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SYSTEMS-LEVEL QUALITY IMPROVEMENT

Role of WhatsApp Messenger in the Laboratory Management System: A Boon to Communication

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Abstract The revolution of internet and specifically mobile internet has occurred at a blinding pace over the last decade. With the advent of smart phones, the hand held device has become much more than a medium of voice calling. Healthcare has been catching up with the digital revolution in the form of Hospital Information System and Laboratory Information System. However, the advent of instant messaging services, which are abundantly used by the youth, can be used to improve communication and coordination among the various stake holders in the healthcare sector. We have tried to look at the impact of using the WhatsApp messenger service in the laboratory management system, by forming multiple groups of the various subsections of the laboratory. A total of 35 members used this service for a period of 3 months and their response was taken on a scale of 1 to 10. There was significant improvement in the communication in the form of sharing photographic evidence, information about accidents, critical alerts, duty rosters, academic activities and getting directives from seniors. There was also some increase in the load of adding information to the application and disturbance in the routine activities; but the benefits far outweighed the minor hassles. We thereby suggest and foresee another communication revolution which will change the way information is shared in a healthcare sector, with hospital specific dedicated apps.

Keywords Laboratory management · Social media · WhatsApp

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Introduction

The involvement of internet and internet-based applications has been increasing with each passing day [1]. With the increasing usage of smart phones and social media in day-to-day activities, the internet is always "on-the-go". In this day and age when we see most of the youngsters spending a big chunk of their time on social media; it is time that the same is also utilized for improving communication at the diagnostic workplace. The patients are also utilizing the resources available online to read and understand about a disease process and various management options available across the globe [2]. There has been a feeling among the decision makers as well as consultants to utilize social media to make a profitable use of the technology [3].

The use of technology for the pre-analytical, analytical and post-analytical parts of the laboratory medicine is evolving rapidly, with the increasing use of automation. However, most of the communications used in the laboratory management are predominantly limited to the official email based communications, which are relatively cumbersome and rarely real-time.

With the increasing use of social media and messaging applications for the social and personal purposes in a person's life, it is relevant and practical to utilize them in the management of laboratory services. Most of the people in general and laboratory personnel in particular have access to smart phones having available data-services. We feel that this can be the

perfect utilization of these modes of communication to enhance the communications within the various workers in this field. We have striven to assess the impact of the application of WhatsApp messenger service. WhatsApp is an instant messenger application available across various platforms like Android, iOS and Windows mobile OS. It was founded by Brian Acton and Jan Koum in 2009, both of whom were former Yahoo! Employees. It was acquired by Facebook in a deal worth approximately US$ 16 billion. The current user base of WhatsApp is estimated to be around 1 billion.

Methods

This study was performed over a period of 3 months from August to October 2014. A total of thirty five (35) laboratory personnel were part of the study belonging to various subsections of the Department of Pathology and Laboratory Medicine at our hospital. The hierarchy of the laboratory personnel included both the scientific and medical staff. Only the lab workers who had access to smart phone and had the WhatsApp app in their smart phones were included in the study. The participation in this study was voluntary. A total of about 15 lab workers could not join the study due to lack of smart phones or app in their phones. However, it was made sure that those people received the information relevant to them through other traditional and existing means of communication like emails and voice calls. The results of this study has encouraged them to get a smart phone for themselves.

There was no limit set on the number of messages shared, and it depended solely on the need and requirements. The sender of the message could check if the submitted message was read by the intended members of the group. This could be done by selecting a message and clicking the "i" icon. It showed the members of the group who have received the message and those who have read it.

A questionnaire was prepared that included various questions on the expected outcome of the use of WhatsApp messenger service. Multiple groups were created such as Histopathology, Hematology, Molecular Genetics, Transfusion Medicine etc. and the various personnel were included in either of these groups. The administrator of all the groups was the director of the department and was part of all the groups.

The questionnaire had 12 questions that were scored from 1 to 10, with a higher score indicating more favorable response. The following 12 questions were included in the questionnaire:

1. Ease of transmitting information to your colleagues and seniors
2. Getting directives from senior lab management
3. Awareness about any incident/ accident reporting
4. Awareness about critical report alerts
5. Awareness about the academic activities
6. Awareness about duty roster and any change in the same
7. Sharing photographic evidence of any results with senior colleagues for their opinion
8. Healthy Interpersonal relationships
9. Workload of adding information to WhatsApp
10. Interference in routine working by regular messages
11. Maintenance of confidentiality of reports
12. Irrelevant and misdirected spread of information

The names of the participants were blinded, however their departments and the designations were mentioned.

