



ORIGINAL ARTICLE

‘WhatsApp[®]’ening in nephrology training

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ABSTRACT

Background. Teaching methods in most residency and fellowship programs have not yet addressed the challenges of rapid dissemination of new scientific information. Our Northwell nephrology fellowship program used the smartphone application WhatsApp[®] to facilitate nephrology education. A qualitative study was conducted to explore perceptions of nephrology fellows and faculty using WhatsApp[®] as a teaching tool.

Methods. A WhatsApp[®] messenger group called ‘Northwell Renal Forum’ was created in 2018, which included all eight fellows and seven selected faculty members. Multiple choice questions on various nephrology topics were posted, about one to two per week. Fellows responded at their leisure. After 7 months, data were analyzed following two 1-h focus groups (one for faculty and one for fellows). Focus groups were moderated by two qualitative researchers, unknown to the participants, who asked open-ended questions about the WhatsApp[®] learning approach.

Results. Faculty feedback was generally positive. Three major themes arose: control over learning material, comfort being fostered between faculty and fellows and faculty perceptions of fellows. The fellows also reported an overall positive experience. Control and comfort were themes again identified in this focus group. Fellows reported feeling control over which faculty member was in the group and when to respond to questions. Fellows also felt comfort from learning without pressure. Variety was the third theme that arose.

Conclusion. Focus group evaluations elucidated the strengths of using WhatsApp[®], and the overall positive experience of both faculty and fellows. This inexpensive and easy-to-use tool can augment the learning of nephrology during fellowship.

Keywords: fellowship, nephrology education, renal fellowship, social media, texting, WhatsApp[®]

INTRODUCTION

As data and knowledge have increased exponentially, so have challenges to foster knowledge acquisition in medicine [1]. Over the past several years, methods for knowledge transfer have also changed. Didactic lectures and teaching in the clinical

setting are the standard forms of education in most residency and fellowship programs. Although these pedagogical approaches remain effective, they have not adapted to the challenges of rapid dissemination of new scientific information and the optimal learning approaches of today’s trainees [2].

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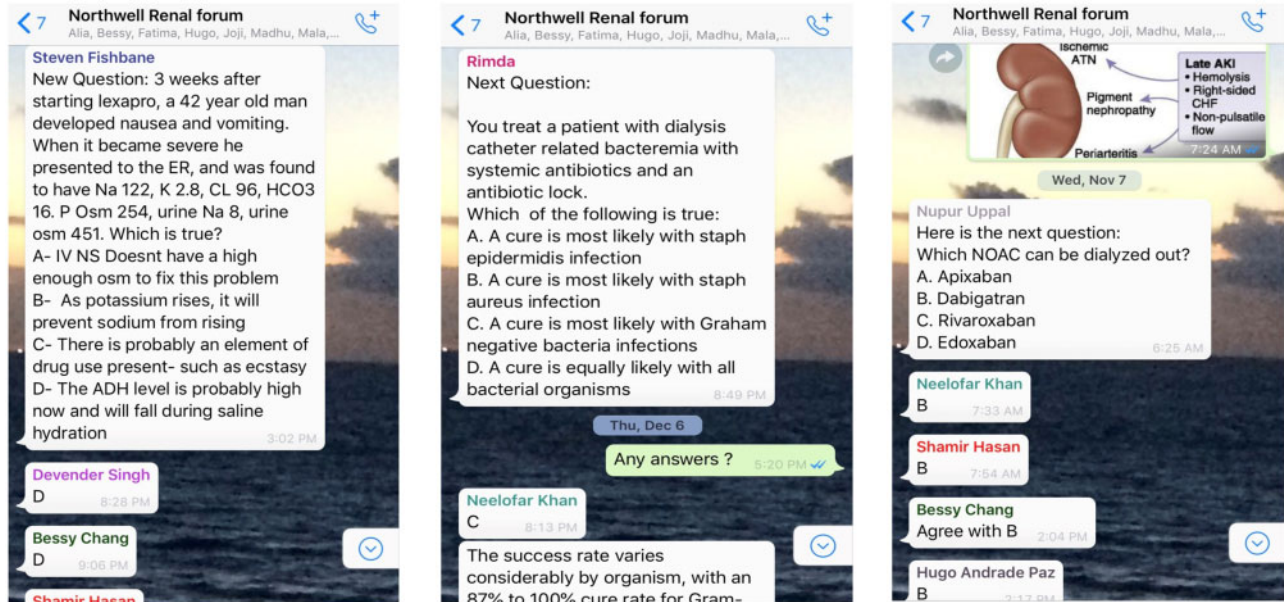


