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Information Technology and Childbirth Education

Debra Henline Sullivan
Walden University

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International Journal of Childbirth Education

Information Technology and Childbirth Education

The official publication of the International Childbirth Education Association

VOLUME 30 NUMBER 3 JULY 2015

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The official publication of the
International Childbirth Education Association

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The International Childbirth Education Association, founded in 1960, unites individuals and groups who support family-centered maternity care (FCMC) and believe in freedom to make decisions based on knowledge of alternatives in family-centered maternity and newborn care. ICEA is a nonprofit, primarily volunteer organization that has no ties to the health care delivery system. ICEA memberships fees are $95 for individual members (IM). Information available at www.icea.org, or write ICEA, 1500 Sunday Drive, Suite 102, Raleigh, NC 27607 USA.

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Being Technically Proficient

by Debra Rose Wilson, PhD MSN RN IBCLC AHN-BC CHT

The information age has arrived. We value access to and control of information as an integral part of human existence. These changes have influenced how we do everything. All this technology was developed from the need to manage large amounts of information quickly and efficiently. Technology has made life faster, easier, and more accurate. What we have is an explosion of information and constantly changing technology. We are suffering from information overload as predicted in *Future Shock* (1970) by Toffler. The pace and sharing of information is now expected and those in childbirth education practice use email, the internet, pregnancy apps, and streaming video. Our clients also use this technology and will need assistance to sort through what is accurate and evidence based.

The computer evolution has advanced society faster than any other innovation and yet continues to change, grow, and become integral to our functioning as humans and as health care practitioners. Instead of waiting for reports from doctors on regional flu activity, the WHO, CDC, NHS, Health Canada, or any federal or state health organization can obtain this data through Google Flu Trend programs. This program tracks the number of google searches for flu symptoms by snuffling people infecting their keyboards as they seek options for self-treatment. The geographical area can be pinpointed by servers and a rise in flu outbreak can be predicted and response can occur weeks faster.

Debra Rose Wilson

Jo High

The amount and types data being collected in health care is unimaginable. Data from apps, smart phone or watch, and from medical records can all provide general information about the population. Epidemics can be predicted and prevented, practice approaches change as a result of this data, research is suggested, and we know more about the health of the population. Keeping individual information secure continues to be a challenge.

This issue was guest edited by Dr. Sullivan who has taught me a great deal about being techno-savvy. Thanks to the authors who contributed to this special issue on information technology in our field of childbirth education. What follows are articles about blogging, pregnancy apps, the new technology of fetal monitoring, using social media in your practice, creating websites, and more. We encourage you to become technosavvy and use the devices that will let you better educate and prepare your clients for childbirth and parenting. Let me know what you think of what you are reading.

Peace,
Debra
editor@icea.org

55 Years of Accomplishments – *We are ICEA Strong*

by Connie Livingston, RN BS FACCE LCCE ICCE

With our 55th anniversary June 30, ICEA began recognizing its valuable members. If you have visited the ICEA Facebook page, you have seen several Board members and IATs with signs "I am ICEA" or "We are ICEA strong!" We want to feature our members also – so please go to the ICEA website, click on the "About ICEA" tab, and then click on "ICEA Media". In that list you will find a PDF that you can print off and write your hometown and state/province/country. We want to see you next on the ICEA Facebook page!

ICEA has a Board of Directors that is a working board. By "working" board, I mean that the 13 of us work nearly every day for you. Much of the work is done behind the scenes so I wanted to highlight a few of the hardworking board members:

Director of Policy is Elizabeth Smith. Did you know that Elizabeth brings ICEA to other birth-related organizations so that we can all work more closely together? Elizabeth also is the head of ICEA's Media Team. This means that when there is an issue that ICEA needs to address, Elizabeth takes the lead in producing press releases. These press releases are available for each member to download and print. Simply access the ICEA Media under the "About ICEA" tab on the website.

Director of Membership and Marketing is Jennifer Shryock. Jennifer has enabled ICEA to have a more interactive Facebook and Twitter presence as well as producing memes and videos for ICEA's You Tube Channel.

Connie Livingston

Director of Education is Barbara Crotty. Under Barbara's watchful eye, all of the ICEA certification programs have recently gone through updating and revision, and have not only ICEA CEs but also Nursing CEs. Barbara has also been key in producing the VBAC Project and our non-certification programs such as the Mother-Friendly Nurse Skills Workshop.

Director of Lactation is Donna Walls. Donna has created the Early Lactation Workshop so that all members will have access to the most recent lactation research. Understanding that what happens during the birth experience greatly influences the immediate postpartum, Donna has also included in this Workshop elements of Skin to Skin.

These are just four of your ICEA working Board of Directors. If you have a few hours each month, I would like to personally invite you to volunteer for the position that interests you most: Director of Education, Director of Communication, Director of International Affairs, Director of Conventions, and Secretary. Becoming a member of the ICEA Board of Directors is a great way to serve this organization and its members with the skill set and talents you possess. Email info@icea.org for links to the nomination information.

Don't feel ready for a director position? Contact info@icea.org for info on committees that currently have vacancies.

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For more information:
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Using Technology to Your Advantage

by Debra Henline Sullivan, PhD MSN RN CNE COI

Debra Sullivan

I feel honored to be the guest editor for this Summer 2015 issue with the theme of information technology (IT). New technology is exciting and I love exploring innovations in education technology. Today, many of our clients are technology natives and expect technology use in the education they receive and throughout their childbirth journey. More than ever, information and advice is instantly available via mobile devices and personal computers. Not only do I urge that you use this to your advantage, but also that you intervene to guide your clients toward reliable and accurate information.

Ashelby and Bahl (2013) found in their study that pregnant women prefer electronic information, in particular mobile information, to traditional information leaflets. Your clients are technology savvy, but there is so much information available that it is difficult to navigate. For example, you have a client who is pregnant with her first child; while sitting in the clinic for her check-up, she looks for apps on her phone. She is interested in what to expect during the first trimester. She finds an app that will allow her to hear fetal heart tones; next, she finds apps that she can wear to monitor her and her baby's health status; and then she finds an app that shows her what can go wrong in a delivery. There is so much information that it is overwhelming and she feels anxious and frightened. She needs not only your reassurance, but your expertise and recommendations for quality resources, including online sites and mobile apps. In this issue, *Pregnancy Apps: A Closer Look at the Implications for Childbirth Educators* you will find mobile app guidelines and steps to evaluate apps. Another article you might find interesting is about an app that will allow the client to hear simulated fetal heart tones. A term you might hear related to apps is mobile health technology or mhealth, which is where mobile computing and communication technology is used in health care (Free et al., 2013). Many healthcare providers are providing their clients with mobile health technology to monitor their progress, answer questions, or provide advice.

Using IT in your education programs may seem daunting and expensive; however, there are many software programs available to assist you in creating an education program online. In addition, your organization may offer IT help in developing a mobile app or website. We have included one article that provides step-by-step instructions for developing an online educational program including the development process. As the subject expert, you know what clients are asking and you may use technology to deliver the information to your clients for easy access

This issue includes many other exciting topics in information technology. There is a general overview of current trends in childbirth education technology. Two articles will enlighten you on the best practice for communication with your clients using social media and blogs. Three articles refer you to some great recent apps for use in your practice. Another teaches you how to critique an App for use with your clients. Other topics include virtual reality program information, and a review of electronic health records. Therefore, you might want to keep this issue close-at-hand to refer to as your IT needs arise. It is my hope that this issue will offer the childbirth educator many IT resources suitable to meet the needs of this generation.

I want to thank Dr. Debra Rose Wilson, the editor of this journal, and the new ICEA board for this opportunity to share this exciting information to childbirth educators. Please let us know of any comments on this issue and if you have any suggestions for future issue themes.

A Blogging Primer for Childbirth Education Professionals

by Lee Stadtlander, PhD

Abstract: Blogs are frequently updated websites where content (e.g., text, pictures, music) is posted on a regular basis and the information is displayed in chronological order. A blog provides a mechanism to establish an online presence as a childbirth education professional. The new blogger does need to learn new software and terminology; however, there are many resources available to help get a blog started. Keys to successful blogging include maintaining a regular schedule of posts, keeping the posts fun and interesting, and providing information that is useful to the audience.

Keywords: blogging, social media, childbirth

Weblogs, commonly referred to as blogs, are frequently updated websites where content (e.g., text, pictures, music) is posted on a regular basis and the information is displayed in chronological order. Blogs often take the form of journal posts and usually focus on a particular topic or subject. Most blogs are interactive, allowing readers to comment and leave feedback; frequent interactions can facilitate development of relationships between authors and readers via conversations and feedback. This article will walk you through the basics of blogging and give you resources to get your own blog started.

How Could You Use a Blog?

It is a good idea to have a definite purpose in mind for your blog: will you be giving opinions? Announcements? Educational info? Who will be your audience? You might want to provide ongoing childbirth education information to your clients or you could provide news and announcements of your classes/ plans. Check with your employer as to whether there are policies and/or resources related to blogging.

An additional plus to consider is that Google will index and archive your blog's content and deliver it when someone is searching for your topic (Baumann, 2012). Regularly blogging useful and interesting information will bring people to your site repeatedly.

Setting Up a Blog

There are a number of blogging sites available; a few examples are blogger.com, which hosts your blog on their server and livejournal.com, which is hosted on your own server. These sites provide directions for using their specific software through their help area. Consider having a code of conduct for your blog, keeping in mind that people may respond to your comments. Some possible inclusions in such a code might be no swearing, no personal names or photos of clients, must be on topic, and no commercial messages.

