

Enhancing Internal Medicine Trainees Nephrology Competency: Queen's Nephrology E-learning using WhatsApp (Q-new) Study

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Abstract

Objectives: The expansion of competency based medical education (CBME) has necessitated the development of novel assessment tools. Social media applications hold potential to become entrenched E-learning assessment tools. The objective of this study was to evaluate WhatsApp as an assessment tool to improve trainees' confidence in diagnosis and management of nephrology clinical problems.

Methods: A 16-week pilot study was performed using WhatsApp to disseminate clinical cases to internal medicine trainees. Clinical cases evaluated a comprehensive set of nephrology clinical competencies, and were followed by multiple choice questions. Pre and post-study surveys evaluated trainees' confidence in the diagnosis and management of nephrology topics, using a 5-point Likert scale.

Results: Twenty seven (42.9%) out of 63 trainees enrolled (44.4% Females; 48.2/33.3/18.5% of post-graduate year 1/2/3, respectively). Trainees' confidence improved for the diagnosis and management of clinical problems in transplantation, glomerulonephritis and dialysis. There was no significant improvement in confidence in areas in which respondents likely had previous exposure, such as acute kidney injury.

Conclusions: Trainees confidence improved using WhatsApp as a tool to enhance critical thinking. However, the response rate diminished prior to the end of the 16-week study period, questioning the durability of using such a teaching method.

Keywords: Competency based medical education; Nephrology; Social media application

Introduction

Competency based medical education (CBME) has gained significant international attention [1]. In Canada, the Royal College of Physicians and Surgeons of Canada has adopted this model of medical education.

E-Learning has become a central modality of medical education over the past decade [2]. Social media applications; despite being widely used by doctors and medical students, are yet to achieve widespread acceptance as sources of E-learning.

WhatsApp is a free application that is widely used for text and media sharing. Articles studying the use of "WhatsApp" in the medical field have focused on its potential benefits in physician-patient or interdepartmental communications [3-5]. However, there is no published literature regarding the use of WhatsApp as an assessment tool for CBME.

This study's objective was to evaluate WhatsApp as an assessment tool to enhance internal medicine trainees' self-reflected confidence in the diagnosis and management of common clinical Nephrology problems. The hypothesis was that WhatsApp could improve the learners' confidence in the diagnosis and management of nephrology issues to which she or he had previously not been formally exposed.

The Queen's University Nephrology E-learning using WhatsApp (Q-NEW) was a pilot study conducted at Queen's University, (Kingston, Ontario, Canada) with internal medicine trainees using WhatsApp as a tool of competency based E-learning.

Study Design

Study participants

All post-graduate internal medicine trainees from Queen's University (Kingston, Canada) were invited to participate in January 2015 by email sent by the internal medicine program assistant as well as by written letters provided by Dr. Bukhari and Dr. Shamseddin. The study period was for 16 weeks, from March 2 to June 20, 2015.

WhatsApp messages

Nephrology clinical scenarios were sent (broadcasted) to study participants through WhatsApp, on Monday before 12 PM, for 16 consecutive weeks. Each clinical scenario was followed by 4 or 5 multiple choice questions (MCQs). Questions focused on nephrology topics that internal medicine trainees would encounter and manage during their training.

Participants were to text back their answers by Friday at 5 PM, with a reminder message sent Thursday before 12 PM. Answers to the weekly scenarios were sent to participants by Saturday at 12 PM. Due

to an unanticipated decrease in study participant response to the weekly WhatsApp clinical scenarios, the study was terminated at 11 weeks, with post-study surveys sent at that time.

Surveys

A survey was emailed to all study participants, to assess confidence in either the diagnosis or management of 11 Nephrology topics. Identical surveys were sent prior to study initiation, and after study completion, to all study participants. The survey was on a 5-point Likert scale, from 1 (very unconfident) to 5 (very confident). The nephrology topics assessed included acute interstitial nephritis (AIN), acute kidney injury (AKI), chronic kidney disease (CKD), drug toxicities (OD), electrolyte disorders (ED), glomerulonephritis (GN), haemodialysis (HD), hypertension (HTN), nephrotic syndrome (NS), peritoneal dialysis (PD), and renal transplantation (Tx).