FIGURE 1: Representative images of the WhatsApp® program and questions asked on the 'Northwell Renal Forum'. All participants gave permission to have their chat image published.

Nephrology has taken a leap forward in using social media and other innovative approaches in attempting to optimize education for today's learners [3–6]. Smartphones and tablets have achieved unprecedented penetration around the globe [7]. In medicine, the smartphone is flattening the educational hierarchy in unprecedented ways, allowing learners and experts to exchange questions, comments and knowledge with minimal friction. The exchange of information and ease of accessibility around the world allows for live collaboration that is changing healthcare education. Development of social media platforms, blogs, the Twitter Nephrology Journal Club, NephMadness, concept maps, visual abstracts and crosswords are several examples of how nephrology has enhanced medical education [3–6, 8–12]. Education during fellowship is challenged by time constraints with various responsibilities of fellows during their training. Between answering pages, seeing patients and attending lectures, scheduling time to study and learn can become challenging [13]. The time dilemma is a significant hurdle for traditional didactics, but it is also a unique opportunity for innovating the approach in medical education. In response to this challenge, the Northwell nephrology fellowship program developed a group chat through the WhatsApp® (WhatsApp®, Mountain View, CA, USA) platform to enrich an emerging framework for fellowship education and lifelong learning in 2018.

WhatsApp® is a form of mass texting application in a closed environment. It is an interactive platform because it allows instantaneous messaging, an unlimited number of participants, end-to-end encryption of texts and the ability to evaluate participation and engagement with cases. WhatsApp® allows participants to rapidly share and discuss educational material through a group text, case-based format. Participants can post interesting cases and the group engages in discussions regarding diagnosis and management plans. The group text allows for administrative rights so that the faculty/fellow leads can ensure focused discussion. In this study, we present the use of WhatsApp® in nephrology fellowship training and a qualitative analysis of this method via a focus group evaluation.

MATERIALS AND METHODS

Design

This is a qualitative study of nephrology fellows and their respective faculty utilizing the WhatsApp® application for closed group texting and sharing of information in order to transfer knowledge in the current era of digital learners. Learners and faculty were recruited from our Nephrology fellowship. A WhatsApp® messenger group called 'Northwell Renal Forum' was created for fellowship including all eight fellows and a selected group of seven faculty members. The faculty leads were selected by the lead investigator (K.D.J.) and a lead member of the fellow committee (A.H.). The WhatsApp® group chat was created in 2018 and after a pilot of 7 months, the qualitative analysis was performed. Questions were asked by rotation by various faculties on the App with varied topics in Nephrology. Figure 1 shows how the App looks on the phone. All fellows currently in fellowship participated in this project. One or two questions were posted per week by various faculty members. The fellows were allowed to respond to the questions at their leisure. Data were collected during two focus groups (one for faculty and one for fellows). If a question is asked by a faculty member and if a respective fellows answers, then all other fellows can see each other's responses. The posted questions were used to stimulate learning, either through prompting use of resources or facilitating discussion of relevant issues among fellows and faculty. Descriptions of answers and links were used to add to the learning. Once the discussion on a specific question ended, the next question was asked. The study was deemed exempt by the Northwell Institutional Review Board. Table 1 lists several sample questions that were asked in the project.

