



How Turkish radiology residents access information related to their profession in this social media and smartphone era

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ABSTRACT

Purpose: To evaluate the frequency of mobile technology and social media usage among radiology residents and their access to professional information.

Materials and methods: A questionnaire consisting of 24 questions prepared using Google Drive was sent via e-mail to 550 radiology residents throughout the country. Of the 176 participating residents, 74 completed the survey via the internet, and 102 completed it at three different national radiology meetings. Response rates and its relationship with responses given to different questions were assessed. **Results:** Hundred two male and 74 female residents participated in the survey. 141 (81.3%) residents thought that they had appropriate internet access in their department. The number of residents using a smartphone was 153 (86.9%). The android operating system (70, 45.8%) was the preferred operating system of respondents. Only 24 (15.7%) of the smartphone users thought that there were enough radiology related applications. “Radiology assistant” (18.9%), “Radiopedia” (7.8%) and “Radiographics” (7.8%) were the most utilized applications. Of the smartphone users, 87(56.9%) stated that they used cell phones in order to find radiological information, and the most used web pages were Google (165, 93.8%), Radiopaedia.org (129, 73.3%), Radiologyassistant.nl (135, 76.7%), and Pubmed (114, 64.8%). Social media usages were as follows: None (10, 5.7%), Facebook (139, 79%), Twitter (55, 31.3%), Google + (51, 29%) and YouTube (44, 25%).

Conclusion: While smartphone usage rates among the residents were high, the use of radiology specific applications was not common. Social media usage was very common among residents.

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1. Introduction

Mobile technologies have evolved incredibly fast during the last 10 years and have become inescapable items of knowledge acquisition and communication. Since “Simon”, the first item referred to as a smartphone, was introduced into the market in 1994, new models with faster processors and better imaging resolution come out each year [1]. The internet has been in every step of our daily lives since the mid 1990’s. Beginning from mid-2000’s, a new concept named as “social media” has also started to take part in our lives. With the introduction of Facebook in 2004 and Twitter in 2006, social media has become a phenomenon. Development of 3G, Wi-Fi networks and mobile technologies along with increased usage of the internet and social media has moved information from desktops

into our pockets. It is now possible for people to access information and communicate with each other anywhere with just one finger motion.

According to the data from the Turkish Statistical Institute, Turkey, the third most densely populated country in Europe, has a population of 76,667,864, 25% of which are under the age of 15 [2]. With its growing number of youths, Turkey had 36,455,000 (36.5% of the population) internet users and 32,131,260 Facebook subscribers in June, 2012 [3].

We have started to observe these new changes brought into our daily radiology education. When the teacher asks a question during lecture, such as “what is dysphagia lusoria” or “what are the things that shine on T1 weighted images”, it is becoming increasingly common to see residents searching for answers through their smartphones. It has become common for graduate radiologists living miles away from each other to discuss the images of patients in a radiology group on Facebook. We carried out this survey study to identify the frequency of mobile technology usage among the radiology residents in our country and how radiology residents

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access professional information through these new technologies and media.

Since English is the universal language in medicine, and most of the radiological information on the internet is published in English [4,5], we also wanted to assess general English skills of Turkish radiology residents. We also wanted to find out what printed or electronic training materials radiology residents had and how they utilized these materials. We thought that this would give us clues about how residents in Turkey study their lessons and search for a topic related to their study area. To our knowledge, there is no similar study performed in either radiology residents or other resident groups in our country or in Europe.

2. Materials and methods

The institutional review board approved this study protocol.

A survey consisting of 24 questions was prepared using Google Forms application (<https://docs.google.com/forms>). Before its online publication, the survey was administered to 10 non-radiology residents and 10 radiology residents to determine potential errors in the survey and online survey system. In September 2013, e-mails were sent to 550 radiology residents throughout the country using the e-mail database requested from the residency council of the Turkish Society of Radiology. Due to low response rate, the e-mails were re-sent. Seventy-four residents completed the survey on the internet by February 2014. The rest of the data were collected from 102 residents through face-to-face interviews at three different national radiology meetings (TURKRAD 6–10.11.2013, Radiology Winter Schools February 2014 and 9th annual meeting of Turkish Society of Interventional Radiology 21–23.3.2014). The respondents were informed they were not identifiable from the data. The online version of the survey can be accessed at <http://goo.gl/eWzt0>. An English version of the the survey can be achieved as a supplementary material.

