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Feasibility of face-to-face and online learning methods to provide nutrition education to midwives, general practice nurses and student nurses

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ABSTRACT

Midwives and general practice nurses are ideally positioned to provide nutrition education to pregnant women. However, it appears that they do not receive sufficient nutrition training to enable them to fulfil this role. This study aimed to develop, implement and evaluate a suite of learning resources developed specifically for midwives, general practice nurses and student nurses. A four-module suite of learning resources was developed based on recommendations in the Australian Antenatal Care Clinical Guidelines as well as formative evaluation with stakeholders. The feasibility of these modules was tested using a pre-test and post-test quasi-experimental design with three arms using convenient sampling (face-to-face with midwives; online with student nurses; and online with midwives, nurses and practice nurses). Completion rates across the three study arms were poor (n=40 participants in total). For the combined data, there was a significant increase in knowledge scores across all modules from the pretest score (median (IQR): 3.46 (2.09–4.13)) to the post-test score (5.66 (4.66–6.00)) (p<0.001). Studies of high quality are required to determine if changing the nutrition knowledge and confidence in delivering nutrition care of health professionals results in sustainable changes to their clinical practice.

What this paper adds

- This paper discusses the feasibility of delivering both face-to-face and online education to midwives, general practice nurses and student nurses about nutrition care during pregnancy
- It demonstrates that dietitian-led, evidence based education for midwives and nurses may improve their nutrition knowledge and confidence in delivering nutrition care
- It also discusses shortcomings with both modes of delivery and areas of consideration for future educators

INTRODUCTION

A healthy, balanced diet during pregnancy is essential to ensure the optimal health of the mother and the baby. While a woman's dietary intake during preconception and pregnancy is multifactorial, research indicates that women are more likely to adhere to recommendations when adequate advice is received as part of antenatal care.[1] Evidence exists that very few pregnant women achieve nutrition intake consistent with dietary guidelines despite over 60% believing that their diet is healthy.[2] Pregnant women also appear to be confused about identifying foods that are high risk for *Listeria* contamination,[3] as well as recommendations for appropriate gestational weight gain (GWG).[4] Although nutrition information is widely accessible through online media, research indicates that women prefer nutrition education to come from their healthcare providers, and are less trusting of outside sources such as the internet and media.[1]

While Australia has relatively low rates of maternal and infant mortality and morbidity, lifestyle-related risks such as obesity, excessive GWG and gestational diabetes mellitus (GDM) are increasing pressure on the antenatal care system. One-fifth of women entering pregnancy in 2016 were classified as obese,[5] and only 30%–40% of pregnant women in Australia have GWG consistent with recommendations.[6] In 2014–2015, diabetes affected close to 1 in 10 pregnancies, with the majority of these being cases of GDM.[7] The prevalence of GDM in the Wollongong region is similar to the national average.[8]

Midwives are ideally positioned to provide nutrition education to pregnant women. In Australia, most pregnant women will see a midwife at some point during their pregnancy, although the level of engagement varies depending on which model of antenatal care is being implemented.[9] General practice nurses could also play an important role, as many women will have

their pregnancy confirmed by their general practitioner (GP) and may receive continuing care throughout their pregnancy from their GP as part of an antenatal shared care service.[9] The Australian Antenatal Care Clinical Guidelines make recommendations around providing nutrition education on general healthy eating, supplements and GWG.[10] However, there appears to be a gap between recommended provision of nutrition information and actual clinical practice. The results of studies have indicated that midwives may lack nutrition knowledge,[11] in particular about weight gain and dietary guidelines about dairy servings and iodine requirements.[12] It has also been reported that midwives lack confidence in both general and specific nutrition issues and may not receive adequate training in nutrition.[12 13] In particular, midwives may avoid discussing GWG altogether to avoid damaging their rapport with patients.[14 15] A recent survey of Australian midwives found that 94% indicated a need for increased nutrition education, and identified that additional education and training would facilitate provision of evidence-based, consistent advice to their clients.[16]

Training programmes which upskill nurses on lifestyle-related topics including nutrition have resulted in an increased frequency of nurses providing brief interventions for physical activity and nutrition with clients.[17] A UK study demonstrated that delivering compact training sessions for midwives about nutrition, physical activity and weight management in pregnancy improves their knowledge and confidence in providing advice on these topics to pregnant clients.[18] Education of healthcare providers in other contexts has been effective in inducing changes to practice, both immediately and over the longer term.[19 20] For nurses, continuing professional development (CPD) programmes which are based on active learning models that use case studies, clinical simulations and participatory discussions are more effective than didactic models of learning.[21] The mode of delivery of CPD programmes also needs consideration. Education delivered online offers convenience and flexibility to busy working professionals and students,[22 23] while resulting in equivalent or superior outcomes compared with traditional methods.[22]

The development of learning resources that can deliver information on antenatal nutrition to midwives and general practice nurses is therefore warranted. Targeting nursing students will also help to build a basic level of nutrition knowledge to be further developed and contribute to overall nutrition competencies. This project aimed to develop, implement and evaluate a suite of learning resources developed specifically for midwives, practice nurses and student nurses. Two modes of delivery of the resources were explored: face-to-face workshops and online learning.

