LETTER TO THE EDITOR

Utility of semi-private messaging application (WhatsApp®) for Onconephrology education: a qualitative analysis of a 'mastermind' chat

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Over the last decade, knowledge sharing in nephrology has shown a paradigm shift by using social media and other innovative approaches to optimize education [1]. WhatsApp® is an interactive platform and allows instantaneous messaging between participants, end-to-end encryption and the ability to evaluate participant engagement [2]. A nephrology fellowship question and answer chat has been analyzed via quality metrics in nephrology and it showed positive results in terms of knowledge sharing and participant engagement [3]. Onconephrology is an emerging subspeciality which deals with cancer and the various effects on the kidney [4]. Connecting like-minded individuals across the globe in this subspeciality is important, as it is uncommon to have more than one person with interest and expertise in Onconephrology at the same institution. This allows for fostering the exchange of ideas and allows for a 'mastermind' discussion to help novice clinicians and researchers navigate this complex field. In this short study, we present the utility of WhatsApp® in an Onconephrology mastermind chat. The study had three parts: a survey of the participants who used the chat, a keyword analysis of the chat and a thematic analysis of the chat (qualitative thematic analysis). Detailed methods of the study design are discussed in the Supplementary data.
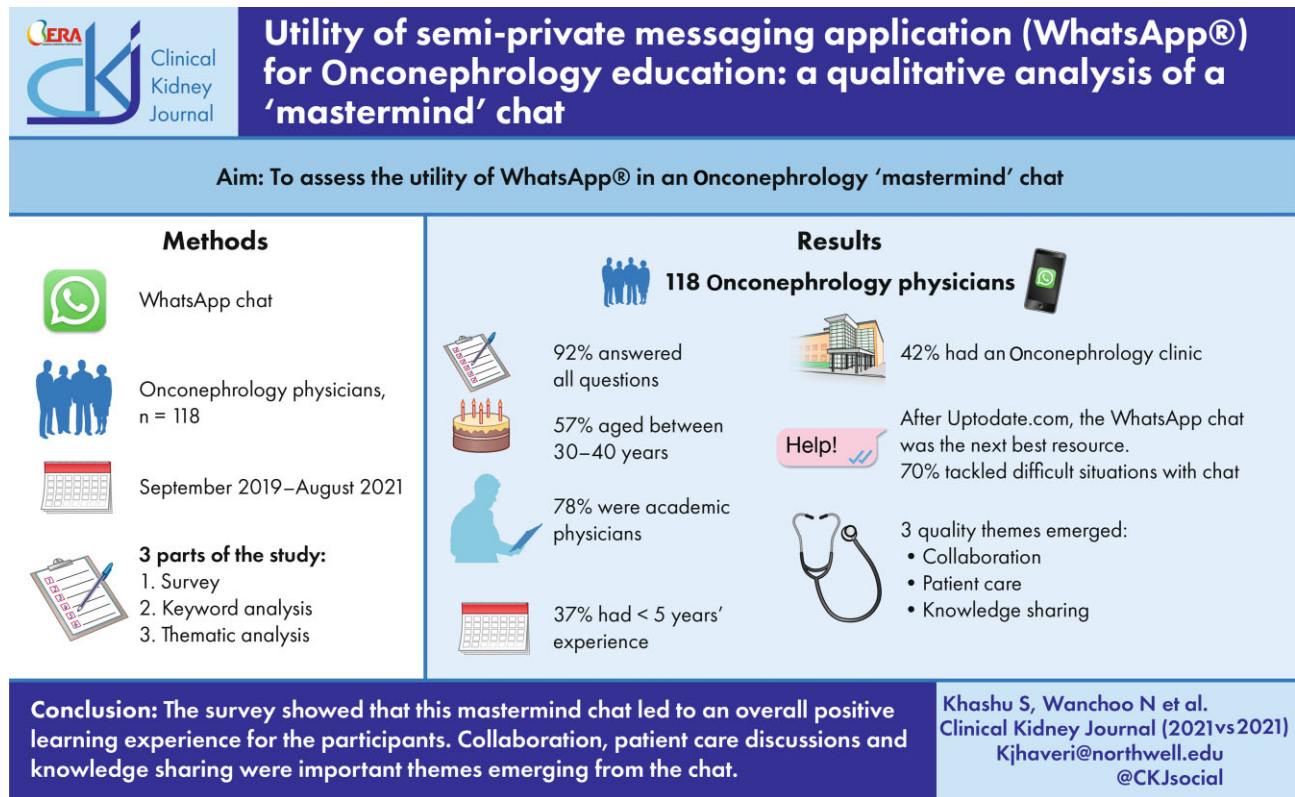
A total of 118 participants registered on the chat. A total of 57% (67/118) responded to the survey. A total of 92% of all those who responded to the survey answered all the questions. Average time spent by each participant to answer the survey was 3 min. Since the inception of the chat in September 2019, approximately 4000 messages had been posted.