How often you post on your blog is really up to you. Lenhart and Fox (2006) conducted a survey of bloggers, finding that 25% of bloggers post one to two days a week, 15% of post three to five days a week, 28% every few weeks, and 19% post less often than every few weeks. Most bloggers spend about 2 hours a week blogging (Lenhart & Fox, 2006). Regular contact between blogger and reader can build close relationships and creates a strong online identity (Wright & Webb, 2011). How often you post is your choice, but keep in mind that regularly posting on specific days (e.g., Mondays and Wednesdays) makes it easier for people to follow your blog regularly.

Typically, there is a way to allow people to follow your blog by email (also called an RSS feed), whereby, an email is automatically sent to readers when you post. For example, in blogger.com, there is a "follow by email" option that can be set by you in the layout or settings page.

Blogging requires more thought and preparation than other social media, such as Facebook. There are some ways to make blogging easier: develop a posting calendar and stick to it. Consider recruiting a team of bloggers, so you do not have to do all of it. Keep your posts short and to the point, fewer than 400 words is a good target. Use your word processor tools of spell and grammar check so your posts look professional. Each post does not have to be perfect; the important thing is to do it.

You might want to write and save several posts in your

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word processor and have them ready in advance. Another option is to write, over several posts/ days, a series of posts on a specific topic (e.g., "How do I prepare my home for my new baby?" Each day's posts covering different rooms/ items with links to example items and/ or videos).

Some useful tips (Hinmon, 2012): be friendly, conversational, and interesting. Write with your audience in mind; you want your site to be the go to place for childbirth education. Avoid technical jargon and explain any medical/ anatomical words that you use. Do not be discouraged if it takes a while to build up a readership. People will find you if you consistently post information that is useful and interesting.

The best bloggers (the "A-List"; Saleh, 2014) tend to be concerned with likeability and competence. They are quick to respond to readers' comments and questions and are highly aware of their readers.

One advantage of blogs is that you can link to other sources of information. Short statements can be used to introduce a scientific paper, article, or video clip from the internet. Be sure you provide enough information in your introduction that people understand the material to which you are linking.

Ethics and Blogging

The International Childbirth Educator's Association (ICEA, 2007) has provided five tips to avoid Health Insurance Portability and Accountability Act (HIPPA) problems with social media. They include:

1. Remember the standards of birth professionalism are the same online as in any other circumstances.
2. Do not share or post information or photos gained through the birth professional-client relationship.
3. Maintain professional boundaries in the use of social media. Online contact with clients may blur this boundary.
4. Do not make negative remarks about clients, employers, colleagues, or birth facilities even if not clearly identified.
5. Do not take photos or videos of clients on personal devices including cell phones. (ICEA, 2007, p. 2).

How do these tips relate to blogging? You can discuss classroom content and provide general childbirth information and announcements. You may not mention any clients by name, post photos of clients or their children, nor can you post testimonials in your blog.

Blog Resources

Here are a few resources for learning how to blog. Most blogging sites also have a help section to get you get started.

- **Blogger Tutorial** (www.blogger.com/tour_start.g). This is a simple tutorial by blogger.com about what a blog is and how to get started.
- **List of tutorials for Blogger** (www.simplebloggertutorials.com/). This site lists many tutorials on how to use Blogger. It includes subtopics like basics, templates, tips and tricks, widgets, etc.
- **Training videos** (www.teachertrainingvideos.com/blogs-wikis/). This site provides videos on blogging related topics.
- **CDC's Guide to Writing for Social Media** (www.cdc.gov/socialmedia/tools/guidelines/pdf/guidetowritingforsocialmedia.pdf). This document provides a lot of examples of dos and don'ts for writing for social media like blogs and tweets. It also includes social networks sites and web pages.
- **Health Works Collective** (www.healthworkscollective.com/node/30402). This page focuses on how to market your health care blog.

Summary

A blog provides a mechanism for you to establish an online presence as a childbirth education professional. As a new blogger you will need to learn new software and terminology; however, there are many resources available to help you get your blog up and running. Use the tools available in your word processor – such as spell and grammar check. Keys to successful blogging include maintaining a regular schedule of posts, keeping your posts fun and interesting, and providing information that is useful to your audience.

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Lee Stadtlander is a researcher, professor, and the coordinator of the Health Psychology program at Walden University. As a clinical health psychologist, she brings together pregnancy and health care issues. She maintains a blog on writing a doctoral dissertation at www.phdrealities.blogspot.com/

Utilizing Technology to the Fullest

by Tracy Scott, DNP APRN-BC RN-BC

Abstract: Technology is an integral part of our lives and in health care. Systems are often purchased without careful consideration for specialty areas requiring customizations. When selecting a system, it is important to include representatives from all areas of a facility and include training to ensure systems are utilized fully. By collaborating with the informatics team, custom screens and reports may be created to ensure that the data collected is aligned with the latest research. Educators should stay up to date on consumer technology as well and work with patients to share data and improve outcomes.

Keywords: electronic medical records, obstetrics, patient education, ad hoc reporting

Technology changes quickly and evolves to meet our needs. In health care, electronic health records (EHR) are becoming the standard. An Understanding of how technology works will allow the user to realize the full potential and greatest benefit from the available data. Telemedicine is being used to reach underserved populations, mobile technology is used to collect data, research is enhanced, and information is readily available to both patients and clinicians. This article will provide an overview of the data storage in EHR systems, examples of technology used to improve patient care, selecting a system, reporting capabilities, and technology available to obstetrics patients.

EHR Selection

When selecting Electronic Health Records systems, it is important to include members from key departments and specializations. If your facility plans to change or move to an EHR system, seek out those involved in the purchase to ensure the system allows for customization for your specialty. The data entered from an obstetrics patient will require specialized screens to collect information regarding the mother and baby. One form does not fit all, so a detailed list of requirements will ensure that the correct system is considered.

It is important to note that many vendor web sites do not provide detailed information regarding the capabilities of their systems. Yeung, Jadad, and Shachak (2013) conducted a study of vendor web sites to evaluate the information offered to consumers. The sites were evaluated based on information regarding the information and data, management of results, order entry, decision support systems, electronic communication integration, patient education content, scheduling, billing, and reporting tools. The vendor sites included persuasive sales information but offered very little information about the specific product capabilities. Being an informed consumer will ensure the correct questions are asked when meeting with vendors.

EHR Behind the Scenes

Gone are the shelves of paper charts and filing cabinets but the data is still stored behind the forms we use to input data. The fields on the forms correspond to a field in the database, which is the backbone of the system. For example, when we enter a pulse rate, it is stored in a field labeled something similar such as pulse rate. To pull the data from the database, a common language is used. Most systems are delivered with the most commonly requested reports built into a dashboard but custom reports are possible from the database. This is especially important in specialty areas.

Requesting a customized report from the informatics team is useful in creating targeted educational programs based on risk identification. An example of this is seen in the work by researchers who pulled data from a large EHR database regarding obese children. The addresses of the children with elevated body mass indexes (BMI) were pulled from the databases and compared to addresses of children who were not obese. The neighborhoods with obese children were

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areas in which participating in outside activity were difficult (Duncan, Sharifi, Melly, Marshall, Sequist, Rifas-Shiman, & Taveras, 2014). Identifying children in these areas allows for an intervention plan early to decrease the risk of obesity.

Custom reporting allows us to put evidence into practice. A study of women who developed hypertension while pregnant was conducted with an 11.5 year follow up in Finland. The population included 9,432 children and sought to find a connection to decreased cognitive ability and maternal gestational hypertension. The results found the children to be at a higher risk for mild cognitive limitations (Heikura, Hartikainen, Nordstrom, Pouta, Taanila, & Jarvelin, 2013). Taking this evidence, a custom report is possible to look for trends in the pregnant patient and allow for early interventions and education to ensure a normal blood pressure is maintained.

You may decide to build a custom form for data collection based on evidence. For example, researchers examined depression during pregnancy to find a connection to poor infant outcomes due to the mother's decreased response to infant distress. The study included 72 women and reactions to infant distress was measured by an elevated systolic pressure. The researchers concluded that the depression did not lead to a decreased response to the infant but that the women were more sensitive to the infant's distress which led to their feelings of depression (Pearson, Lightman, & Evans, 2012). This information might be used to add fields to an existing screen to monitor pregnant patients for depression and elevated systolic pressures.

Patient Collaboration

Technology is also helpful in collecting data from patients outside the clinical setting. Empowering the patient to take part in their plan of care is made easier through technology. This is especially true in rural areas. Partnering with the patient to share data through the use of cell phones was a success in Liberia. The patients were encouraged to send data related to their pregnancies to midwives after receiving training on the use of cell phones. With over 80% of the world's rural population having access to cell phone networks, this is an excellent option for monitoring progress during pregnancy (Lori, Munro, Boyd, & Andreatta, 2012). Designing education for patients in rural settings with instructions for sending updates so their progress may be easily tracked.

Social media offers an excellent platform for reaching patients.

Social media offers an excellent platform for reaching patients. In London, a group developed an electronic midwife through the use of social media. A gap analysis identified the needs of the local population and a plan was developed. Facebook and Twitter accounts were created and populated with evidence-based information. The midwives respond to questions and email within 48 hours and have received 100 contacts per month since the program was launched (Labriola, 2015).