Statistics

Data was analysed using IBM[®] SPSS Statistics version 23. The means of pre versus poststudy survey responses were compared using two-tailed student t-tests, with a significance level of less than or equal to 0.05.

Results

There were 63 internal medicine trainees at Queen's University approached to participate in this study, and 27 responded (Response rate = 42.9%). There were 44.4% females and 48.2/33.3/18.5% in post-graduate year 1/2/3, respectively. Post-study survey responses confirmed a statistically significant improvement in the Trainees' confidence in diagnosis of 10 of 11 clinical nephrology topics (Table 1). Only the confidence in diagnosis of acute kidney injury (4.00 vs. 4.20 pre to post-survey, p=0.08) failed to show a statistically significant improvement.

The highest pre study confidence for diagnoses was for AKI (4.00 ± 0.66), ED (3.60 ± 0.63), HTN (3.27 ± 0.70) and NS (3.27 ± 0.80). The highest post-study confidence for nephrology diagnoses was for AKI (4.20 ± 0.41), ED (3.87 ± 0.52), GN (3.80 ± 0.68) and HTN (3.67 ± 0.72). The greatest improvement from pre to post-study confidence was found in Tx (1.07 ± 0.88), GN (0.93 ± 0.80), HD (0.73 ± 0.46), CKD (0.53 ± 0.52), AIN (0.53 ± 0.64) and NS (0.53 ± 0.64).

Diagnosis	Post-study Mean ± SD	Pre-study Mean ± SD	Post-pre difference Mean ± SD	95% confidence interval		P value
				Lower	Upper	
Acute kidney injury	4.20 ± 0.41	4.00 ± 0.66	0.20 ± 0.41	-0.03	0.43	0.08
Acute interstitial nephritis	3.47 ± 0.64	2.93 ± 0.70	0.53 ± 0.64	0.18	0.89	0.006
Glomerulonephritis	3.80 ± 0.68	2.87 ± 0.83	0.93 ± 0.80	0.49	1.38	0
Nephrotic syndrome	3.80 ± 0.68	3.27 ± 0.80	0.53 ± 0.64	0.18	0.89	0.006
Electrolyte abnormality	3.87 ± 0.52	3.60 ± 0.63	0.27 ± 0.46	0.13	0.52	0.04
Hemodialysis/Complications	3.60 ± 0.51	2.87 ± 0.83	0.73 ± 0.46	0.48	0.99	0
Peritoneal dialysis/Complications	3.07 ± 0.59	2.60 ± 0.63	0.47 ± 0.52	0.18	0.75	0.004
Chronic kidney disease	3.27 ± 0.59	2.73 ± 0.70	0.53 ± 0.52	0.25	0.82	0.001
Kidney transplantation	2.93 ± 0.46	1.87 ± 0.74	1.07 ± 0.88	0.58	1.56	0
Hypertension	3.67 ± 0.72	3.27 ± 0.70	0.40 ± 0.51	12	0.68	0.009
Over Doses	3.40 ± 0.74	2.80 ± 0.86	0.60 ± 0.51	0.32	0.88	0

Table 1: Diagnosis-Pre and post study trainee's confidence scores.

Management	Post-study Mean ± SD	Pre-study Mean ± SD	Post-pre difference Mean ± SD	95% confidence interval		P value
				Lower	Upper	
Acute kidney injury	4.00 ± 0.54	3.93 ± 0.46	0.07 ± 0.70	-0.32	0.46	0.72
Acute interstitial nephritis	3.40 ± 0.63	2.87 ± 0.52	0.53 ± 0.74	0.12	0.95	0.02
Glomerulonephritis	3.27 ± 0.46	2.60 ± 0.74	0.67 ± 0.98	0.13	1.21	0.02
Nephrotic syndrome	3.40 ± 0.63	3.73 ± 0.70	0.68 ± 1.05	0.09	1.25	0.03
Electrolyte abnormality	3.53 ± 0.64	3.27 ± 0.70	0.27 ± 0.70	-0.12	0.66	0.16