A total of 57% (36/63) of the participants were in the age group range of 30–40. A total of 78% (49/63) of the participants were academic physicians followed by 21% (13/63) who were private practice nephrologists. A total of 37% (23/63) of the participants had less than 5 years of experience, followed by 27% (17/63) who had 11–20 years of experience. A total of 62% (39/63) of the participants were based out of North America and the rest of the participants were based out of other countries. At the time of this survey, 42% (26/63) responded that they have an established Onconephrology clinic and approximately 5% (3/63) mentioned that they will have such a clinic soon. Approximately 16% (10/63) responded that they see more than 20 patients and 65% (41/63) see less than 10 Onconephrology patients each week, based on the local referral pattern.

GRAPHICAL ABSTRACT

Utility of semi-private messaging application (WhatsApp®) for Onconephrology education: a qualitative analysis of a 'mastermind' chat

Aim: To assess the utility of WhatsApp® in an Onconephrology 'mastermind' chat

Methods

WhatsApp chat

Onconephrology physicians, n = 118

September 2019–August 2021

3 parts of the study:
1. Survey
2. Keyword analysis
3. Thematic analysis

Results

118 Onconephrology physicians

92% answered all questions

57% aged between 30–40 years

78% were academic physicians

37% had < 5 years' experience

42% had an Onconephrology clinic

After Uptodate.com, the WhatsApp chat was the next best resource.
70% tackled difficult situations with chat

3 quality themes emerged:
• Collaboration
• Patient care
• Knowledge sharing

Help!

Conclusion: The survey showed that this mastermind chat led to an overall positive learning experience for the participants. Collaboration, patient care discussions and knowledge sharing were important themes emerging from the chat.

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Quest for education, research and collaboration was assessed in these questions (on a scale of 1 to 5, 1 being least and 5 being most helpful). At least 48% (30/63) of the participants felt that the chat motivated them to learn Onconephrology, whereas 62% agreed that the group fostered collaborative and interactive learning, with 51% supporting the problem-based learning (PBL) format. Figure 1 summarizes the results. Almost 83% (52/63) of participants believed that the chat frequency usage was appropriate, with 70% (44/63) checking their chat daily. A third of the participants (19/63) said it took fewer than 30 min, 41% (26/63) of the participants said it took from 30 min to 1 h to get a response, and 29% (18/63) of the participants said it took 1–12 h for a response.

The majority of the participants replied that they would highly recommend this group to others as they found the content to be useful. About half of the participants foresee no barriers/challenges to the digital disbursement of medical education, but the other half saw varying potential future issues, the most common being 'Technical barrier in reviewing data', which was mentioned by 15% (9/63) individuals. When quizzed about the use of educational tools in Onconephrology in the preceding 3 months, approximately 75% (47/63) of the participants used the WhatsApp® forum, which was the same percentage as the number of participants that referred to Onconephrology articles that were featured in general nephrology journals and second only to the percentage of people that referred to UpToDate [84% (53/63)] (Figure 1D). Overall, a little less than half of the participants said that the platform motivated

them to conduct research and become an effective educator, and it provided an opportunity for collaboration. Furthermore, over half the survey participants said they found the chat useful in better understanding Onconephrology, tackling different clinical scenarios and motivating them to read more. All results of the remaining questions are in Supplementary data, Figures S2–S5. When analyzed via analyzer for WhatsApp®, the most common disease states/procedures mentioned (number of times) are summarized in Figure 2.