METHODS

Resource development

The nutrition modules were initially developed to be delivered face to face as an interactive series of workshops. Authors (ATM, CJL and KEC), who are also accredited practising dietitians (APD), developed the content for the workshops following formative evaluation meetings with stakeholders at the major public antenatal clinic in the Illawarra region of New South Wales (NSW) in Australia. Four key topics were identified: (1) healthy eating, (2) nutrition supplements, (3) GWG and (4) nutrition for breast feeding. Content was based on the Australian Antenatal Care Clinical Guidelines[10] and designed using a problem-based learning approach, using video simulations and opportunities for discussion and reflection within each module.

Online learning methodology

The online platform OpenLearning (https://www.openlearning.com/), a host for massive open online courses (MOOCs), was used to host the content. Each of the four modules was segmented into smaller subtopics, and each subtopic included content, video simulations and interactive activities such as quizzes. The OpenLearning platform also included strategies to foster peer-to-peer interactions by using an introduction page at the beginning of the course and inclusion of a student area where participants could post questions and discussion points. The course was self-paced and participants were required to complete all the activities in one module before being able to 'unlock' the following module.

Feasibility study

The education resources were tested using a pretest and post-test quasi-experimental design with three arms. For arm 1, face-to-face workshops were held with midwives at a large public antenatal clinic in the region, delivered from August to September 2016. Midwives were invited to participate through an email from the midwifery clinical educator as well as flyers distributed in the staff lunch room. All midwives working within the clinic were eligible to participate. The 30 min workshops were held in the lunch period weekly over four consecutive weeks, followed by a block delivery of sessions so that midwives could catch up on missed content. Workshops were led by the lead author, an APD experienced in delivering nutrition counselling in community settings.

The online resources were piloted in two arms from July to September 2017, arm 2 with nursing students and arm 3 with practising midwives and general practice nurses. Student nurses were recruited from the University of Wollongong through poster advertisements displayed at various locations around the campus, PowerPoint presentations at tutorials and email messages to student cohorts. Student nurses were incentivised to participate by going into the draw to win a nutrition textbook and a $100 gift voucher. Participants for arm 3 were recruited via advertisements on midwife and nursing association websites and social media platforms. The online learning was moderated by two nutrition and dietetics students as part of their research placement, with support from the wider research team. There were some unforeseen technical difficulties which may have impacted on participants'

ability to complete the study. A malfunctioning URL link was mentioned by some participants, and some content was blocked by the NSW Health Server, which impacted on participants who completed the modules at work.

Participants from all three study arms completed a pretest and post-test survey which included knowledge questions related to the four topic areas, as well as questions regarding clinical practice and confidence in providing nutrition advice. Surveys were estimated to take 10–15 min to complete. For the face-to-face arm, pretest surveys were completed at the commencement of the first module; post-test surveys were distributed at the final workshop and block delivery day and were collected by the midwifery educator after 2 weeks. For the online arms, participants were required to complete the pretest survey prior to accessing the first module, and the post-test survey was available after completion of the final module. Participants in the online module received three email reminders during the final week of the course to prompt the completion of the final module and post-test survey.

Each knowledge question was weighted equally, with participants able to score from −1 to 1 for each question (incorrect responses in multiple choice resulted in a proportionate deduction of points), to receive a total knowledge score out of 7. A confidence score was derived from responses to a 5-point Likert scale question regarding the participant's confidence in providing advice on six nutrition topics (healthy eating, food safety, folic acid, iodine, GWG and breast feeding). Each item was scored from 1 (strongly disagree) to 5 (strongly agree). Pretest surveys also collected basic demographic information, while post-test surveys included process evaluation questions regarding the workshops or online modules. Open-ended questions were used to explore which aspects of the course were perceived as most valuable and which sections could be improved.

Surveys were entered into Microsoft Excel (V.2010). Data were analysed using SPSS V.21. Due to the small sample sizes across the three arms, results were pooled to explore changes in knowledge and confidence. Wilcoxon signed-rank tests were used to test the difference in knowledge scores and confidence scores before and after completing the education due to the skewed distribution of the data.