Hemodialysis/Complications	3.60 ± 0.83	3.00 ± 0.93	0.60 ± 1.06	0.02	1.19	0.04
Peritoneal dialysis/Complications	3.27 ± 0.70	2.67 ± 0.72	0.60 ± 0.83	0.14	1.06	0.01
Chronic kidney disease	3.20 ± 0.56	2.67 ± 0.72	0.53 ± 0.52	0.07	0.99	0.03
Kidney transplantation	2.93 ± 0.70	2.00 ± 0.66	0.93 ± 0.70	0.54	1.32	0
Hypertension	3.33 ± 0.62	3.13 ± 0.52	0.20 ± 0.78	-0.23	0.63	0.33
Over doses	3.20 ± 0.0.68	2.80 ± 0.86	0.40 ± 0.99	-0.15	0.95	0.14

Table 2: Management-pre and post study trainee's confidence scores.

Post-study survey responses confirmed a statistically significant improvement in the trainees' confidence in management of AIN ($p=0.02$), CKD ($p=0.03$), GN ($p=0.02$), HD ($p=0.04$), NS ($p=0.03$), PD ($p=0.01$) and Tx ($p<0.001$) (Table 2).

However, confidence did not improve in the management of AKI ($p=0.72$), OD ($p=0.14$), ED ($p=0.16$) or HTN ($p=0.33$). The highest pre-study confidence for nephrology issue management was for AKI (3.93 ± 0.46), NS (3.73 ± 0.70), ED (3.27 ± 0.70) and HTN (3.13 ± 0.52).

The highest post-study confidence for nephrology issue management was for AKI (4.00 ± 0.54), HD (3.60 ± 0.83), ED (3.53 ± 0.64), AIN (3.40 ± 0.63) and NS (3.40 ± 0.63). The greatest improvement from pre to post-study confidence was found in Tx (0.93 ± 0.70), NS (0.68 ± 1.05), GN (0.67 ± 0.98), PD (0.60 ± 0.83), AIN (0.53 ± 0.74) and CKD (0.53 vs. 0.52).

Discussion

New social media smart phones applications are in wide use. However, their role in the medical field is not yet completely established. The use of WhatsApp (one of the smart phone applications) is still limited in education and hospital related communications. Most of research on social media applications studies the role of this form of communication to help diagnosing [6] and managing [7] medical cases.

A limited number of studies addressed the role of such applications in medical education. In a qualitative exploratory, descriptive study from South Africa, 21 undergraduate nursing students were enrolled in WhatsApp group discussions about primary health care topics [8]. The authors conclude that WhatsApp could be used as a tool of teaching and learning to enhance the integration of the theory and clinical practice.

To date there is no study addressing the use of WhatsApp as an assessment tool to enhance trainees' self-reflected confidence in diagnosis and management of nephrology clinical problems. In this study, we noted that internal medicine trainees felt self-assured in diagnosing and managing common Nephrology topics including AKI and ED, but felt less confident dealing with more complicated nephrologic issues such as diagnosing and managing HD, PD, and Tx complications. All of the latter topics are critically important and frequently encountered in day-to-day practice both during the internal medicine residency and clinical practice.

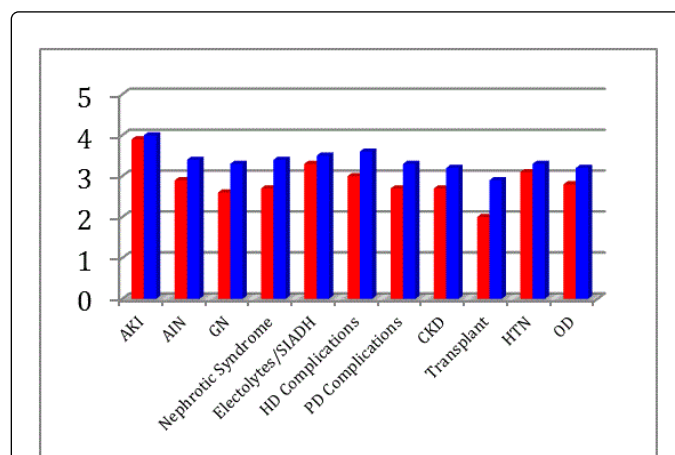


Figure 1: Diagnosis-pre and post study trainee's confidence.