Technologies are also available to the consumer and worth mentioning since clients may be using these at

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Table 1. Consumer Technology

Device	Summary	Web Site
Bellabeat	The Bellabeat is a small Doppler device which allows mom to hear and record baby's heartbeat and share with family and friends. A free app is available with the device to track your progress.	www.bellabeat.com
Kickme Baby Kicks Counter	This free app allows mom to keep track of each movement and stores the statistics.	www.play.google.com/store/apps/details?id=com.dilmeapps.kickme
Kickabee (coming soon)	A wearable soft band which detects movement of your baby and sends a tweet.	www.kickabee.net
Hi Bebe Fetal Doppler	This handheld device allows you to listen to your baby's heartbeat and allows one to connect headphones for private listening.	www.healthchecksystems.com/hi_bebe_fetal_doppler_bt200.htm
BioBands	If you are interested in reducing nausea without medication, these may be the answer. This band uses acupressure to reduce nausea. They may not work for everyone but at about $12 may be worth a try.	www.biobands.com/morning-sickness

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home (Table 1). A device which allows one to record baby's heartbeat and share with family is called Bellabeat. It comes with a free mobile app to allow the user to store information and track progress. Kickabee is a soft belt-like device which senses the movement of the baby and sends out a tweet. Hi Bebe offers a hand held Doppler device with an optional headphone jack for listening to the baby's heartbeat. For those suffering from morning sickness and reluctant to take medication for relief, Bio Band may be worth a try. The band is inexpensive and uses acupressure to relieve nausea.

Conclusion

Understanding the technology available and the capabilities of the software is important when educating a population or collecting data. Collaboration with the informatics team, and staying involved when facilities select or upgrade EHR systems, will ensure the system will allow customization, offer ad hoc reporting tools, communications, and include patient education materials (Table 2). As new evidence is available, it is important to have the capability to request reports from the EHR system in order to provide the education our patients need for optimal outcomes.

Table 2. Tips for EHR Success

Device	Summary
Reporting	The system should be installed with pre-built reports and have options for creating custom reports.
Custom Screens	Ensure the system will allow for customizations based on specialties such as obstetrics.
Interoperability	The system will need to integrate with systems such as radiology or the laboratory.
Patient portal	A web based interface which allows the patient to view records and communicate with health care practitioners.
Patient education	Ensure the system has built in handouts for patients based on diagnosis.
Collaboration	Stay up to date on the plans for an implementation and ensure all departments are represented in the selection.
Communication	Discuss the communication capabilities of the system such as email, results, and consultations.

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Pregnancy Apps: A Closer Look at the Implications for Childbirth Educators

by Christine Frazer, PhD CNS CNE, Leslie Hussey, PhD RN CNE, Emily Bosch, RN BSN, and Michelle Squire, RN

Abstract: Most pregnant women download an average of three pregnancy apps during their gestational period. There are no set standards in place for what needs to be included in an app's description leaving consumers to decide for themselves when it comes to selecting the right app to download. The childbirth educator must be knowledgeable about pregnancy apps, in-tune as to what apps their clientele download, and how to analyze them for credibility. This article presents characteristics associated with women of childbearing age (i.e. Millennial/Net generation); the reasons why pregnant women are turning to apps; the limitations of apps, and the childbirth educator's role in a smartphone app culture.

Keywords: smartphones, mobile apps, generations, pregnancy, millennials

Many smartphone apps exist on almost any topic and consumers can locate and subsequently download onto their device (Kamel Boulous, Brewer, Karimkhani, Buller, & Dellavalle, 2014). New apps are developed and made available to consumers on a weekly basis via their smartphone operating system app store (i.e. iTunes, Google Play) (Mertz, 2012). It has been reported that more women own smartphones and utilize health-related apps compared to men (Derbyshire & Dancey, 2013). In fact, apps for pregnancy outnumbers other health related topics (Tripp et al., 2014). A majority of pregnant women download an average of three pregnancy apps during the gestational period (Petrie, as cited in Derbyshire & Dancey, 2013). With the popularity of women of childbearing age downloading pregnancy apps, a closer look is warranted. We need to know what information our clients are getting and from where. Therefore, this article presents generational characteristics associated with women of childbearing age (i.e. Millennial generation); the reasons why pregnant women are turning to apps; the limitations of apps; and lastly, the childbirth educator's role in a smartphone app culture.

The Millennial Generation

The population between ages 18 and 35 is often referred to in the literature as the Millennials, Net Generation, Generation Y, or Gen Yers (Lichy, 2012; Mencl & Lester, 2014; Oblinger & Oblinger, 2005). Other sources refer to those born in the early 1990s as Generation Z (Gen Next) (Dillon, 2007; Posnick-Goodwin, 2010). For consistency, the population born from 1980 to 1997 (aged 18-35 at the time of publication) will be referred to in this article as the Millennials.

As professionals working with Millennial mothers-to-be, it is important to explore the characteristics associated with this generation in order to understand their needs. The Millennials have always had instant access to technology through the internet via laptops, smartphones, and other handheld devices. They are knowledgeable and feel at ease with the tools and terminology that technology has produced (Dillon, 2007). Characteristics of this generation include assertiveness, self-reliance, and curiosity. Millennials use technology to gather information thus enhancing their sense of independence and maturity (Skiba & Barton, 2006; Tapscott, 1998). Millennials are quick to learn and are proficient at multitasking; they grew up believing that they can do anything. Their use of technology and demand for information also drives technology to a higher level. Social networking sites are a large part of the Millennial's communication strategy for conducting and maintaining relation-

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ships and discovering information. Having constant connections to family and friends is vitally important to them (Black, 2010; Lichy, 2012). Some view Millennials as high maintenance; they demand flexibility and require constant stimulation. They prefer texting to phone calls or face to face conversations (Chambers, 2010). Therefore, a generational shift has occurred with the advancement of technology. The Millennials are used to a digital world and how technology enables them to access instant information (Grimes, Forster, & Newton, 2014; Kraschnewski et al., 2014).

Millennials are knowledgeable and feel at ease with technology

Reasons Related to Pregnancy App Usage

Pregnancy is an emotional experience and a major life event that calls for information. Information is most likely to be obtained by a Millennial via a smartphone and available apps (Tripp et al., 2014) in order to seek information about having a baby, especially for first time mothers-to-be (BinDhim, Hawkey, & Trevena, 2015). In fact, because of accessibility and availability, these are the first resources pregnant women within this generation access (Kraschnewski et al., 2014).

In addition to the characteristics that draw pregnant women of the Millennial generation towards technology, Kraschnewski and colleagues (2014) research findings report that current prenatal care visit structure and practice are two other reasons. During the early stages of pregnancy, current prenatal care practice structure schedules infrequent visits; and in the eyes of new mothers-to-be, the first visit occurs too late. Pregnant women have the most questions early on in pregnancy. These questions typically relate to nutrition, diet, exercise, pregnancy symptoms, and the baby's development; henceforth, information from apps and internet sites is sought out to fill this void (Hearn, Miller, & Lester, 2014; Kraschnewski et al., 2014).

With regards to prenatal care practice, information distributed to mothers-to-be on their first office visit usually includes a packet containing a multitude of leaflets and brochures. According to Grim, Forster, and Newton's (2014) study, women reported these items were given to them, but no one took the time to discuss and review the content contained in these materials; henceforth, the material was viewed as unhelpful. There is a possibility of these being outdated or undated, in poor formatting and/or printing, or of questionable quality.

Millennial generation pregnant women desire information from a variety of sources (Grimes et al., 2014). Pregnancy apps not only contain text, but may include interactive photos and videos of the baby's development. Women found these features not only informative but as a way to engage their partners and family members in the experience (Kraschnewski et al., 2014). Some apps contain ways to connect with other pregnant women who are at the same stage of pregnancy (i.e. Baby Bump Pregnancy Pro). The potential for social support with others who are going through the same experience is viewed as valuable and second nature to the Millennial generation who grew up with social networks like MySpace, Facebook, and Twitter. This social support system is a way for them to seek information, advice, confirm knowledge, receive reassurance, and to deal with everyday challenges or struggles faced during their pregnancy (Hearn et al., 2014). Turning to technology to get answers, to fill information gaps, and to seek social support is viewed as a generational approach (Kraschnewski et al., 2014; Grimes et al., 2014).

Apps and Their Limitations

Although there are advantages to apps educating consumers on various health and wellness topics, this booming industry comes with some limitations. Murfin (2013) claimed mobile app guidelines recommend that developers "decrease features, content, and word count" in apps for general use (p. 39). With these guidelines, there is a potential for pertinent information not to be included. A lack of evidence-based research into the efficacy and validity of apps exists (Derbyshire & Dancey, 2013; Kamel Boulos et al., 2014). If the information shared in an app is unclear as to whether or not content is based on "the most current evidence for practice" (Murfin, 2013, p. 38), safety becomes an issue. In app stores, there are no set standards in place for what needs to be included in an app's description leaving consumers to decide for themselves when it comes to selecting the right app to download (Bender, Yue, To, Deacken, & Jadad, 2013).

Steps to Evaluating Apps

Although it is impossible to evaluate the numerous pregnancy apps on the market today, it is crucial that the information presented in a pregnancy app is credible. The following suggestions are based on information gleaned from the review of various literature as well as criteria used to evaluate websites. First, begin to assess an app's credibility by looking at the "details" tab and "information" heading in order to gain an awareness about where the app originated (i.e. private individual, healthcare provider or group, professional organization) (Murfin, 2013). Important questions to

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ask include: Did the app originate from a reputable or known and legitimate source? Are credentials provided? Interestingly enough, it has been reported that 77% of consumers who download health-related apps do not assess the credibility of its publisher (BinDhim et al., 2015). Has the app been recognized and/or approved by US Food and Drug Administration (FDA) or England's National Health Service (NHS)? Although not all health-related apps reviewed meet the criteria for approval and/or are reviewed by the FDA or NHS, the process an app has to go through to be endorsed and/or approved by any one of these government entities is rigorous. At this time, the FDA only regulates mobile medical apps and pregnancy apps available to consumers, unfortunately, do not fall into this requirement. However, the NHS does review consumer-related pregnancy apps. Apps included in NHS's Health Apps Library are deemed safe, trustworthy, and comply with the Data Protection Act (NHS, n.d.). Currently, four pregnancy apps were located in the Health Apps Library (My Pregnancy Today; Tiny Beats – Baby Heartbeat Monitor; RSB! the Ready Steady Baby App; and Pregnancy +).

