

Introduction

Social media is a powerful force in modern communications. Social media can be defined as digital tools to share information (Fraser, 2011). There have been numerous calls for nurses to use social media as a tool for professional development (Ferguson, 2013; Jackson, Fraser, & Ash, 2014) and nursing education (Amerson, 2011; Schmitt, Sims-Giddens, & Booth, 2012). While there has been some uptake of social media use, there has been limited use of social media by organizations, especially for staff education. This article describes a quality improvement intervention to increase nurse knowledge about hypoglycemia management through an evidence-based social media intervention. This intervention occurred in the context of a larger social media initiative at the hospital, which is described elsewhere (Jackson & Kennedy, 2015).

Hypoglycemia is an important issue to address in the inpatient setting. It has been associated with increased length of stay and mortality among hospitalized patients (Garg, Hurwitz, Turchin, & Trivedi, 2013; Nirantharakumar et al., 2012). The setting for this project was a large, multi-site tertiary care teaching hospital located in an urban setting. As diabetes nurse specialists, we conduct annual patient surveys about the diabetes care patients received during their admission as part of an ongoing quality assessment measure. Our internal 2014 patient survey results indicated that 18% of patients with diabetes who were interviewed reported experiencing hypoglycemia during their hospital stay. A survey of 44 U.S. hospitals reported a similar prevalence of hypoglycemia in a retrospective study of inpatients (Wexler, Meigs, Cagliero, Nathan, & Grant, 2007). Hypoglycemia is important in regards to patient safety but can also have a negative impact on the patient experience during their hospital admission.

We observed varied practices in the management of hypoglycemia by nurses in our hospital. This problem is not unique to our organization. Others have found nurses in the inpatient setting frequently lack the knowledge of some aspect of best practices in the management of hypoglycemia in their admitted patients. Knowledge deficits have been reported in identifying hypoglycemia requiring treatment, appropriate treatment and the follow up monitoring after an event (Anthony, 2007; Trepp, Wille, & Reinhart, 2010; Yacoub et al., 2014). Other hospitals have also observed that despite having implemented strategies to address hypoglycemia management by nurses in the inpatient environment, adherence to the hypoglycemia treatment guidelines is often inconsistent (Coats, & Marshall, 2013; Gashau, 2009). Ongoing education of nurses has been emphasized as an important patient safety strategy.

We identified the need to have a hospital wide education campaign to inform nurses about best practices in the treatment of hypoglycemia. Traditional face to face teaching sessions or in-services are time consuming and as well, this format is becoming more and more difficult for us to sustain in an acute care settings. Clinical nurses are extremely busy and find it challenging to leave the bedside for a traditional teaching session. This led us to explore the use of social media as an innovative approach in order to reach as many nurse at our organization as possible.

Quality Improvement Intervention

We designed a stand-alone social media intervention to educate nurses about hypoglycemia best management practices. The purpose of this intervention was to increase nurses' knowledge about hypoglycemia identification, management, and follow up. The intervention was structured to provide two weeks of educational material for

nurses via social media, specifically the apps Facebook and Instagram. This intervention took place at a large, multi-centre teaching hospital in Canada.

A storyboard was developed, and contained images that were shared over 2 weeks. Figure 1 presents a sample of the posts we created. The posts traced a patient's journey and the nurse's actions from being symptomatic for hypoglycemia, assessment, intervention, and follow up. There were 22 posts in total; 2 per day, 6 days per week, for 2 weeks (excepting the second week of the intervention, which only ran for 5 days). These were shared online in September, 2014. The first week of the intervention focused on the management of an inpatient with hypoglycemia, who was able to eat. The second week focused on nursing action for an inpatient with hypoglycemia who was either NPO or unresponsive. Each social media post contained an image, a caption explaining the rationale for the action, and a link to the Canadian Diabetes Association 2013 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada (Canadian Diabetes Association Clinical Practice Guidelines Expert Committee, & Cheng, 2013). Nurse educators were also contacted about the intervention, and were encouraged to promote the initiative in their clinical settings.