Data collection

Two 1-h focus groups were conducted 7 months into the study (one focus group session for faculty and one for fellows), led by two moderators previously unknown to participants. Moderators used a guide with open-ended questions and probes

Table 1. Sample questions asked on WhatsApp®

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|--|
| 1. Which of the following drugs is associated with formation of calcium phosphate kidney stones? A. Atazanavir B. Triamterene C. Orlistat D. Topiramate |
| 2. Which of the following causes are NOT responsible for a LOW anion gap or a negative anion gap? A. Low albumin B. Hypercalcemia C. Hyperphosphatemia D. Bromide ingestion E. IgG paraproteinemia |
| 3. A 54-year-old female presents with severe headache, and is noted to have a blood pressure of 180/100 mmHg. Urinalysis confirms hematuria, proteinuria and red blood cell casts. The serum creatinine is 2.3 mg/dL and blood urea nitrogen is 80 mg/dL. The kidney biopsy is done. Light microscopy shows mesangial proliferation with lobular pattern, IF is predominantly strong staining for C3 and IgG and mild staining for IgM, kappa, lambda and C1q. Electron microscopy confirms randomly arranged fibrils with 14–20 nm in diameter. The DnaJ homolog subfamily B member 9 staining was positive. What is the most likely diagnosis? A. Immunotactoid glomerulonephritis B. Fibrillary glomerulonephritis C. Monoclonal Ig deposition disease D. Proliferative glomerulonephritis with monoclonal deposits E. Lupus nephritis, Class III |

related to program and App perception in relation to board exam preparation. Participants were queried about how the WhatsApp® learning approach differed from traditional teaching approaches, interaction between faculty and learners, and reported strengths and weakness of learning through WhatsApp®. The discussion was digitally recorded and stored on an internal server to ensure security and transcribed professionally. Transcripts were checked against the original recordings for accuracy.

Data analysis

To optimize credibility, transferability and dependability of results, we utilized researcher triangulation, peer debriefing and conducted an audit trail of decisions made during the analysis and rationale [14]. The focus group transcript was analyzed by two researchers (A.K. and B.P.), so that researcher triangulation could be assessed and a more complex understanding of the data attained. A six-phase thematic analysis approach was utilized based on Braun and Clarke [15] and Nowell et al. [14] as the primary methodological orientation. In the first phase, transcripts were reviewed independently multiple times by qualitative researchers to ensure familiarity with the data. The researchers documented initial theoretical and reflective thoughts, as well as potential codes and themes. In the second phase, the qualitative researchers focused on patterns in the data and generated a comprehensive set of codes through a combination of inductive and deductive coding relating to the primary research questions. The two qualitative researchers documented their reasoning for coding a particular block of text to make explicit how they perceived, examined and developed their understanding of the data and its source in the

transcription. The third phase consisted of searching for themes after the coding process was initially completed and the codes were collated. In the fourth phase, themes were reviewed and refined. Criteria for retaining themes was that they needed to be specific enough to be concrete, while broad enough to capture ideas contained in the transcripts. Themes with sparse data were eliminated and those with large amounts of data were further divided into separate themes. In the fifth phase, all team members met and discussed definitions and finalization of theme names, and lastly producing the report. In the sixth phase, the report was generated.

RESULTS

Over the span of 1 year, a total of 65 questions with discussion and relevant links were generated. The questions were broken down into topics as follows: electrolytes/acid base/stones (28%), chronic kidney diseases and dialysis (25%), acute kidney injury (17%), glomerular diseases (15%), hypertension (7%) and transplantation (8%).

Faculty focus group

Results described below identify general themes and subthemes that arose from the faculty focus group. Three major themes and an assortment of subthemes arose from this focus group. The faculty had positive perceptions toward the teaching program. They enjoyed the enthusiasm from the fellows and being able to see their progression over the year through this program.

Theme 1: control. The faculty liked the control they had over learning through WhatsApp®. Faculty discussed how this is a different approach to learning and it allowed students the flexibility to not be in the classroom and take control of their learning experience. The faculty discussed the importance of having an organized environment with a small group of people.

Yeah, I think its asynchronous, which is the best part... you could be at a beach and answer this question, or you don't have to be in a classroom or such setting.

It stimulates them to go look up on their own and get back and see others doing it and learning kind of spreads like that.

Ours is a controlled environment where everything is moderated and the number of people involved are very associated closely.

It's more of an adult learning approach rather than spoon feeding.