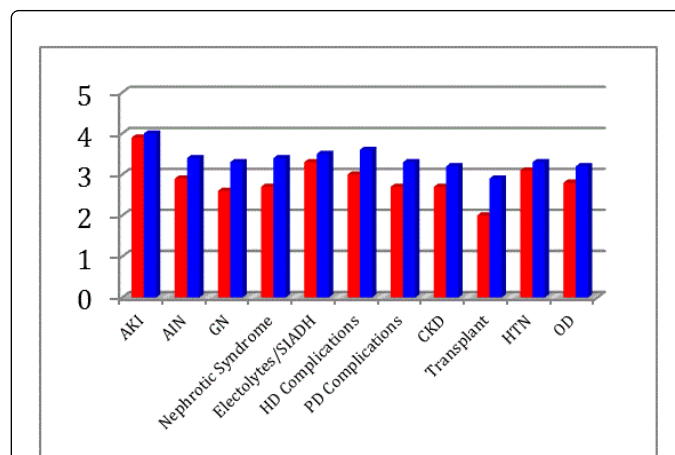


Figure 2: Management-pre and post study trainee's confidence.

By using WhatsApp to broadcast medical scenarios in these areas (HD, PD, and Tx), and providing electronic follow-up with case discussion, we found this to be a useful tool to enhance trainee's perception of confidence especially in areas where traditional teaching might be limited or not regularly available (Figures 1 & 2).

Unfortunately, and even though broadcasting nephrology scenarios via WhatsApp was useful, it was found that residents' interest and

utilization of these scenarios declined over time mainly due to their busy schedule, daily workload, and lack of time.

A mid-study survey that was conducted due to a significant drop in residents' response rate revealed that all participants felt that the weekly WhatsApp scenarios enhanced their confidence diagnosing and managing common nephrology cases significantly (50% of participants) or partially (50%). More than half of all participants felt that the broadcasting nephrology scenarios were adequate to their level of training. 67% of enrolled trainees found scenarios concise, clear, and practical and enhanced their overall nephrology confidence significantly. That said 67% of participants showed interest of the weekly WhatsApp scenarios only for a short period of time due to the above reasoning.

Based on the mid-survey results, the study was unfortunately terminated at 11 weeks few weeks earlier than planned (16 weeks). Future considerations to provide the same study to trainees over a shorter period of time during the nephrology rotation, which is usually four week duration, could be viable and more targeted during the time of their nephrology focus.

Limitation

This study was done in a single center, with 27 trainees participating. Moreover, the study was stopped earlier than planned (at 11 weeks as opposed to planned 16 weeks) due to a significant drop of the response rate to the weekly WhatsApp scenarios. The enrolled residents highlighted participation, due to busy schedule, daily workload, and lack of time, as the most difficult challenge to the study.

Future Plan:

A shorter and larger size study is planned for internal medicine trainees during their two-month Nephrology rotation to enroll more residents over an academic year. Improving the retention rate of enrolled Trainees in similar studies is essential and critical to enhance trainees' competency while maintaining an adequate recruitment.

Involving the Program Directors and the members of Residency Program Committees including residents might enhance the identification of trainees' needs while requiring these assessments as a part of Trainees' routine assessment instead of being voluntarily done. Furthermore, showing evidence that trainees' performance on high stakeholder credential examination could be improved by participating in such studies will encourage more trainees to participate in similar studies. Furthermore, texting cases at different time (broadcasting on Saturday instead of Monday) may also enhance participation of interested trainees.

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