RESULTS

Completion of all three study arms was poor. In the face-to-face arm, 33 midwives commenced and 10 completed the pretest and post-test surveys (30%). Not all participants completed all modules (n=5 completed all four modules), and the mean number of modules completed was 2.7. In the nursing student online arm, 27 commenced and 11 completed (41%). Similarly, in the midwife and practice nurse online arm, 50 commenced and 19 completed (38%). The combined participation rate across the three arms was 36%. Only participants with completed pretest and post-test surveys are included in the results. Demographic details are displayed in table 1.

Table 1 Participant demographics

Demographic characteristics	Midwife, face-to-face arm (n=10)	Nursing students, online arm (n=11)	Midwife and practice nurse, online arm (n=19)
Years working in the profession			
<5	3	N/A	3
5–10	0	N/A	2
>10	7	N/A	14
Received nutrition training in the past	0	2	3

N/A, not applicable.

Nursing students ranged across first (n=3), second (n=4) and third (n=3) years. The midwife and practice nurse online arm included midwives (n=12), nurses (n=3), practice nurses (n=2) and other professionals (n=2).

Participants were asked what they aimed to learn or achieve by completing the modules. Most answers focused on learning more about healthy eating and advice to give to pregnant women: *"Be able to educate women in the antenatal and postnatal period about healthy eating and types of food to eat"* (midwife, arm 1). Nursing students noted they were taking part to add to their resumes or to assist in furthering their education for midwifery.

Feasibility

Feedback was positive overall for the face-to-face workshops. When asked how they would rate the workshops overall, participants answered "excellent" (n=7) or "good" (n=3). Most participants found learning current recommendations with regard to nutrition the most valuable part of the programme. Four participants noted that the workshops could be improved by having work hours allocated to attend.

Participants also provided positive feedback about their experiences using the OpenLearning resource. Participants strongly agreed that participation was actively encouraged (arm 2: 91%; arm 3: 95%). All participants from both online arms indicated they would recommend the programme to their peers.

In terms of the course structure, participants identified the video case studies as the most valuable aspect of the course and identified them as a way to strengthen their learning: *"I found I remembered things better when I heard them in the video"* (nurse, arm 3).

Both online arms identified course design as an area for improvement. Comments related to fixing technical issues such as site navigation and completion status issues, adding multiple choice questions, and having course content available to download. Some participants stated

they did not find the reflection useful, whereas others indicated that this was a strength of the course.

Changes in nutrition knowledge

Mean knowledge scores and changes in scores from pretest to post-test for each are displayed in table 2. For the combined data, there was a significant increase in scores across all modules and the total score (pretest median (IQR)/post-test median (IQR); p value): healthy eating (1.60 (0.80–1.80)/1.8 (1.75–2.00); 0.001); supplements (1.00 (1.00–2.00)/3.00 (2.00–3.00); <0.001); GWG (0.00 (0.00–1.00)/1.00 (0.00–1.00); 0.005); breast feeding (0.00 (−0.33 to 1.00)/0.66 (0.33–1.00); <0.001); and total score (3.46 (2.09–4.13)/5.66 (4.66–6.00); <0.001).

Changes in self-efficacy

Participants were asked about their confidence in delivering nutrition education about the key topics to ascertain self-efficacy. Combined results showed increases in confidence (pretest median (IQR)/post-test median (IQR); p value) for healthy eating (3 (2–4)/5 (4–5); p<0.001); food safety (3 (2–4)/5 (5–4); p<0.001); folic acid (3 (2–4)/5 (4–5); p<0.001); iodine (3 (2–4)/4 (4–5); p<0.000); GWG (3 (2–4)/5 (4–5); p<0.000); and breast feeding (3 (2–4)/5 (4–5); p<0.000).

DISCUSSION

Participants who completed the face-to-face and online workshops had a significant increase in knowledge scores across all modules, as well as improved confidence in delivering nutrition education as part of routine care. The success of nutrition education workshops in improving nutrition knowledge of health practitioners has similarly been demonstrated in the UK.[18]

Participants rated the workshops positively and indicated that active participation was encouraged. However, the process evaluation also noted that time constraints were a barrier for busy working professionals and students alike. In all three study arms, completion of the modules was in addition to current work responsibilities or undergraduate studies. High dropout rates are common for online learning courses, with one review of MOOCs demonstrating a median completion rate of less than 13%.[24] However, a qualitative study by Jacobsen[25] noted that MOOC participants may pick which segments of the course are most useful to them and only complete segments that have perceived value. These non-completers should be considered 'drop-ins' rather than 'drop-outs', which may have occurred in the current study. For example, midwives in arm 1 noted that nutrition for breast feeding was a topic that they already perceived themselves to be knowledgeable about. Thus, it is possible that participants may have chosen not to participate in this module, as the perceived value may have been low.