Theme 2: comfort. *Comfort with faculty.* The WhatsApp® program has also fostered relationship-building between faculty and fellows. Over the course of the program, faculty had noticed a change in the comfort level of the fellows and reported a stronger relationship with them. Faculty reported being approached more often by fellows and that fellows were not as hesitant to bring up questions.

It also helps with relationship-building between the fellows and the attendings. I mean, when they start, they might be a bit hesitant. But like with the attendings who are on there, I think then they feel more comfortable bringing up questions for those attendings.

Even like in person, I feel like they can get – they get more comfortable talking to those attendings, and then they are not that much hesitant to ask even a question which they might find is like a simple question with the involvement.

It helps with relationship building between fellows and faculty. When they start, they might be hesitant and then feel more comfortable as more questions are being asked.

Comfort with answering questions. Faculty also noticed a comfort in fellows to speak up and respond through the App even though the same fellow may be relatively quiet in lectures. Some fellows may have fears about speaking out in a room of people or even feel judged for getting something wrong. It also gave fellows the opportunity to speak up and get their viewpoint across even when they were not able to in other settings.

The best part of the thing is that even somebody who doesn't speak up so fast was rather thoughtful in answering get the same kind of opportunity with this otherwise, they would be like we'd never hear their viewpoint unless they get an opportunity where they can think through and write a thoughtful response.

Yeah, that's very important, because a lot of people have fear of speaking out in a room of being judged, I guess at some level. It's WhatsApp® and you're literally on your own in a room, the confidence to write any answer, which may even be wrong, probably isn't—they don't have that much fear.

Theme 3: perceptions. An important topic that came up during discussion was how fellows are perceived by faculty when using WhatsApp®. The response time of fellows could be perceived as negative by faculty involved with the App. Faculty reported understanding that there are times when fellows are busy with work or in their personal lives and cannot respond right away. However, the longer a fellow waits to respond, some faculty might perceive the fellow negatively and disinterested in learning.

I don't know if judging them would be the weakness, because maybe they are preoccupied with something else. At some point, they are busy in the hospital, and if a certain fellow doesn't respond like Saturday. Sometimes it might be perceived as someone not being interested.

I mean, if they don't respond in four days, or even at all responded in a week, then I perceive that negative.

Like we are making some judgments here on certain fellows, so I'm assuming they know that we are making judgments if they don't answer at a certain timeframe.

Fellows focus group

Results described below identify general themes and subthemes that arose from a focus group with fellows. The focus group started with a general discussion of WhatsApp®, where the fellows shared their experiences using the App. Most found WhatsApp® to be helpful in their studies. Four major themes and a variety of subthemes arose from the focus group. Overall, the fellows reacted positively to the addition of WhatsApp® in their learning. They were motivated to participate and actually test their knowledge. It was a great addition to the work they were already getting in lectures and while working. Fellows also discussed what aspects they would like changed or added for the next year.

Theme 1: control. The fellows liked the control they had over learning through WhatsApp®. They were able to go on when they wanted to and had the time. The App allowed fellows to be involved regardless of work or personal schedules. They were also able to have a say in what faculty were involved with the App so that they could better tailor their learning experience.

You can use this at your own time.

Most of our teaching sessions are time limited and not all the fellows can attend because of other clinical work. But this is a

democratic platform for everyone else—ability to attend, and there is not much time constraint.

Well... we actually had kind of more say as to who we wanted in, and then eventually became a discussion as to who we thought would contribute the most rather than just have the whole division.

Theme 2: comfort. Many fellows discussed how comfortable they felt using the App. They were able to learn in a safe environment without the fear and pressure of being forced to answer questions or to get the answer wrong. Fellows also mentioned that being able to choose the faculty that participated in this program helped to foster this comfortable learning environment.

It was a safe environment to learn.

And then we picked people who were very open to teaching the fellows.

And it also mattered, like the comfort level that we had with each one of them. So we had a few options, and then we would pick the ones that we were more comfortable.