Second, it is important to determine if the app is worth the value if a cost to download is involved and moreover, if the user's privacy is protected (BinDhim et al., 2015). The old saying of "buyers beware" must nowadays be expanded to include "buyers and downloaders beware." If there is a cost associated with buying a particular app, there must be value in return (BinDhim et al., 2015). Moreover, prior to downloading an app, read the privacy policy listed on the app's "details" tab. The privacy policy should clearly state how any data (personal and other) will be collected, processed, and if applicable, distributed. Downloading an app indicates that the consumer agrees to the privacy policy.

Third, evaluate an app's quality and accuracy. Reviewing the description listed under the app's "details" tab provides an overview of what the app includes. However, a description should not be used solely to come to a conclusion about quality. Likewise, consumer star ratings or reviews should not be a substitute for quality and are not scientifically determined (BinDhim et al., 2015; Derbyshire & Dancey, 2013). It is important to note that publishers can hire market review services to positively review their apps; so ratings can be falsely high. Therefore, it is not prudent to rely on consumer star ratings or reviews but rather to download the app itself and investigate it. Questions to ask include: Is content accurate, non-biased, and representative of current practice guidelines (BinDhim et al., 2015; Kamel Boulos et al., 2014)? Are there citations or references listed in any segment of the app? It is important to know from what source is the content being obtained (Murfin, 2013). Within the "details" tab, a date should be listed on when an app was last updated. As well, to avoid consumer misunderstanding of content, assess readability as a component of content quality. Is content written in a manner appropriate for the target audience and will they be able to comprehend the information presented (Grimes et al., 2013; Kamel Boulos et al., 2014)?

The last step in the evaluation of an app is to gauge its usability. Questions to pose include: How easy is it to use each operation/function within the app? Is it easy to get around and to locate information within the app? Does the app function as described by the originator and according to the information written in the app's description (BinDhim et al., 2015; Kamel Boulos et al., 2014)?

Childbirth Educator's Role

In relation to pregnancy apps, it is imperative for childbirth educators and other professionals working directly with pregnant women to become knowledgeable about the various pregnancy apps available and in-tuned as to what apps their clientele download (Kamel Boulos et al., 2014; Mertz, 2012). Since the iPhone and Android are the two leading smartphone operating systems, it is advisable to search for apps in both the App Store and Google Play. Early on, childbirth educators need to begin the conversation with their clientele about apps they are considering or have already downloaded and educate and offer guidance on how to evaluate pregnancy apps based on suggested steps previously presented. Additionally, childbirth educators need to jump on that "app" wagon and begin to evaluate and formulate a recommended pregnancy app list of their own to discuss with clientele early on during their pregnancy. To begin this process, Table 1 presents a review of several pregnancy apps. Moreover, to aid in the development of a list, childbirth educators might want to consider starting a Women's App Group with other professionals to discuss, review, and evaluate pregnancy apps. Always keep in mind that new apps are developed and made available on a weekly basis in addition to current apps that are updated. Therefore, scheduling time to revisit previously evaluated pregnancy apps is crucial in order to reassess properly for any updates and/or new issues. Lastly, the childbirth educator must consider alternative ways to relay information and answer questions early on and prior to the first prenatal visit especially for new mothers-to-be. Suggested alternatives might be conducting a bi-weekly 20 to 30 minute "Lunch and Learn" webinar on various topics pregnant women most often seek (i.e. nutrition, diet, exercise, sex during pregnancy, expected first trimester symp-

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Table 1. Pregnancy Apps

App Name	Evaluation Criteria	Findings
Text4baby	Originator and/or Source/Author (credentials)	• Promoted by the CDC • Service of the National Healthy Mothers, Healthy Babies Coalition, in collaboration with founding sponsor Johnson & Johnson and Voxiva • FDA approved website and texting services • The American College of Obstetrics and Gynecologists (ACOG) is a partner and contributor • Supported by numerous government organizations
	Description/Details	• Includes - Developmental milestones, interactive polls, appointment reminders, labor and delivery, safe sleep, prenatal care, oral health, smoking cessation, exercise and family violence • Covers pregnancy and baby's first year
	Download Price	• Free to download • Free to receive and send text messages
	Approval and/or Endorsement	• American Academy of Obstetrics and Gynecology • Centers for Disease Control & Prevention • American College of Nurse-Midwives
	Accuracy/Quality	• Provides accurate information for stages of pregnancy and after delivery up to baby's first year
	Last Update	• March 6, 2015
	Privacy Statement	• Privacy policy includes introduction, respect of user privacy, information collected about each user, how the information about each user will be used • Personal information will not be sold
	User Friendliness	• Very user friendly • User texts "BABY" to 511411 to initially sign up • Receives three free text messages per week about pregnancy and other educational information including fetal development and critical health and safety information • Provides hotlines for everything from finding child care to domestic violence
	Unique Features	• Available in Spanish
App Name	**Evaluation Criteria**	**Findings**
Pregnancy ++	Originator and/or Source/Author (credentials)	• Created by Health & Parenting together with leading healthcare professionals • Guide for daily development of fetus
	Description/Details	• Symptom tracker and pregnancy journal • Kick counter, contraction timer, baby shopping list, and 1000s of baby names
	Download Price	• Available for iPhone, Android, and Windows App • Free trial version available called Pregnancy + however, it does not cover the entire pregnancy • Pregnancy ++ is $3.99
	Approval and/or Endorsement	• NHS certified
	Accuracy/Quality	• Health & Parenting content is developed in partnership with a team of healthcare professionals, obstetricians, midwives, pediatricians
	Last Update	• March 13, 2015
	Privacy Statement	• Privacy statement last updated October, 2013 • Information collected from each user • Cookies filed on user hard drive • Disclosure of user information included
	User Friendliness	• User friendly • Information is easy to locate within the app and works exactly how the originator describes • Available in multiple languages – English, French, German, Portuguese and Spanish
	Unique Features	• Can be personalized for dads, grandparents, or other family members
App Name	**Evaluation Criteria**	**Findings**
RBS! The Ready Steady Baby!	Originator and/or Source/Author (credentials)	• Created by NHS Health Scotland • Day-by-day tracker on how mother-to-be and baby are developing
	Description/Details	• Provides notifications throughout the pregnancy and baby's first year • Includes information about pregnancy journey, pregnant life, problems that may arise in pregnancy, and then preparing for the birth • Discusses postpartum depression in depth
	Download Price	• Free for Android and iPhone
	Approval and/or Endorsement	• NHS certified
	Accuracy/Quality	• Accurate content presented • Annual reports and reviews publicized
	Last Update	• August 29, 2014
	Privacy Statement	• No privacy information provided
	User Friendliness	• User friendly • Application is very straight forward • Available in multiple languages including English, German, Northern Sami, Spanish
	Unique Features	• Includes information on SIDS, immunizations, postpartum depression and weaning • Complement to the Ready Steady Baby! website
App Name	**Evaluation Criteria**	**Findings**
My Pregnancy Today	Originator and/or Source/Author (credentials)	• Created by BabyCenter • Reviewed by the BabyCenter Medical Advisory Board
	Description/Details	• Pregnancy day-by-day tracker • Teaches body changes, what's ahead, and helps mother-to-be develop a plan • Weekly fetal development images
	Download Price	• Free for iPhone and Android
	Approval and/or Endorsement	• NHS certified • Baby Center is sponsored by national companies – cord blood registry, diapers.com, StemCyte and Viacord • Partners with Johnson & Johnson, United Nations Foundation, Every Mother Counts, and Preeclampsia Foundation
	Accuracy/Quality	• Accurate information with award winning videos
	Last Update	• November 25, 2014
	Privacy Statement	• All contents copyright BabyCenter LLC. • Details the data collected about each user, Ad choices and third party association and disclosure of data
	User Friendliness	• User friendly • User may also create an online account to utilize the application on their home computer
	Unique Features	• Includes pregnancy checklist, bumpie (weekly pictures of baby bump), kick counts, contraction timer, baby registry checklist, and product search • Direct access to a midwife or pediatrician if questions arise

toms). In the end, childbirth educators need to continue to provide reassurance, validation, and support for this major life event pregnant women are going through as they transition to parenthood.

Conclusion: Points of Relevance

In summary, childbirth educators must be technologically savvy in order to meet the needs of the pregnant, Millennial women who seek information for a healthy pregnancy. Therefore, it is important to:

- Realize that smartphone's and the continuous advances in technology significantly impact health-seeking behavior in Millennial women.
- Become familiar with key traits associated with the Millennial generation.
- Recommend a variety of sources of information.
- Update and evaluate the quality of current learning resources distributed in practice.
- Realize more evidence-based research is needed in support of apps.
- Download and clinically evaluate apps to recommend to clients.
- Develop alternative ways to relay information and to support women early on in their pregnancy.

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Simulated Electronic Fetal Monitoring Device for Childbirth Education

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Abstract: The International Childbirth Education Association recommends including obstetrical procedures and technology in childbirth education classes. The purpose of adding this content in childbirth classes is to familiarize parents with common procedures and technologies and educate parents so that each decision families make is informed. This article reviews several electronic fetal monitoring learning strategies that can be integrated into childbirth classes. Simulated tools and techniques include a mobile application demonstrating fetal heart rates and uterine contractions.