While collaboration was the overarching theme for the chat creation and chat, two additional major themes emerged from the analysis, which were patient care/case management and knowledge sharing. Individuals posted questions and members worked together at problem solving, although questions were clinical or research based. Additionally, research articles and projects were shared across the platform. There were no instances of unprofessional social media behavior in the analysis. Table 1 summarizes the three major themes that evolved from the analysis.

Semi-private applications such as WhatsApp® allow for a selected group of individuals to discuss topics without worldwide dissemination. The survey focused on various aspects of the chat such as demographics, nature of the practice, the participant's perception of the format, its utility to enhance education, research and collaboration, and finally, its means to improvise the discussions. The responses from the survey highlighted the benefits the application provided for the participants, e.g. increased motivation, knowledge in the field of Onconephrology
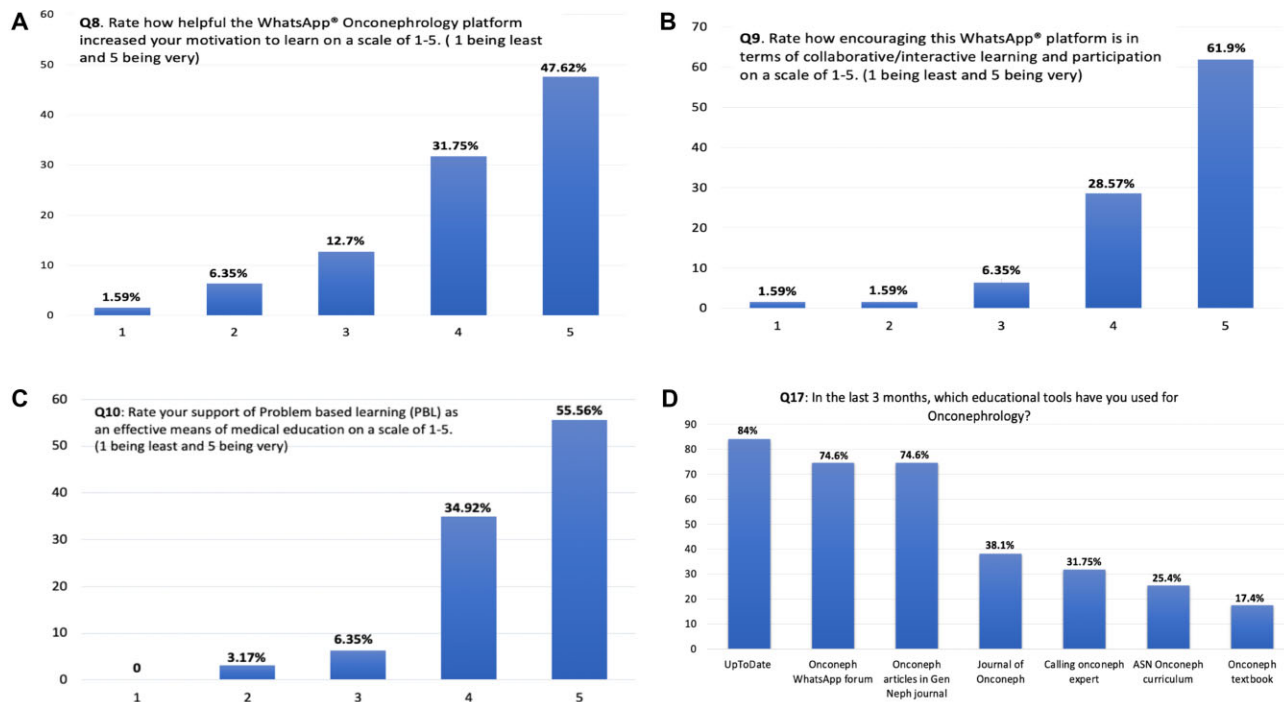
FIGURE 1: (A–D) How did the WhatsApp® chat help your quest for education, research and collaboration in Onconephrology (Q8–10). Survey results of what most participants used to answer their Onconephrology questions (Q17).
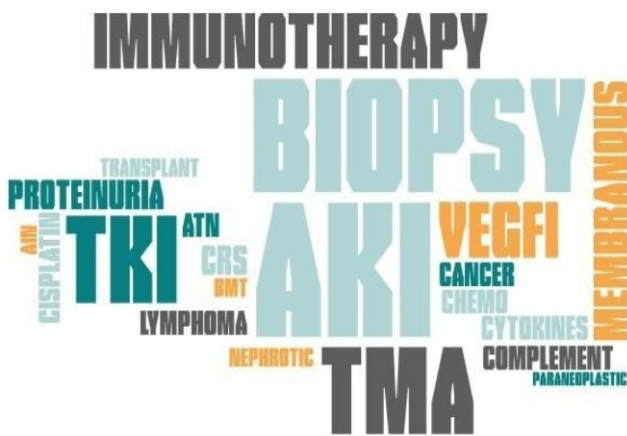