Theme 3: variety. Fellows felt that they were asked a variety of questions by faculty. They chose faculty that had different areas of expertise so they could get different questions across the whole field of nephrology. They also liked not having to worry about being sent the same questions over and over because these were broad and made up by faculty, not pulled from a question bank. The questions also forced fellows to think about topics they find difficult or do not deal with on a daily basis.

There is really a need for questions in our field, which is what I thought we were really trying to address with the WhatsApp® group.

You can lecture on anything. But when you are asked a question, it really tests your knowledge. You have to think, and you have to know why other answer is wrong. It's totally different.

Yeah, because then you're just going to get the same questions over and over, so we kind of wanted it to be a little bit broad.

No, I thought the questions were difficult and on topics that we struggle with, so that was good. Because it makes you think about things that you are missing or maybe not thinking about on a regular in the consult service or on dialysis.

Timing of questions. Many fellows objected to the times during which questions were being sent to them, as they were inconvenient in terms of their schedule. Several noted that they would prefer to be able to anticipate the specific days and times that the questions would be sent. By knowing when the questions are coming, participants reported that it frees them up at work and in their personal lives.

Sometimes the questions got sent at like 6:00 in the morning, and that was annoying.

Yeah, so if we could... we'd be like these days at these times is when the question will come.

Question type. Some fellows discussed how they would like to see a variety in the questions being asked. They want variety in the question topics and also the type of questions being asked. They would like to see more board style type questions asked.

Theme 4: other recommendations. As discussion of WhatsApp® continued, many fellows made additional suggestions for improvement. One recommendation by the majority of the fellows

Table 2. Suggested improvement from fellows on the WhatsApp® project

Response rate:
‘The only glitch would be like if people didn’t respond to the question. Then it was just like a silence.’

Type of questions:
*‘Maybe we should come up with a bank of questions, like either we used registered bank of questions.
 This way it actually formally trains them.’*
‘A topic list, a monthly topic or topic of the conference that week.’

Timing of questions:
‘Two per week’
‘None on weekends’

was to have more explanations with the question answers. When faculty posts the correct answer and explains why this answer is correct, they would also like to know why the other answers are wrong.

Or like why that other answer is wrong, for example. Not just to say the right answer and here’s why kind of thing.

Or the context in which the wrong answer would be right. Just like expand on it a little bit

Another recommendation made by a few of the fellows was to have more training on how to research the answers to the questions. One fellow discussed how there were a variety of resources to look at and without really knowing where to look for the information it was easy to get stuck. Fellows wanted to make sure they are looking at the top tier journals for their responses but need to be trained on what those journals are and how to find them.

Well, I think maybe like a little crash course in where—or how to look up the information so that when you are looking up the question and how to answer it, you go to the right sources rather than the wrong sources and then mess yourself up a little bit.

Table 2 summarizes the suggested improvements on timing and number of questions on the project by fellows in training.

DISCUSSION

Social media-based applications have had great initial success in nephrology [12]. While Twitter, blogs and American Society of Nephrology online communities have been successful in nephrology, creating time to teach in busy clinical fellowships has been challenging. WhatsApp® is cheap, easy, accessible and a rather simple educational model. Our trial on WhatsApp® as a pilot project showed feasibility as a supplemental nephrology educational material. In our study, three themes that emerged from the focus group with fellows showcased the importance of control, comfort and variety in education. Three themes that emerged from the focus group with faculty were comfort, control and perception. WhatsApp® is an effective social media tool to motivate, augment and perhaps improve the learning of nephrology during fellowship. This study is a proof of concept of using such technology in nephrology and this model could easily work in other fellowship programs. The focus groups evaluations helped examine and improve the experience of trainees and faculty using this mode of teaching. This is the first study of using such a model in nephrology education.

There are advantages for improved patient care when various ideas are exchanged and discussed. WhatsApp® is a flexible platform and can be brief or extended depending on the level of engagement. It is a form of teaching to dwell in when less busy and ease back from when very busy. It allows for more informal and less stressful teaching while maintaining seriousness. The real time flow of subject material can be aligned with day-to-day clinical experiences. This method should be used as a parallel mode of teaching and not completely replace lectures or didactic teaching methods. This method allows for flexibility and incorporates fun and humor into the daily dose of education in nephrology. Finally, it allows for easy linking to articles or images of interest from the App. The WhatsApp® platform could be expanded to include mentoring and coaching in addition to medical education. Academic training programs as well as the American Society of Nephrology can use this platform for several communities subdiscussion, and/or committee discussions of cases and research ideas. WhatsApp® is appropriate for medical education and appropriate for engaging millennials and expanding clinical care.