Keywords: electronic fetal monitoring, childbirth education, mobile application, childbirth simulation

The anticipation of giving birth to a child evokes feelings of joy and excitement and sometimes anxiety. One goal of childbirth education is to reduce anxiety by teaching parents what to expect and strategies to promote a healthy and memorable childbirth experience. Informing parents about electronic fetal monitoring (EFM) promotes decision making and satisfaction with their delivery experience (Rattray, Flowers, Miles & Clarke, 2011).

What is EFM?

The purpose of EFM is to determine the well-being of the fetus prior to and during labor and birth by monitoring the unborn child's heart rate. A fetal heart rate is a good indicator of well-being because an unborn child's heart rate will decline when the amount of oxygen delivered to the baby is compromised. Despite evidence that intermittent auscultation is a safe method for monitoring fetal heart rate during labor (Association of Women's Health, Obstetric and Neonatal Nurses, 2009), many healthcare providers still use continuous EFM. Continuous EFM potentially alters the birth experience by limiting the mother's mobility. Women must either wear an external belt around the abdomen that secures an ultrasound transducer to their abdomen or a scalp electrode is attached to the fetal scalp once the amniotic membranes have ruptured. Both methods restrict the mother's movement during labor (Lamaze International, 2015). Walking is an important birth practice because it promotes comfort and helps labor progression (Ondek, 2014).

The practice of monitoring fetal heart rate has occurred since the early 1970s (Sandelowski, 2000; Schmidt & McCartney, 2012). Surprisingly, the technology has not changed as rapidly as other health technologies. The external fetal monitoring device was the first electronic monitor to trace fetal heart rate and is still used today, varied only slightly from original design. The ultrasound transducer is sensitive to the fetus or mother's movement and may be unable to trace fetal heart rates accurately. The external device is also less accurate in obese women. The internal EFM device with the attachable fetal scalp electrode was developed and used just a few years after external EFM (Murray, 2006). Data from the electrode are more accurate; however, insertion of the electrode is an invasive procedure, and the membranes must have ruptured. The scalp electrode is attached to the fetal scalp. Both internal and external modes of monitoring the fetal heart rate connect to the same type of monitor to produce a fetal heart rate digital reading.

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What Should Parents Know About EFM?

Effectively helping parents understand the technology and equipment used in EFM occurs by displaying the monitor, belts, transducers, and visual images of the equipment. Familiarizing parents with this technology is essential to reducing their anxiety. Learning about EFM and its equipment helps parents anticipate and understand their surroundings during childbirth. However, knowing how much information to give parents about EFM is far more complex. In some cases, having more knowledge and a greater understanding about EFM reduces stress and anxiety among parents. Alternatively, some new parents use their new found skills and knowledge to fixate on the digital readings of EFM, which may create more anxiety. Nonetheless, the International Childbirth Education Association (2014) promotes incorporation of obstetrical procedures and technologies, such as fetal monitoring, in childbirth education to promote informed decision-making by parents during the childbirth experience.

Re-Purposing the *Simulated EFM App* for Childbirth Education

The *Simulated EFM App* is designed to emulate realistic real-time reading of an EFM during simulation, self-guided learning, or in a didactic setting as in a large classroom. Simulation training uses experiential learning in a safe environment and has been encouraged to train novice and experienced clinicians in different disciplines (Cioffi, 2001; Issenberg et al., 1999; Kohn et al., 1999). Studies in cognitive psychology show recall and application of information are best when taught and rehearsed in environments similar to the workplace (Khan et al., 2011). The same simulation technologies that enhance learning for professional nursing students can also be useful in teaching parents about childbirth.

Prior to developing the *Simulated EFM App*, the primary sources for educators to simulate EFM interpretation were costly manikins. Unfortunately, childbirth educators may not have the resources to purchase, use, or store these manikins. The *Simulated EFM App* is a low cost instructional technology to simulate electronic fetal monitoring in multiple settings including large classrooms, individual learning opportunities, and simulation settings. It can be used as a stand-alone application or when using scenarios including maternal standardized/simulated patients that emulate realistic clinical settings. The application allows the instructor to manipulate the fetal heart rate and uterine contraction tracings dynamically during the simulation educational experience.

Figure 1. Simulated EFM App function screen and tracing

For teaching EFM interpretation to the learner, in this case, parents, the *Simulated EFM App* can instruct using simulated live feed of an EFM in place of using printed copies of EFM strips that do not provide realism. See the *Simulated EFM App* that simulates a live feed screen compared to the strip of paper displaying the fetal heart rate and contractions from a past patient.

Figure 2: Simulated live feed from Simulated EFM App

Ways to Promote Learning in Simulated Childbirth Education

Using technologies that enhance learning in childbirth education promotes informed decision making about childbirth (Miller, 2014). Technologies that enhance learning, however, need not be costly or require special training to operate. Any method of experiential learning that uses technologies similar to what is found in the actual setting enhances learning. For example, it may not be necessary to

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Figure 3: Mother attending Childbirth education class learning about EFM with the Simulated EFM App

demonstrate the placement of the EFM belts and transducer on an expensive manikin. Instead, the belts can be placed on the mother, which demonstrates the procedure and engages the mother as the learner in the activity.

The insertion of the internal fetal scalp electrode can be demonstrated by inserting the electrode into a plastic toy ball with an infant face drawn on the ball. By manipulating the controls on the *Simulated EFM App*, the childbirth educator can create scenarios, similar to those that might occur during labor and childbirth. Then, the educator can explain appropriate interventions to improve the infant's condition such as oxygen delivery to the mother or changing the position of the mother.

Conclusion

Simulation technology has been shown to increase knowledge and confidence in the learner (Miller, 2014). By using various methods of simulation learning in childbirth education classes, parents are encouraged to interact and engage in the learning activities. These simulated learning strategies need not be expensive. This article has reviewed ways to teach parents about EFM using scenarios and the *Simulated EFM App* available in the iTunes App Store. Simulations allow the ability to manipulate fetal heart rate and contraction recordings in real time while a scenario is unfolding and changing. Functionalities of the *Simulated EFM App*, see Table 1, add realism to the learning, which helps parents better understand technologies and situations that may arise during the childbirth experience.

Functionalities of *Simulated EFM App*

Highlights of the Simulated EFM App

- Graphically simulate relevant states of fetal heart rate based on instructor or user input
- Graphically simulate relevant states of uterine contractions based on instructor or user input
- Allow simulated live-feed EFM tracings across multiple devices simultaneously using one device as a controller and the others as monitors.
- Switch between patterns while running the simulation
- Store and recall saved simulations
- Record generated charts and share via jpg images or pdfs sent via e-mail.
- Design custom simulation based on advanced inputs in addition to standard simulations.

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Articles should be in APA format and include an abstract of less than 100 words. The cover page should list the name of the article, full name and credentials of the authors and a two to three sentence biography for each author, postal mailing addresses for each author, and 3 to 5 keywords. Accompanying photographs of people and activities involved will be considered if you have secured permission from the subjects and photographer.

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Speaking Their Language: Integrating Social Media into Childbirth Education Practice

by Deborah Weatherspoon, PhD MSN CRNA COI, Chris Weatherspoon, MSN RN, and Caitlin Ristau, BSN RN-C

Abstract: With the advancement of modern technology, the internet has become a standard platform for many forms of communication and education. The majority of pregnant females fall into the cohort known as Millenials and have experienced technology since early in life. Millenials consider technology as part of their everyday life and use it for personal interaction or a source of information. The established comfort with the use of technology combined with busy lifestyles, multiple commitments, transportation costs or logistics, childcare, or a desire for privacy, support the use of perinatal online learning. This article examines options that childbirth educators may consider for integrating social media or other forms of technology into their repertoire.

Keywords: social media, websites, childbirth education

With the advancement of modern technology, the internet has become a standard platform for many forms of communication and education. Considering the median age at last birth for females is estimated to be 40–41 years of age (Eijkemans et al., 2014), the majority of pregnant females fall into the cohort known as Millenials (Ross, 2014). Born between 1978 and 1995 Millenials, also known as the Y2K generation, were influenced by early and ongoing exposure to and the use of technology. In general, this population is comfortable with a variety of technology, and may be referred to as *Digital Natives* as opposed to their parents who may use technology as *Digital Immigrants* (Dingli & Seychell, 2015). Many women in the United States are using social media for both education and social support during the intrapartum period (Asiodu, Waters, Dailey, Lee, & Lyndon, 2015). This article examines options that childbirth educators may consider for integrating social media or other forms of technology into their repertoire.

Internet Websites

The advantages of presenting new information via communication technologies in health care have long been established (Street, 2003). Additional studies have shown that social media enables new ways of access to and sharing of information, social support, emphasize collaboration and participation of the stakeholders involved, and increase individuals' direct participation (Antheunis, Tates, & Nieboer, 2013). Childbirth educators are integrating both online and hybrid approaches in addition to the traditional classroom.

One way for educators to have a centralized location for their material is a personal website. Here, clients have access to educational materials such as links, blogs, and forums. It may also include resources to local childbirth education classes that are hospital based or hospital specific, according to user preference. Links to independent free or low cost classes with flexible scheduling may include examples such as Birth Boot Camp website, (n.d.) or StudyWomb website, (n.d.). Tech savvy educators may build their own personal website, hire an expert to build and maintain it, or simply tap into the many wonderful free websites that are open access. The following are a few additional examples of existing websites for use during the prenatal period.

Learning the Basics of Childbirth

There are many ways to obtain childbirth education on line. Electronic Interactive Simulation (EIS) is an example of

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an effective method of experiential learning (Weatherspoon, Phillips, & Wyatt, 2015). An excellent and realistic website for childbirth education is Surgery Squad (n.d.). Despite its name suggesting it is only for surgical procedures, this interactive website guides the user systematically through common delivery procedures. The use of videos and EIS offer guidance supported by quality evidence amidst being entertained through point and click interaction (Romano, 2007).