A key strength of this study is its contribution to facilitating the inclusion of evidence-based nutrition education into routine antenatal care.

Table 2 Mean nutrition knowledge scores pretest and post-test

Topic	Midwife, face-to-face arm (n=10)			Nursing students, online arm (n=11)			Midwife and practice nurse, online arm (n=19)		
	Pretest median (IQR)	Post-test median (IQR)	P value	Pretest median (IQR)	Post-test median (IQR)	P value	Pretest median (IQR)	Post-test median (IQR)	P value
Healthy eating (score /2)	1.45 (0.8–1.85)	1.80 (1.41–2.00)	0.107	1.15 (0.55–1.80)	1.80 (1.51–2.00)	0.160	1.80(1.00–2.00)	1.80 (1.80–2.00)	0.009*
Supplements (score /3)	1.00 (0.75–2.00)	2.00 (1.00–3.00)	0.020*	1.00 (1.00–2.00)	2.50 (2.00–3.00)	0.008*	1.00 (1.00–2.00)	3.00 (2.00–3.00)	0.002*
Gestational weight gain (score /1)	0.50 (0.00–1.00)	1.00 (0.00–1.00)	0.317	0.00 (0.00–0.00)	1.00 (0.00–1.00)	0.059	0.00 (0.00–1.00)	1.00 (0.00–1.00)	0.058
Breast feeding (score /1)	0.00 (0.00–0.00)	0.50 (0.00–1.00)	0.046*	0.00 (−0.33 to 0.41)	0.66 (0.33–0.66)	0.012*	−0.33 (−0.33 to 0.66)	0.66 (0.66–1.00)	0.001*
Total score (score /7)	3.45 (1.79–4.20)	5.00 (3.74–6.00)	0.016*	2.74 (1.65–3.47)	5.06 (4.18–6.03)	0.005*	3.47 (2.42–4.67)	5.75 (5.66–6.46)	0.000*

*Indicates statistical significance (p<0.05).

While studies that have examined additional nutrition education sessions and allied health involvement in antenatal care have had positive results, they have also had high attrition rates.[26 27] In particular, these types of interventions may have difficulty recruiting and retaining 'hard to reach' women, such as women from disadvantaged communities, further widening the gap.[26] Therefore, the inclusion of nutrition as part of routine midwifery or practice nurse consultations may be preferable, as it ensures all pregnant women receive education about the guidelines as part of routine care.

This feasibility study has numerous limitations. First, the small sample size means that comparison between arms was not possible. The results should be interpreted with caution due to the high likelihood of selection bias skewing the results, as participants in all three arms were not required to complete the modules as a compulsory part of their work or study. The results therefore reflect the knowledge and opinions of a small group of likely highly motivated staff and students. While undertaking the programme was voluntary, midwives and nurses in Australia are required to undertake a minimum of 20 hours of CPD per year, which can include a range of formal and informal learning activities.[27] Completing the learning modules was therefore an opportunity for free CPD, and participants could claim a total of 2 CPD hours for completion. A follow-up qualitative study with participants to identify reasons for completion or non-completion would be useful to ensure future programmes contain relevant content and are appropriately delivered.

Second, the survey instruments that have been used have not been validated; however, they were tested for face validity using a convenience sample of APDs (n=12) and reviewed by the midwives on the research team. Lastly, this pilot study focused on evaluating both the process and the impact of the workshops; however, it did not examine long-term outcomes in terms of changes in midwives' knowledge, behaviour and confidence, nor the impact on the knowledge and behaviour of pregnant women receiving care from these professionals.

Third, there were some technical difficulties which impacted the accessibility of the online resources. Some content on the OpenLearning platform was blocked for participants accessing the resources at work via the NSW Health Server. This is likely to have impacted the participation rate in arm 3, as CPD affecting time outside work has been documented as a key barrier for nurses and midwives to accessing CPD.[28] Consideration should be given to settings where learners are likely to access CPD, and if possible rigorous testing should be conducted within such settings to minimise technical and accessibility issues.

This study demonstrates that dietitian-led, evidence-based education for midwives and nurses improves nutrition knowledge and confidence in delivering nutrition education to pregnant women, as part of routine care. Further research is warranted to identify the aspects of nutrition-related CPD that midwives and nurses would find most valuable and how this training can be delivered in the most efficient manner.

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Contributors KEC, ATM and CJL were responsible for conceptualisation and study design, as well as content development of the learning materials. EL and BK were responsible for translating the face-to-face workshops into the online learning modules, with support and guidance from SL. CJL facilitated the face-to-face workshops, with support and guidance from VE and LC. EL and BK facilitated the online modules.

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