic school education would likely be useful.

Another important reason that was mentioned by participants for not using portable gadgets was distractions during work. While it is true that most portable gadgets have games and applications for entertainment purposes, there are options available to customise these gadgets in a way that reduces such distractions.[16] However, in our society and culture, use of portable gadgets during sessions or in patient-care settings is viewed as inappropriate in general. Patients' have expectations from doctors that they should pay full attention to them and they ought to retain all medical facts in their working memory. On the other hand, use of clinical decision support systems during daily clinical practice can reduce the incidence of medical errors and increase confidence of healthcare professionals in their decisions.[17-19] While it is indeed inappropriate to ignore a patient's expectations, it would be useful to raise awareness in the general population in this regard and inform them regarding the benefits of using these devices in patient care.

While the advantages of portable gadgets are encouraging, their disadvantages also deserve equal attention. Many participants mentioned that portable gadgets have a small display, which makes it difficult to use them for various purposes. Indeed, most participants preferred reading hard copies of books than reading them in a digital format. Laptops and personal computers have a larger display, but as they are not portable, this limits their usability in day-to-day clinical practice. Newer laptops and tablets have a sufficiently large display screen and they are relatively lightweight and portable. Yet, they cannot provide the same tangible experience of reading a hardcopy book. This explains in part why most participants did not prefer to read electronic books. Use of portable gadgets for reading journal articles on the go during clinical work can be especially useful. However, in our study, most participants did not use them for reading journal articles. This may in part reflect the fact that many healthcare professionals in Pakistan choose to practice medicine based on experience and anecdotal evidence, rather than actual evidence-based medicine.[20]

Another important finding in our study was that most healthcare professionals were not aware of radiology applications. A number of radiology smartphone 'apps' have been introduced over the past few decades that can help radiologists not only academically, but also in terms of clinical practice.[21] These applications include image viewing software, radiology references, logbook software, and so on.[22-25] Even smartphone-based ultrasound devices are now available that can be used to scan patients.[26] This shows that although radiology smartphone applications have immense potential for improving clinical practice, it remains largely untapped in our part of the world.

This study does come with a number of limitations. It was performed in the department of radiology and these findings cannot be generalised to healthcare professionals of other specialties. Secondly, it is based entirely on personal reports of study subjects, which may not always be wholly accurate, but there is no reason to doubt these reports either. A major limitation of our study is that it was performed among healthcare professionals at a private, tertiary care hospital. These findings cannot be generalised to healthcare professionals of public-sector hospitals or rural health centres (RHCs) where use of portable gadgets and their perceived usefulness may be much lower. Lastly, while it seems intuitive that use of portable gadgets would improve patient care in Pakistan, research studies are needed to fully assess their impact on patient health outcomes.

Conclusion

Portable gadgets were being used by a substantial proportion of healthcare subjects. However, there still remains immense potential to utilise portable gadgets for improving clinical practice and for academic purposes.

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Conflict of Interest: None.

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