Social Media

Habrial (2013) states that one quarter of the world's population uses social media and the numbers continue to grow. Fisher and Clayton (2012) conducted a descriptive study of 111 patients in an outpatient family practice center and found a growing patient acceptance of social media as a communication strategy. Findings include that 83% of respondents used some form of social media and 56% wanted providers to use social media (Fisher & Clayton, 2012).

Digital natives and some digital immigrants use various forms of social media frequently and tapping into these as a resource for education is important. However, if you are not familiar with these media sources, one might feel that they are in a foreign land when asked, do you post, pin, tweet, snap, or text? Understanding the way many childbearing families communicate and share information will help childbirth educators provide the information their clients need.

Facebook

Facebook was launched in 2004 by Mark Zuckerberg. It was initially developed as an online social networking site for college students to connect and share with family and friends. The success of Facebook led to a widespread launch and is open to anyone over the age of 13; and today it is considered the world's largest social network (GCF Global, 2015). Facebook is easy to use and allows members to update their status with posted comments, photos, and links. In addition, they may respond to their friends or family's posts. Setting up a Facebook account allows you to choose levels of security that determine privacy settings.

Twitter

Digital immigrants rely on asynchronous email for a great part of their communication with others. However, digital natives tend to communicate in shorter more instant forms such as instant messaging, text messaging, blogging, or via a social networking site called Twitter (Skiba, 2008). Considered as micro-blogging, Twitter is an online social networking service that enables users to send and read short 140-character messages called "tweets". Registered users can read and post tweets, but unregistered users can only read them. A hashtag (#) is a keyword assigned to information and describes a tweet in order to aid in searching.

As a childbirth educator, you might consider setting up an account and sharing it with your clients. Through short but very effective messages, you may tweet a daily post on any topic you desire. Recognizing and meeting Millenials need for short, instant messages increases the likelihood they will read them. Another bonus for this type of communication is that it requires little time for the educator, yet may reach many clients because anyone who is following you on twitter will see your tweets.

Pinterest

Pinterest differs from Facebook and Twitter in that its focus is about collecting and sharing (GCF Global, 2015). This popular social media website allows users to view the site online or via an app. Free registration is required so that the user may upload, save, sort, and manage images.

As a childbirth educator, you may want to create a personal pin board, give it a name, and then determine if you want it open to the public or only to individuals you invite via email. Here is an example; we created a pin called Integrating Social Media into Childbirth Education and re-pinned a post called *What's in Daddy's Hospital Bag?* As a childbirth educator, you might watch for interesting pins and then share your pin board with your clients.

Instagram

Taking instant to a higher level, Instagram uses pictures or videos to convey messages. This social media site allows users to post and edit pictures. Instagram is generally used as an app on a smartphone so that spontaneous photos may be shared. Photos may be sent privately and directly to friends or posted on other media sites such as Facebook or Twitter. This might be a suggestion for someone who wanted to share their pregnancy or childbirth experience in a series of pictures.

SnapChat

This social network takes instant to the next level of spontaneity and visual fun. Created in 2011 by Evan Spiegel and Bobby Murphy, SnapChat is a social network that allows user to send photo and video messages that disappear within ten seconds (Colao, 2012). Picture or video messages, called Snaps, are shared with friends in real-time. Although the default is for Snaps to disappear from the screen once viewed, friends may decide to keep them as a screenshot. A

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series of Snaps may be threaded together into a flipbook that tells a story.

The usefulness of this media is that the majority of Snapchat's US-based users are between the ages of 18 and 34 (Lipsman, 2014). Clients may be encouraged to share their day-to-day moments of exaltation or frustration as a spontaneous visual message.

Vine

Yet another popular social media is Vine. This media allows the creation of short looping videos that are six seconds or shorter. The point is that one tends to watch the short loop repeatedly and it is especially suited for new baby clips, humor, or other uplifting images.

Text Messaging

Text messaging is very common today and may be used by childbirth educators as a useful tool for communicating to clients. The content of the messages may be any short communication that provides information or directs the person to a web link. Text messaging remains a tried and true method to send either an individual message to one client or a group message to several.

YouTube

Another commonly used website for sharing videos is YouTube. The difference in this media is that it is capable of holding large files that would be too big to send by email and provides a platform for anyone willing to record and post a video.

Childbirth educators may record their own instructional videos, or identify existing ones and recommend them to their clients. Videos may be up to 15 minutes long and a user may create a series of related videos. Videos are easy to share by simply sending a URL or web address link for the relevant internet page and a privacy option is available.

Challenges

Recognizing the benefits and rise of use of social media also requires recognition of the challenges it presents to all health care educators. Stellefson et al. (2014) conducted a study on the number and quality of YouTube videos on the topic of COPD and found that existing video content and quality varies significantly. Househ, Borycki, and Kushniruk (2014) conducted a literature review of the use of social media and reported a risk of misinformation that could result in misleading patients and potentially harming patient safety.

With this in mind, patients should be educated to avoid and/or critically view videos posted by individuals who are not health professionals. Childbirth educators should warn patients and provide them with a list of useful and accurate videos.

Summary

A focus on the age population designated as Millenials supports the use of popular social media sites for childbirth education. This writing is a general review of several popular social media sites and websites that childbirth educators may consider to enhance communication with their clients. While specific content is left to the educator, the use of a variety of media is recommended in order to meet Millenials where they figuratively live: connected, online, and in real time. Cautionary measures to protect patients from misinformation in both video- and text-based health information shared on social media include initiating personal videos, tweets, blogs, or Facebook accounts and warning patients about the potential of misinformation. In addition, when asked, do you post, pin, tweet, snap, vine, or text—say yes!

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Creating an Online Educational Program

by Niloufar Pourfarrokh, MD MS

Abstract: Childbirth education plays an important role in supporting pregnant women and improving their understanding about pregnancy and delivery. Pregnancy related online classes focus on details about pregnancy, prenatal and post-natal care, exercise and nutrition during pregnancy, delivery, and pain management. Online educational websites provide quick access to the latest information and can draw a family in to learn more. This paper focuses on the basic tips for childbirth educators to create an online educational website for childbearing families.

Keywords: childbirth, pregnancy, web authoring software, KompoZer

Introduction

An understanding of physiology of pregnancy and delivery through educational programs helps pregnant women improve their confidence, address their concerns, and support them and their families to prepare for delivery and caring a new baby. Various types of educational programs are available. Today in the technological world, creating an online educational website allows educators to organize all they need to teach online and share updated information in an efficient way. These programs provide flexibility of time and location for educators and the childbearing family and improve the quality of education about pregnancy, delivery, and child care. Some information may be password protected for paying customers. This article includes basic tips for creating an online educational website for child birth educators. (Roberson, 2009)

Creating a Website for Educational Purposes

When designing a website, especially for educational purposes, first think about the logical development and organization of information. You should initially define goals/purpose and decide on the main contents to include. Then find ways to attract the audience to the site and organize the website in a visually pleasing way. For educational websites, adult learning processes, the use of graphics, appropriate colors, and dynamic capabilities such as video and audio recording should be considered (Jenkins, 2009).

Tools to Create Websites

In order to create a website a HTML editor is needed. HTML editors are computer software that are used for designing websites. There are various types of HTML editors such as Adobe Dreamweaver, KompoZer, or Microsoft Expression. In this article, we use KompoZer to demonstrate basic steps of designing a website. This tool is free and can be downloaded easily from their website at www.KompoZer.net. KompoZer is compatible with Windows, Mac, and Linux operating systems. (Heng, 2014a)

Steps to Design Websites

The following section provides basic instructions for designing a website using KompoZer web authoring software.

1. Create an HTML folder (for example, MYWEBPAGE) on your local desktop. This folder helps you save all of your webpages in an organized fashion.
2. Open the KompoZer.
   On the KompoZer start-up window, there are the following panes: (see Figure 1)
   - Menus on the top line (red and orange arrows)
   - A left panel called site manager (Purple arrow)
   - A large pane on the right site of the window. This pane is the main place to write the web contents and to design the web pages (black arrow) (Heng, 2014a).

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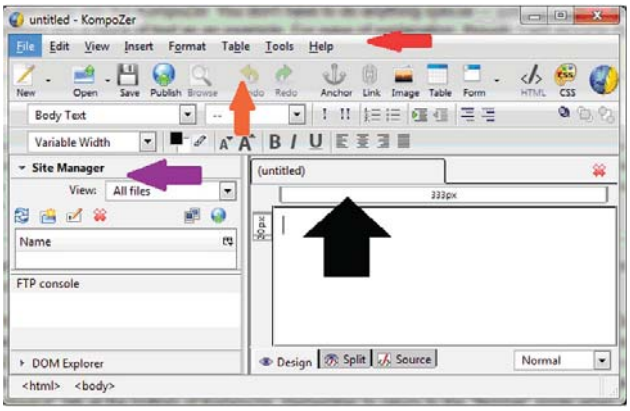

Figure 1

3. Tables are highly recommended to organize contents. To insert tables, click on "table" icon in the top menu toolbar, click on "insert" (see Figure 2).You can change the size of your table, merge the cells as well as changing the color, table alignment (see Figure 2).You can now include all contents including texts, links, graphics, in the table.