Promotional posts on social media and the hospital's communication channels alerted nurses to the intervention. The posts were shared on pre-existing corporate social media accounts. The posts were programmed to appear at the same time each day for 2 weeks, and were targeted at a time that had peak traffic on the social media platform. At the end of the intervention, a summary blog post was shared that combined all of the posts, and the link was distributed across all available social media channels. All of the hospital's accounts are publicly available; thus, a nurse did not need to have a Facebook

or Instagram account in order to see the content. We endeavored to promote the intervention through every available channel at the organization. There were concerns raised about the posts being seen outside the organization; however, the posts were based directly on national best practice guidelines, so anyone using this information would be practicing to the national standards.

Intervention Design

The intervention was developed collaboratively by the organization's diabetes nurse specialists and a nurse educator with specialized technology skills. Our priority was to create images and captions that would be accessible and clear for nurses, to facilitate knowledge transfer and quick application for nursing practice. To this end, every effort was made to capture nursing realities in the clinical setting. Pictures were taken with a confederate in a bed, wearing a gown, and an id band. The materials used in the images were taken directly from a clinical setting. For instance, the juice cups that were used are exactly the same ones that are available to clinical nurses on the wards. Through our emphasis on realism, we aimed to make the social media posts as practical and effective as possible.

After the images were taken, they were edited on a tablet, paired with text, and directly uploaded into social media software. All of the apps that were used to create and share the posts were free, and used exclusively on mobile devices. The captions for each image were presented in both English and French.

Evaluation of Impact

While the intervention was implemented, the organization's social media accounts were watched closely for feedback. Nurses asked questions about the organization's best

practices, which were answered using social media. We were able to answer nurses' questions almost instantaneously, despite being located at a different site of the organization. We monitored the number of views the posts received on Facebook, to track the impact of the posts (this function was not available on Instagram at the time).

Prior to launching the intervention, we circulated a 6-question survey about hypoglycemia to assess baseline knowledge (Figure 2). The questions were written based on the Canadian Diabetes Association 2013 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada (Canadian Diabetes Association Clinical Practice Guidelines Expert Committee, & Cheng, 2013) and directly reflected the content of the intervention. These guidelines are established as valid, and diabetes nurse specialists mapped the content of the guidelines to both the posts for the intervention and the evaluation questions. The survey was circulated prior to the intervention, using the same social media pages that shared the intervention posts. Nurses were invited to complete the survey prior to the intervention. After the intervention, we circulated the survey again to assess if knowledge had changed.

Hypoglycemia is a dangerous patient safety risk, so we prioritized increasing nursing knowledge about hypoglycemia over conducting a formalized research study. This intervention was a quality improvement program, which did not require ethical approval or ethical review in this jurisdiction. The survey was anonymous and no identifying information was collected. Our results cannot be traced to the participants and only provide an aggregate measure of hypoglycemia knowledge. A disclaimer was posted at the top of each survey, indicating the purpose of the survey and how these data would be used. Completion of the survey was accepted as consent to participate. After each

question of the survey, nurses received feedback as to whether they had answered each question correctly. The results of the surveys are presented in the following section.

Results

A large number of nurses saw the social media posts related to the intervention. At our organization, there are about 5,000 nurses employed with about 3,500 actively working at a given time. The first week of posts saw 2,962 views on Facebook, and 1,491 views the second week (Table 1). The most popular post both weeks reviewed the signs and symptoms of hypoglycemia. The posts were also available on Instagram; however, that app does not have a function for users to view the number of posts, so it is unknown how many views were attained through Instagram. While it is not possible to say how many nurses viewed posts repeatedly, or if these views include nurses external to the organization, these numbers likely remain well beyond what would have been possible with 2 weeks of traditional educational sessions on a ward.

Table 1: Facebook post views per day

	Mon	Tue	Wed	Thu	Fri	Sat	Total
Week 1 : Patient who can eat	173	1246	201	696	278	368	2962
Week 2: NPO/Unconscious Patient	401	175	259	278	378	x	1491

Table 2 summarizes the proportion of correct responses to each of the 6 knowledge-based questions both in the pre-intervention study and in the identical post-intervention study.

Table 2: Comparing proportions of correct responses in pre- and post- intervention studies. ** indicates a result significant at the 1% level.