WhatsApp® has been used in other areas of medicine. A study by Johnston et al. [16] analyzed the effectiveness of using WhatsApp® as a communication method among members of an emergency surgery team. The study concluded that WhatsApp® represents a rapid and efficient means of communication even in the context of emergency medicine. One of the key points the study highlighted was that participants felt a ‘flattening of the hierarchy’ in the team. Other fields in medicine have used WhatsApp® in either direct care of patients or in teaching of trainees. A recent literature review [17] of WhatsApp® use in clinical practice found 32 papers covering 17 disciplines, with the most papers, 12, from India. Seventeen papers reported the use of WhatsApp® Groups within departments, 14 of which were surgery-related disciplines. Groups improved communication and advice given on patient management. Telemedicine services outside of departmental groups were reported in seven papers and covered emergency triage in maxillofacial, plastic, neuro- and general surgery, and cardiology and telestroke [17–21].

In medical education, most of the studies using WhatsApp® have been in medical students [22, 23]. A recently published study from the Duke Cardiology fellowship program [24] reported findings using WhatsApp® similar to our study. Their group started with 1 faculty lead and 14 fellows. Over a 5-month period, participation grew to 42 fellows and 14 faculties. Faculty expertise covered imaging, anesthesia, electrophysiology, congenital heart disease and interventional cardiology. Current and former fellows, including subspecialty fellows, were included in the group to increase the diversity of experiences and cases. Their analysis was done using a survey and 66.7% of their fellows actively participated in this learning forum, and even more fellows (85.7%) believed the group-text format enhanced their educational experience. Similar to our findings, they also felt the need for having such a venue for fellows in training. Compared with the Duke Cardiology study [24], our study differs in that this is a closed group with current fellows in training and selected faculty. In addition, our study design led to a qualitative analysis of the process using focused groups. Other platforms similar to WhatsApp®, such as Slack, have been used in higher education [25]. Slack allows for more sophistication and customization but is not as commonly used as WhatsApp® [25].

There are several limitations to the study. This is a single center, single fellowship program study evaluating the use of

this common App in nephrology. The study evaluated qualitative outcomes and no quantitative assessment of knowledge was performed. The educational value of posting questions is limited by how the questions posed prompt learners to access novel information and apply it to scenarios. In certain cases, questions alone do not educate and active facilitation is required.

The suggestions for improvement proposed by our fellows that resulted from the focus group were immediately implemented in the educational venture and are currently used in the current version of our WhatsApp® group chat. Only two questions are asked per week, fellows are prompted to try to respond in a timely manner, and there is no penalty for guessing. Faculty is advised to explain wrong answers. Questions are asked on weekdays and at working hours, but answers can come in during any time of the week and discussion can continue for a long duration of time. Some questions led to a formal discussion in the classroom as the fellows met with that respective faculty. In addition, the App creation led to the creation of 65 nephrology-related questions, and more ongoing as the App continues. Over time, this could constitute a collection of teaching material of nephrology questions to ask trainees during fellowship. Each question leads to a discussion online where several faculty and fellows contribute on the App.

Medical trainees are presently torn between an exponential growth of medical knowledge and limited dedicated teaching time. Our WhatsApp® project is as an education-focused group text that provides high-yield teaching points through a question-based model during the fellow's years of nephrology fellowship. It allows for a safe environment, yet asynchronous form of learning. In addition, it leads to a bank of questions that will form their basis for in-training exam and board review. A fellowship program-specific group text is a simple and effective tool to enhance the learning experience for nephrology fellows. Scaling this group text approach to other nephrology and medical training programs to augment program-specific teaching should be easy and valuable.

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CONFLICT OF INTEREST STATEMENT

None declared.

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