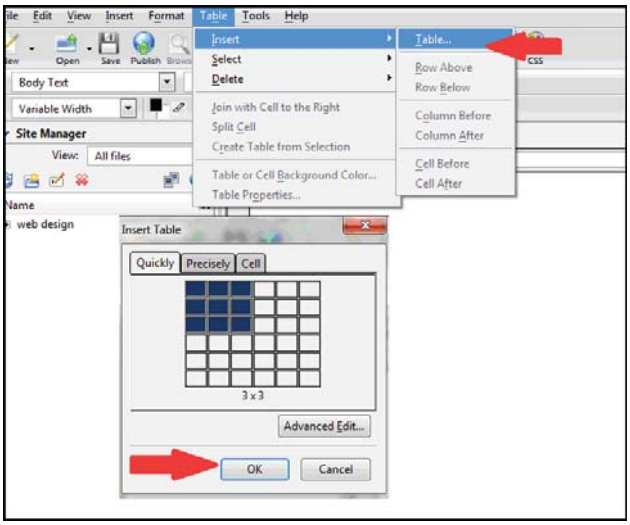

Figure 2

4. Adding graphics to visually attract the audience and to improve the quality of content. First, save all pictures in a separate folder in the HTML folder you already created on your local computer (Heng, 2014b). To add graphics, click on the cell where you wish to add the visuals. Then click on the "Insert" tab on the top menu toolbar, and click on "Image" and choose the file. After you add the image, type a name for your image in the "Alternate" field followed by a period (.). You can change the size of the picture from its actual size to a custom size by clicking on the "Dimension" tab. Click Ok to attach the figure (Heng, 2014b). (see Figure 3)

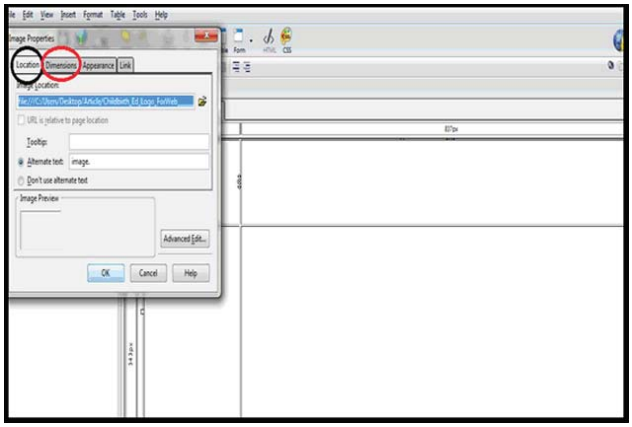

Figure 3

5. Add text in Normal mode of the KompoZer and type in the cells you have already inserted. KompoZer converts the texts into the HTML codes (Heng, 2014b).
6. Save HTML pages. In order to save it, simply click on the file (on top toolbar) and click "Save as". Once clicked, a dialogue box will pop up, now name your web page (see Figure 4)

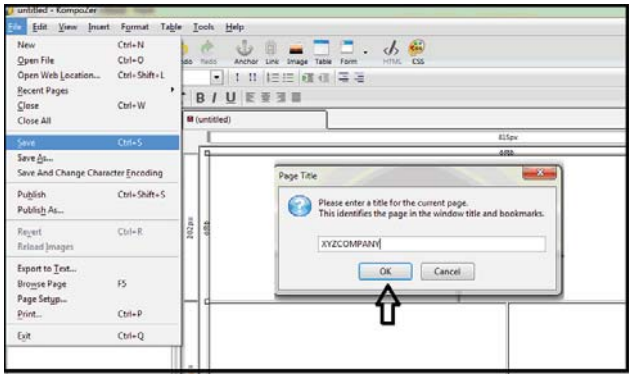

Figure 4

Once you click OK, another dialogue box will appear to define your file name. Type index.html (written in lower case) and save the page in the html folder you have already created. Do not use another name, as most hosts expect the main page of your websites to be called index. html (Heng, 2014c).

7. Adding more pages. You may want to add more pages to your website. In order to do that, click on the "New" icon in the Menu toolbar to open a new page. Then name your page and save the page in your HTML folder as example.html.

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Creating an Online Educational Program

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8. Link webpages: You may want to link you webpages to each other. To do that, on the navigation pane/cells (where you want to add links), type the name of the webpage, then highlight the name and click on the "Link" icon on the top menu toolbar. A dialogue box will pop up. Then in front of "Link Location", click on the browse icon and select the page that you want to link. You can also link your webpage to images or external website. (Hint: do not move the linked web pages and pictures or file from the folder as your links and pictures will be broken when you publish your website) (Heng, 2014a) (see Figure 5)

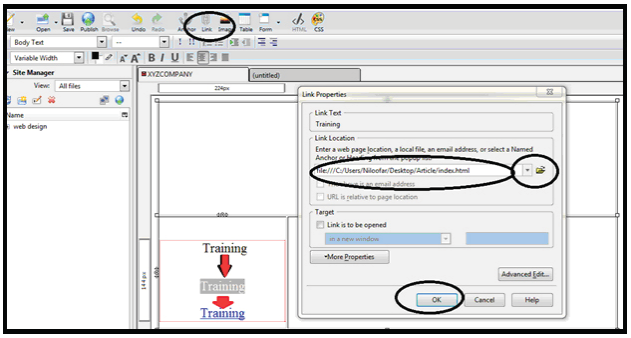

Figure 5

9. Adding interactives to webpages. Making web pages interactive is one of the ways to attract audiences to the webpages. There are different ways to make the web pages interactive such as buttons, rollover links, etc. for a simple function such as rollover links, you can add the related HTML code to your HTML Mode of your webpage.(Jenkins, 2009). You can easily find the codes online for free for many interactive functions. Kompozer is WYSIWYG web authoring software (What You See Is What You Get) (Jenkins, 2009).
10. Publishing the website. To publish your website take the following steps:
    - Choose a domain name. In order to choose a domain name such as BABYBUMPCLASSES.com you should register in a domain name registrar website. There are a variety of domain name registrars, and you can get your domain name for free. Examples of domain name registrars include Godaddy.com, namecheap.com, 1&1.com, and register.com (Heng, 2014c).
    - Sign up with a hosting company/remote server to upload your website files directly to a remote server. By signing up you will be given a FTP address (File Transfer Protocol), username and a password by which you can connect to your web hosting website and transfer your web files from your local computer. Examples of these web hosting websites are Easyspace.com, Squarespace.com, Dream host.com, Godaddy.com, web.com (Heng, 2014a).
    - To publish your website, click on "File" on the top menu toolbar and click on "Publish" icon and on the "Setting" tab in the "Site Name" field enter your HTTP address of your web page that you got when you registered the website and the server.
    - Enter your FTP address, your user name and password in the required field.
    - Click Publish tab, check box "include images and other files" in the "Publish" dialogue box. Then click on the "Publish" button. KompoZer will now connect to your FTP account and will upload your pages. You can now test your website in your web browser (Heng, 2014a)

Conclusions

Child birth education is very critical for pregnant women and their family in order to understand the physiology of pregnancy and delivery. These programs help moms to reduce their pregnancy related concerns and support them to prepare for delivery and prenatal care.

Creating an online educational program that is professional and well-designed a critical way to improve quality of education for child bearing families.

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Enhancing Childbirth Education through Technology

by Melanie Daniels, RNC-OB BA and Joyce Ann Wedler, RN

Abstract: This article discusses how health information technology is utilized in maternity care settings, and the impact technology has on childbirth education and labor and delivery. Information is provided on electronic technology such as mobile devices and electronic health records may help expectant women to be more empowered in making informed decisions throughout pregnancy.

Keywords: technology, mobile devices, electronic health records, personal health records, childbirth education, prenatal care

In the 21st century, technology will continue to advance rapidly and become the norm in healthcare rather than the exception. Mobile devices such as iPads and smartphones help us to be connected to friends and families. Gadgets such as Fitbit and BodyBugs encourage us to get moving and be healthier, and social media, like Twitter and Facebook, allows us to talk about it. Even hospitals have become high tech, using robotics and telemedicine to diagnose, treat, and care for patients. Nursing and Medical Informatics is taking its place in history, pushing technology further into healthcare. However, what about something as timeless as pregnancy and giving birth? How does technology fit in with pregnancy and childbirth and, as childbirth educators, how can we educate expectant parents when everything they need to know appears at their fingertips or the push of a button? The following discussion will look at technology and its impact and ability to enhance childbirth education, perinatal, and intrapartum care.

Prenatal Childbirth Education: Its Impact on the Prenatal and Intrapartum Experience

Many women will turn to friends, family, or colleagues for advice on which doctor to choose, what to expect over the next few months, and recommendations for babysitters, nannies, or daycare. Childbirth educators, as well as any healthcare professional caring for this unique patient population, need to intervene early to ensure that accurate, evidence-based information is being delivered throughout the pregnancy.

Childbirth education classes, whether delivered in person or via technology, have a significant impact on pregnancy and birth. The primary purpose of childbirth education is to educate expectant parents about birth and early parenting. Labor and birth are normal and natural human experiences, but maternity care delivered throughout the world today is increasing in intervention. This phenomenon is reflected by the increasing number of elective labor inductions and high rates of cesarean section (Lothian, 2008; Simpson, Newman, & Chirino, 2010; Regan, McElroy, & Moore, 2013). However, Simpson, Newman, and Chirino (2010) found that women who attend childbirth classes were not only less likely to have an elective induction, but that they were more satisfied with their overall birth experience. By providing evidence-based information, childbirth educators can help to empower women to make informed decisions (Bingham, 2005).

women who attend childbirth classes are less likely to have an elective procedures and are more satisfied with their birth experience

Nursing and Technology: What to Expect When They Are Expecting

Today's expectant parents are technologically savvy and only a fingertip away from childbirth self-education (Fleming, Vandermause, & Shaw, 2014). Information via technology is convenient and can be retrieved in seconds, but the results may be inaccurate, inconsistent, or poorly referenced (Fleming et al., 2014). Childbirth educators need to ensure that when a woman is "Googling" a pregnancy question, evidence-based materials are available. Women need to be informed from the early weeks of pregnancy as to which

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internet resources contain accurate information and which they should ignore. Childbirth educators and other health care professionals play a significant role in teaching expectant parents fact from fiction.