Question	Proportion correct		χ^2	p-value
	Pre	Post		
1	88.1%	78.3%	2.75	0.097
2	83.2%	64.4%	7.24	0.007**
3	87.6%	88.1%	0.003	0.956
4	85.6%	83.1%	0.18	0.673
5	72.4%	81.0%	1.46	0.227
6	76.8%	71.4%	0.55	0.459

There were n=101 responses to the pre-intervention survey, and n=60 responses to the post intervention survey (with a small number of respondents not answering all questions). Chi-squared tests of independence were used to compare the proportions of correct responses to each of individual questions in the unmatched pre- and post-intervention studies and the results are presented in Table 2. There were no statistically significant differences between the proportions of correct responses on any of the questions, with the exception of Question 2, where there was a significantly higher proportion of correct responses before the intervention ($\chi^2=7.24$, $p=0.007$). The intervention was not shown in these data to increase nurses' knowledge about hypoglycemia management. There were no known negative reactions or adverse outcomes from the content or process of this intervention.

Discussion

To our knowledge, this is the first published intervention where social media was used by a hospital for clinical nursing education, particularly for post-qualification education. Educators at Penn State used social media for graduate level educational material (George & Dellasega, 2011). Researchers found social media use to be feasible, and acceptable to graduate students. The authors report that some students were skeptical or hesitant, but many were pleased with the added value to the program, and ability to

receive feedback in real time. In our intervention, we anecdotally found similar value in providing real-time feedback from diabetes nurse specialists to clinical nurses across the multi-site organization.

In this quality improvement intervention, there was no statistically significant increase in nurses' knowledge about hyperglycemia management. Other studies have also not detected a significant impact from social media interventions. For example, a randomized controlled trial using Facebook to support physical activity did not significantly increase perceived social support or physical activity (Cavallo et al., 2012). The evaluation of the intervention found 66% of participants would recommend the intervention to friends, with the authors suggesting further study. In our intervention, the absence of statistically significant results may be due, in part, to the limitations of the study.

Limitations

There are several limitations to this intervention. We acknowledge that paired survey responses would have provided a better understanding of the potential impact of the intervention, and possibly detected increases in nurses' knowledge. It would have been preferred to collect descriptive data for the sample, to have more information about who the intervention was reaching. The number of views on a post does not necessarily reflect the number of eligible participants for the study, and so we abstain from calculating a response rate as such. However, it would have been preferred to have more responses to the survey. These limitations could be overcome in future studies if formal research processes are in place, and demographic data are collected from participants.

Social media use will inevitably continue to grow. Researchers can learn from this intervention for future studies, especially regarding the implementation and evaluation of social media interventions. The benefits of social media may be challenging to detect in interventions, and mixed-methods strategies could be a preferred method of evaluation. This intervention also underscores the need for formal evaluation of social media interventions, as there have yet to be best practices developed in this field.

This intervention did reach a large number of social media users, which potentially represent a notable portion of the organization's nursing staff. It would have been impossible for the diabetic nurse specialists to reach this number of nurses in the same timeframe with traditional education sessions, so the online reach of this intervention has been a measure of success. We learned that social media interventions may have potential to overcome limitations of in-person education sessions for clinical nurses at hospitals, especially multi-site organizations. Nurses could access posts based on approved organizational policies at their convenience, which is advantageous given the shift-work nature of clinical nursing. For these reasons, social media interventions in nursing education merit continued development and study.

The decrease in views during the second week (as seen in Table 1) may have reflected some fatigue with the intervention. In the future, it would be worthwhile to consider interventions of shorter length. It may also be useful to limit the number of posts to one per day, rather than two. The posts did not receive negative comments online, which may reflect a measure of satisfaction with the intervention. The development of this intervention was cost neutral, with the exception of our time. The freely available apps used promote accessibility in developing social media interventions, which is also

an important consideration in limited resource settings. Future research can be undertaken to explore more about the content, process, and impact of social media as a tool for clinical education.

Conclusion

In this quality improvement intervention, social media posts did not significantly increase nurses' knowledge about hypoglycemia management. This may be due to limitations in the study, rather than a lack of effect. This intervention did reach a large number of nurses, and future research can explore how to create social media interventions that achieve the desired outcomes. Social media shows promise as a free, widely available technology to connect educators and clinical nurses and hospital settings. Researchers can consider further implementation of social media interventions, with more robust evaluation strategies, to create widely accessible clinical education interventions.

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