FIGURE 2: Keywords from the WhatsApp® Onconephrology chat (number of times mentioned). Biopsy (219); thrombotic microangiopathy, TMA (133); acute kidney injury, AKI (132); cancer (81); proteinuria (74); nephrotic syndrome (37); membranous nephropathy (36); lymphoma (32); bone marrow transplant (31); acute interstitial nephritis, AIN (28); transplant (28); acute tubular necrosis, ATN (26); paraneoplastic (18); capillary leak (15). The most common medications mentioned (number of times) were as follows: immune checkpoint inhibitors, ICI (88); anti-vascular endothelial growth factors, VEGFI (44); tyrosine kinase inhibitors, TKI (38); cisplatin (25); chemo (22). Other keywords mentioned were cytokines (29) and complement (28).

and collaboration. Our survey revealed 74% of the participants used the group chat as a prominent tool for Onconephrology education, a close second to UpToDate. The content of the group chat was thematically analyzed to reveal the larger themes of the group chat. The tag cloud exhibits the most common medical themes and represents how WhatsApp® is a practical re-source for physicians to discuss complex clinical scenarios with real-time application (Figure 2).

Thematic analysis is a qualitative data analysis method that involves reading through a data set (such as transcripts from in-depth interviews or focus groups) and identifying patterns in meaning across the data [5]. It is a good tool to use when one wants to identify patterns in data and analyze data from a qualitative standpoint. We had over 100 participants, making this a large study on evaluating themes in WhatsApp® education. Based on the thematic analysis, the Onconephrology WhatsApp® provides a quick and easy access forum for members to garner feedback regarding patient care and management. Posting in the chat allowed members to tap into a larger community for problem solving and collaboration, with replies being posted within 1 h of the original post. While collaboration was the overarching theme in our qualitative thematic analysis, two additional major themes emerged from the analysis, which were patient care/case management and knowledge sharing. Similar thematic analysis was found in studies using WhatsApp in women in medicine and cardiology [6, 7].

There are several limitations to the study. This application was created for collaborative purposes in Onconephrology and, thus, there is an inherited bias. The study evaluated qualitative outcomes and no quantitative assessment of knowledge was performed. The survey tool was created by two of the organizers (K.D.J. and S.L.) of the chat and, hence, this could institute a bias. This bias was handled by the other authors of the article who were new to the chat and not directly involved (S.K., N.W. and K.D.F.). Furthermore, since thematic analysis focuses on looking for patterns across chats or interviews, phenomena that occur in only one individual account can be overlooked. Furthermore, the analysis did not measure the impact of either active or passive participation in the WhatsApp® group chat on group members. It is our belief that the high level of engagement correlates with

Table 1. Summary of the various themes noted in the WhatsApp® Onconephrology chat