The information pertaining to the various aspects of the laboratory services were shared by each group. This included sharing information about the following:

- Daily work load
- Adverse event/ Accident
- Critical alert
- Sharing photographic evidences
- Directions from a senior colleague
- Duty roster
- Academic activity roster

This process continued for duration of 3 months, when the same questionnaire was redistributed. The score of both the questionnaires (i.e., before using WhatsApp and after using WhatsApp) were tabulated in a MS-Excel and were analyzed using paired student *t*-test. The authors will again monitor the response at the end of 1 year, as the practice is still ongoing.

Results

The results of the questions from the 35 participants were recorded in a MS-Excel sheet and were analyzed using paired student *t*-test to compare the mean of the results. Of the total of 12 positive questions that were put-forth, eight (8) were positive questions while four (4) were negative questions (Table 1).

"**Positive questions**"

All the eight positive questions had a significant increase in the score in the "after WhatsApp" compared to the "before WhatsApp" scenario. The eight "positive questions" were pertaining to : (i) ease of transmission of information, (ii) Getting directives from seniors, (iii) awareness about any accident/ incident, (iv) awareness about critical alert reporting, (v) awareness about academic activities, (vi) awareness about duty roster, (vii) sharing photographic evidence with colleagues and seniors, and (viii) healthy interpersonal

Table 1 Means of the response of the questions as "Before WhatsApp" and "After WhatsApp" with Paired Student *t* test for comparison of means

Paired Student *t* Test for comparison of Means

Questions	Before WhatsApp	After WhatsApp	Mean Difference	95 % C.I > of the Difference		*t* - value	*p* - value
				Lower	Upper		
Q1	3.7±2.1	8.4±1.2	4.7	3.747	5.664	9.988	0.000*
Q2	4.8±2.0	7.9±1.6	3.1	2.205	4.099	6.779	0.000*
Q3	4.3±1.9	7.9±1.4	3.6	2.830	4.405	9.348	0.000*
Q4	4.3±2.3	7.8±1.9	3.5	2.556	4.4561	7.223	0.000*
Q5	4.5±1.8	8.0±1.7	3.4	2.564	4.318	7.985	0.000*
Q6	4.7±2.2	8.1±1.7	3.4	2.337	4.427	6.585	0.000*
Q7	3.0±2.4	8.5±1.7	5.5	4.392	6.578	10.218	0.000*
Q8	5.2±2.3	6.8±2.4	1.5	0.307	2.784	2.542	0.016*
Q9	3.1±2.4	4.6±2.6	1.9	0.820	2.980	3.597	0.001*
Q10	3.0±2.1	4.9±2.7	2.3	1.363	3.170	5.130	0.000*
Q11	4.4±3.1	4.8±2.4	0.6	- 0.709	1.976	0.965	0.343
Q12	3.2±2.4	4.9±2.5	1.9	0.831	3.040	3.580	0.001*

relationships. However the rise in score in "healthy interpersonal relationships" was significant but less so compared to the other positive parameters as the p value was 0.016 (compared 0.00 for other seven "positive questions"). These responses indicate that there was a significant ease in transmission of information across varying aspects across the laboratory, which was beneficial to the users.

"**Negative questions**"

Among the four negative questions that were put forth, three had a significant increase in the score thereby indicating some increase in inconvenience to the user as far as (i) workload of adding information to the WhatsApp, (ii) Interference in regular working by constant messages and (iii) misdirected and irrelevant spread of information. However, there was no significant increase in the feeling among the users about the impact on "confidentiality of the reports". However, the mean difference in the negative questions range from 1.5 to 2.3, thereby being less as compared to the mean difference in the positive questions which ranged from 3.1 to 5.5.

Hence we can deduce that the positive impact of the WhatsApp outweighed that of negative aspects.

Discussion

There is an increasing awareness in the healthcare community to utilize internet and available internet-based resources to maximize the available resources. Renowned hospitals like John Hopkins have used social media like Facebook and Twitter to provide various relevant resources to the patients and their attendants [4]. As had been suggested by Friedman [5], the medicine will grow to become more participatory and the practice will become more patient-centric. In a publication in Health Affairs, Dr Parkinson says, "It (health care) needs to be Facebook-ed and Wiki-ed" [6]. The same paper also suggests that social media is a more democratic, "flatter" and effective mode of communication in a health care network. However, there is also a downside of it: to maintain the patient privacy.