The data were obtained from the responses given by 176 residents. Response rates and the relationship between responses given to different questions were assessed. IBM SPSS version 21.0 software was used for statistical analyses. Descriptive statistics were calculated in each group. To determine the association of variables in independent groups (type of hospital, gender, residency year, foreign language knowledge, textbook ownership, smartphone usage frequency in order to achieve radiological information), χ^2 analysis was used. A p -value of <0.05 was used to indicate statistical significance.

3. Results

102 male and 74 female radiology residents joined the survey. Gender, age group and workplace differences are summarized in Table 1. The rates of those are in the 2nd–3rd year and the 4th–5th years of residency are 45.5% and 41.5% respectively. Responses show no significant difference between the groups in terms of gender, foreign language knowledge or textbook ownership.

3.1. Language skills

We asked several questions to the participants regarding their English reading, listening, writing and speaking skills. Only six (3.4%) participants stated that they did not know to speak English. Seventy-three (41.5%) claimed that they could understand a scientific article written in English completely. Fifty-seven (32.4%) claimed that they were able to speak to a foreigner on the phone. Fifty-six (31.8%) of the residents reported that they were able to write an article in English while 52 (29.5%) thought that it was impossible to write an article in English. The most difficult language

Table 1
Frequencies of training centers, gender, age groups and smartphone ownership.

		n = 176 (%)
Training center	University hospital	113 (64.2)
	Government teaching hospital	63 (35.8)
Gender	Female	74 (42)
	Male	102 (58)
Age group	20–30	152 (86.4)
	31–35	20 (11.3)
	>35	4 (2.3)
Smartphone ownership	Android	69 (39)
	iOS Apple	61 (35)
	Windows	1 (1)
	Other	2 (1)
	None	43 (24)

skill was presenting in English, with only 39 (22.2%) answering that they could successfully do it.

3.2. Possession of printed educational material

We asked residents how many Turkish and English radiology textbooks they possessed and how many of them subscribed to a medical journal. Seventeen of them had no Turkish textbooks and 45 of them had no English textbooks. Sixty-five (36.9%) residents had three or fewer Turkish textbooks while 94 (53.4%) had four or more Turkish textbooks. 67 (38.1%) residents had three or fewer English textbooks while 64 (36.4%) had four or more English textbooks. Only 8 of the participants subscribed to a Turkish medical journal and 11 of them subscribed to a foreign medical journal in which Radiographics was the most popular with only 4 followers. We also asked the participants whether their radiology department had a satisfying textbook library. Only 53 (30.1%) responded with “yes” while the rest (123–69.9%) responded with “no”. Of the 113 residents who worked in a university hospital, 75 (66.4%) thought they did not have a satisfying library at their institutions. This rate was higher (48–76.2%) in 63 residents who work in a government teaching hospital. However, the difference between the two groups was not significant ($p = 0.170$) (Table 2).

3.3. Smartphone ownership

According to the responses, 153 (86.9%) of the participants owned a smartphone during the survey. Of the 153 smartphone users, 80 (52.3%) had a phone with the “Android” operating system (OS) and 70 (45.8%) had an “iOS Apple” OS phone. Only one (0.7%) resident had a phone with the “Windows” OS and two had a phone with another OS (Table 1).

We asked radiology residents using smartphones if there were enough radiology related applications. Of the 153 users, 60 (39.2%) answered this question as “no”, 69 (45.1%) answered as “few”, while 24 (15.7%) answered as “quite enough”. When asked to write down the two most used applications, they answered as “Radiologyassistant”(29–18.9%), “Radiopedia”(12–7.8%), “Radiographics”(12–7.8%), “Imaios” and “Radiological anatomy”(8–5.3%). 10 other applications were used less frequently and included: “Diagnostic and Interventional Radiology”, “Eurorad” and “E-anatomy”.

We asked the smartphone users how frequently they used their smartphone to search for information through the Internet when they had a question about a radiological issue. The results are shown in Fig. 1. A statistically significant difference was determined between the residents using smartphones “frequently” or “always” and the residents using smartphones “never”, rarely” or “from time to time” when compared with e-book usage in their teaching insti-

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