Theme	Example	Additional information
Collaboration	P1: Hello, has anyone seen a case of AKI with Palbociclib? Is this real or pseudo-AKI? P2: I have seen several cases of pseudo-AKI with this class of agents—CDK4/6 inhibitors. Did you measure cystatin-based GFR? P1: Yes, this is true AKI. P4: I have a case of biopsy-proven ATI with a similar CDK 4/6 inhibitor. P5: Perhaps, we should collect all cases that we are seeing of pseudo-AKI and biopsy-proven ATI with this agent. P1: Let us do that; that would be helpful to the community.	Group members collaborated to form a case series to eventually describe a new lesion/lesion with a novel group of cancer agents.
Patient care/case management	P1: Hello all. Wanted to get the group's thoughts on using (dose-adjusted) carboplatin in patients with high-risk bladder cancer but eGFR $\approx$ 25 (< 30). P2: Certainly, far less nephrotoxicity than cisplatin, but it has been reported to be associated with AKI. I would support its use if it is the best treatment option. P3: I will also support its use with the appropriate dose adjustment. I think it must be adjusted according to CrCl. P4: Carbo is not completely benign, I have certainly seen nephrotoxicity with it, and very severe hypomagnesemia as well. The AUC-based dosing can be reduced in case of problems. I think the nephrotoxicity is ~7% as compared to cisplatin, which is ~25% P1: Thanks guys. This patient has had a nephrectomy but still has an unresectable tumor in the bladder and has a high-grade tumor, so high risk of recurrence. I was thinking of asking the oncologist to target AUC around 4 instead of 5 or 6 as they usually do. P3: Immunotherapy is another option.	Group members posted clinical questions to garner feedback from other members to address a clinical concern. Questions could be based on a singular patient (see example) or on cohorts of patients such as geriatric patients. Messages typically reflected situations in which the original posting member would ask a specific question and other group members would weigh in on the issue at hand and provide recommendations.
Knowledge sharing	P1: https://nephinp.wordpress.com/2019/11/30/methotrexate-nephrotoxicity-the-Onconephrology-forum-series/ P1: A question by one of my colleagues after reading the blog: Does plasma exchange have any role in removal of MTX, given that it is protein bound? As glucarpidase is not available here! P2: That is a good question. I do not know why we did not notice plasma exchange as a treatment. Anyway, I think it seems likely more effective than hemodialysis HFlux.	Group members used the platform to share research articles or other educational material. This included direct links to recently published articles, uploaded documents, or files of published or unpublished manuscripts and data, and uploaded images depicting pathology scenarios. Shared files or links were likely to spur additional dialogue surrounding the topic. Additionally, shared topics could provide examples of topics that were not widely recognized by the larger community.

P1, P2, P3, P4, P5: Deidentified participants 1, 2, 3, 4, 5, involved in the Onconephrology WhatsApp® chat. AKI, acute kidney injury; (e)GFR, (estimated) glomerular filtration rate; ATI, acute tubular injury; CDK, cyclin-dependent kinase; CrCl, creatinine clearance; AUC, area under the curve; MTX, methotrexate.

feelings of belonging and support. Surveys of the group members helped determine that this platform has fostered community and/or added value to their community.

To summarize, knowledge sharing provided users with up-to-date information regarding the best practices and new treatments within Onconephrology. The survey showed that this mastermind chat led to an overall positive learning experience for the participants. Our study portrays how advances in communication have revolutionized medical knowledge dissemination and facilitate global collaboration. Eventually, such a platform can be expanded to provide additional mentoring to trainees at various levels with more faculty engagement, oversight and silhouette virtual fellowship/training in this niche subspecialty of Onconephrology. We feel that similar platforms can enhance collaboration and sharing of knowledge in cardionephrology, obstetric nephrology, glomerular diseases and other fields of nephrology.

SUPPLEMENTARY DATA

Supplementary data are available at *ckj* online.

CONFLICT OF INTEREST STATEMENT

N.W. and S.K. are high school students interested in a career in medicine. K.D.J. was one of the original creators of the

WhatsApp® Onconephrology chat. K.D.J. is a consultant for Astex Pharmaceuticals, Natera, GlaxoSmithKline, ChemoCentryx, Chinook and Travere Therapeutics, a paid contributor to UpToDate.com and receives honorarium from ISN and ASN. He is Editor in Chief for the ASN Kidney News and section editor for Onconephrology for *Nephrology Dialysis Transplantation* and serves on the editorial board for *Journal of Onconephrology*, *Kidney International*, *CJASN*, *AJKD* and *CKJ*. P.G. serves on the editorial board for *ACKD* journal. S.L. was one of the original creators of the WhatsApp® Onconephrology chat.

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