In the current work, we have tried to address the plausible, both the positive and negative impacts, of communication using the WhatsApp messenger among the laboratory personnel. It is clear from the results that the most significant factor that was useful for the users was the facility of sharing the photographic evidence of the result, which they may want to share with the senior colleagues and get their opinion, before they give out the results. One of the user told, "My senior colleague was in the UK at the time, and I was bit apprehensive about reporting out a result. I immediately WhatsApp-ed the results and got the opinion and was thus able release the report". The traditional use of an email in such a scenario could have lead to some delay, which can at times be critical to make a diagnosis and start a treatment.

The ease of transmission of information among peers also shows significant improvement. Such communication methods have been utilized by disease groups to share disease-related information (eg. diabetes groups on Facebook) [7]. The users felt that utilizing this platform they could transmit the information to all the members of a group in one go. This helps keep all the users of a particular section of the laboratory on the same page. If there is a special instruction to be shared about a particular sample or patient, then personnel of different shifts are aware about it.

For instance, if there is a stem cell harvest due on the next day morning and this information is received by a person on the evening shift of the last day, he can put the same information on the WhatsApp group and thus making everyone aware, especially the person on morning duty.

The other aspects pertaining to the communication in the form of sharing information about academic activities in the department, information about critical results, any accidents/ incidents, and about the duty roster also witnessed a significant improvement in awareness. In a similar study by Lau, an attempt was made to study the impact of adoption of Web 2.0 for sharing knowledge among hospital-based nurses [8]. Although most of the accredited laboratories (like ours) have got a mechanism available to deal with all these aspects, the utilization of a social media application can make it more real-time and hands-on. The utility was also well appreciated by the students who have to attend the academic activities across the hospital and they are able to get the information about any amendment in the schedule and venue.

However, no technology comes with its drawbacks and lacunae. We tried to address them in the form of four negative questions. Three of the negative aspects recorded a significant increase in the score, thereby stating that the users felt that there was increased load of adding information to the messenger, disturbance in the routine tasks by the continuous flow of messages and some of the users also felt that there is irrelevant spread of information, which may not be required by some. The most significant of the negative aspects was the maintenance of patient privacy, and the user did not feel that this was compromised in any way. There was a slight increase in the mean score (4.8 against 4.4); however it was not deemed significant.

The data shared is mostly in the form of text messages (except when the photographic images are require to be shared), and it does not add significantly to the cost to the user. In the laboratories that provide free access to Wi-Fi, the cost to the user can be brought down to zero. Some of the quality parameters that are conveyed as of now through paper, email or phone can all be shifted to WhatsApp or similar messengers, and the quality cell of the laboratory can then record it. The data may also be backed-up on the laboratory server for documentation of the conversation. This use of social media may also become part of laboratory policies in a long run, and can help to comply with the clauses of ISO: 15189: 2012, pertaining to communication in a medical laboratory.

Another concern about using the app is the security and privacy issues. WhatsApp is not liable for the submissions made by the users, as per their legal statement and does not own or store them. As per the company's terms of service, "The content of any delivered messages reside reside directly on the sender's and recipient's mobile devices (and which may be deleted at the user's option". The Terms of Service of WhatsApp clearly states that, "For clarity, direct messages, location data and photos or files that you send directly to other WhatsApp users will only be viewable by those WhatsApp user(s) or group(s) you directly send such information". It also states that "You shall be solely responsible for your own Status Submissions and the consequences of posting or publishing them." [9]. In order to protect the content shared on the group the users in the lab have been advised to protect the app with a PIN or password. Any group member who resigns from the hospital, is removed from the group before he is given clearance from the department. Also the lab workers are legally bound by the hospital code of conduct about sharing the patient information and data with only the authorized hospital staff. WhatsApp in its statements has clearly stated that it does not sell or share the data even with its parent company (Facebook) [10].

We can foresee a future where the diagnostic setups and hospitals would have their dedicated applications which would revolutionize the way information is communicated across various stake-holders.

Conclusion

The current work proves that the judicious use of social media (WhatsApp messenger in this case) can significantly aid in improving communication across the laboratory/ diagnostic services, thereby ensuring timely intervention/ action (where required), and enabling information sharing amongst partners and stake-holders, which ultimately translates in improved patient care and quality of healthcare service.

Compliance with Ethical Standards

Conflict of Interest None.

Ethical Approval "All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards."

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