With the technology comes new ways for childbirth educators to practice. Because childbirth classes are not mandatory, and information from the internet is easily accessed, attendance in Lamaze classes has dropped significantly and this has spread to other approaches to childbirth education as well (Budin, 2014). For those women who do elect to enroll in traditional childbirth education classes, attendance is usually not until the 3rd trimester of pregnancy. Now, women come to childbirth classes already armed with the information found on the internet, social media, and television (Lothian, 2008). Many women have already decided how they would like to give birth even before becoming pregnant (Regan, McElroy, & Moore, 2013). A woman who experienced a primary cesarean delivery with her first child may only seek out a provider and hospital that can accommodate her desire for a trial of labor after cesarean (TOLAC). Childbirth education needs to begin in the preconception period or, at the very least, in the first few weeks of pregnancy (Lothian, 2008; Regan, McElroy, & Moore, 2013).

The Internet's Role in Pregnancy

For patients and consumers, information seeking through the internet has become one of the easiest ways to learn about health-related information. In the United States, it is estimated that over half of the American population use the internet to obtain information about their health (Richter, Muhlestein, & Wilks, 2014). Because there are no controls over quality of content, health care professionals have the responsibility to recommend appropriate sites. Patients may search for health-related information, but never consult healthcare providers about what they learned, leading to inaccurate information and possible harm.

Information can be confusing, overwhelming and harmful without proper guidance, especially if there are barriers such as cultural background, language, and literacy. In a study by Gao et al. (2012), researchers found that like western countries, Chinese pregnant women often turn to the internet for advice to relieve worries throughout pregnancy. Fetal development was the most sought out information retrieved from the internet with both Chinese and Swedish women (Gao et al., 2012; Larsson, 2009). General pregnancy information and antenatal pregnancy complications were also frequently searched (Lagan, Sinclair, & Kernohan, 2010). In most studies about the internet and pregnancy, researchers expressed concerns surrounding the issues of credibility, reliability, and accuracy of the websites women visited. Lagan et al. (2010) warns that all healthcare providers need to be aware that pregnant women are actively seeking information online regarding pregnancy. Childbirth educators and other healthcare providers should be supportive of patients, teaching them how to interpret and apply the information retrieved from internet sources.

Childbirth Education through Social Media

Social media is an important internet tool that hospitals, clinics, and childbirth educators can use to disseminate important pregnancy-related information. According to the Centers for Disease Control and Prevention (CDC) (2011), "using social media tools has become an effective way to expand reach, foster engagement, and increase access to credible, science-based health messages" (p. 1). It is important for childbirth educators, hospitals, and primary health care providers to recognize the powerful impact that social media can have on delivering quality health-related information.

Popular social media sites such as Facebook and Twitter have the potential to allow information dissemination to patients in every corner of the country or even the world. According to Richter, Muhlestein, and Wilks (2014), social media can be used by healthcare organizations to engage consumers through marketing strategies and dissemination of educational information. It is important to recognize that today's consumers of childbirth education materials have grown up using the internet and social media applications. To more effectively engage young women, Livingston (2015) refers to this population as "Digital Natives" and challenges childbirth educators to incorporate the use of social media in all childbirth education programs.

The Impact of Personal Health Records on Prenatal Care

Disseminating educational information to expectant parents is an important responsibility of childbirth educators. However, in the electronic age, patients also have access to their medical records through patient portals that may or may not be linked to a particular facility's electronic medical record (EMR). There are several advantages to personal health records (PHR) for both patients and providers. These include family health management, care coordination, emergency care while traveling, and secure communication between patients and providers (HealthIT.gov, n.d.). Childbirth educators have the unique position to help maternity

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patients interpret antenatal health records with the goal of empowering women through knowledge.

More and more healthcare providers are encouraging their patients to establish and access their PHR. Pregnant women display high levels of information seeking behavior; the ability to access and utilize information in the PHR may lead to a deeper understanding of health conditions and increased involvement in healthcare delivery (Forster, Dennison, Callen, Georgiou, & Westbrook, n.d.). A study by Duran, Mihalas, and Galuscan (2010) found that a pregnancy PHR needs to have some unique features including nutritional advice, medication information, and information about how to prepare for labor and delivery. Childbirth educators affiliated with agencies using PHR could use the opportunity to provide links, through the PHR, to evidence-based prenatal information.

The Role of Smartphones and Mobile Technology in Childbirth Education

Cell phone usage is increasing significantly, arriving in labor suites all over the world. According to the study, *Listening to Mothers III* (2013), as many as 64% of pregnant women are using their smartphones to gain access to pregnancy and birthing information (as cited by Fleming et al., 2014). Concerns exist that unregulated mobile phone applications, referred to as 'apps', are providing inconsistent, inaccurate, and often fragmented information regarding labor and delivery, increasing the possibility of frightening pregnant and first-time moms (FTMs) (Fleming et al., 2014)". Quick and easy access to information about all aspects of pregnancy and childbirth allows pregnant women and FTMs to self-educate via electronic media, cutting out the patient/provider relationship (Fleming et al., 2014).

Smartphones now play an essential role in pregnancy and delivery, and the influence on self-education and health-seeking behavior. As with the internet, Childbirth Educators can instruct their patients to look for 'About us' and 'Contact us' and sponsors of the apps they are considering downloading (Fleming et al., 2014). Childbirth educators can also suggest phone apps or hyperlinks they find credible and reliable (Fleming et al., 2014).

According to Tripp et al. (2014), there are more pregnancy apps than for any other health topic, enabling women to track their pregnancies, communicate with others and to potentially alleviate anxieties through interactive consultations. These apps provide a broad range of maternal and fetal topics, with many offering advice and guidance creating a plethora of information at the touch of a button. Many patients use interactive apps to record and track information. Some apps allow questions that might be uncomfortable to ask a health care professional, to be asked in a mask of privacy which may contribute to an intimate and non-judgmental relationship with a smartphone (Tripp et al., 2014). Other apps that can monitor fetal heart rate by holding the phone to one's belly or calculate due date or healthy weight gain can cause unnecessary worry or false reassurance (Tripp et al., 2014). Childbirth educators have the responsibility to have discussions with patients about technology and its role in childbirth education.

there are more pregnancy apps than for any other health topic

Technology and the Woman on Bedrest

Bedrest, either at home or in the hospital, can be long, lonely, and worry-filled. As others go about their busy days, the woman on bed rest must rely on others and restrict her own movements (Alcade, 2011). Because women are restricted to their homes and most often their beds they may be unable to communicate with others in person to share their experiences, ideas and suggestions and even their worries (Rubarth, Schoening, Cosimano, & Sandhurst, 2012). Online discussion chat rooms provide a way for women to communicate with others including other mothers, and to find answers, support, and encouragement during their time on bed rest (Rubarth et al., 2012). In a study by Alcade (2011), women reported, "searching through blogs and websites to read success stories as a way to remain hopeful" (p. 217). Many women in the study also used the internet to increase their knowledge and research their diagnosis in order to have meaningful discussions during visits to their obstetrician and other healthcare providers (Alcade, 2011).

Although concerns for inaccurate information in discussion rooms exist, childbirth educators can help women on bedrest find meaningful, accurate information about their pregnancy and special situations. Directing mothers-to-be towards educational videos online are also an option as many healthcare organizations provide wellness videos through sites such as YouTube. Childbirth educators can also improve health literacy by steering patients to websites such as the NIH Library of Health and Healthfinder.gov, which can provide a wealth of information for the childbearing family. The use of computers and the Internet can play a significant role in the daily life of women on bed rest (Alcade, 2011).

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The 21st Century Dad

Today's fathers want to play a role in pregnancy, childbirth and the raising of their children, but research shows that men's inclusion of childbirth education is mostly absent (Guadagno, Mackert, & Rochlen, 2013). "Advancing research on men and pregnancy is conspicuously absent from the Healthy People 2020 objectives" (Guadagno et al., 2013, p. 525). More research is needed, and more education should be provided to fathers regarding pregnancy and childbirth. Attention to this field could improve health campaigns, establish policies, enhance public health, and lower healthcare costs (Guadagno et al., 2013).

Childbirth educators through technology can encourage the father's involvement in prenatal care, enhancing the pregnancy and increasing positive outcomes. Web-based male-only antenatal groups have recently been found to be successful in involving men and providing information to be successful partners in the birthing process (StGeorge & Fletcher, 2011). However, social marketing tactics, such as mobile apps and websites, are geared exclusively towards women and pregnancy, leaving men mostly excluded (Guadagno et al., 2013). Many women report using technology to inform their partners, mainly first-time dads, about pregnancy related information by email or text messages (Kraschnewski et al., 2014). More father-related websites, apps, and other internet-based resources are needed, and childbirth professionals are tasked with staying abreast of the health information technology that is current and available (StGeorge & Fletcher, 2011). Childbirth educators should guide fathers, like mothers, towards credible and reliable pregnancy and childbirth information available via the internet.

The Labor & Delivery of Electronic Health Records

Electronic health records (EHR) systems are advancing rapidly among all specialties because of technology, economic, and policy factors, but many challenges remain in gynecology and obstetrics (Eisenberg, Hom, & Sharp, 2013). Pregnancy involves longitudinal care combining visits and diagnostics that are then combined in an 'episode of care' (Eisenberg et al., 2013). Physicians, nurses, and childbirth educators care for both the mother and baby throughout a woman's pregnancy using EHRs. Because most EHRs do not provide records for the fetus, providers are left without tools to document care and interventions (Eisenberg et al., 2013).

The EHR is designed to put digital information in an electronic format to be used by patients and providers at anytime and anywhere. This information can be accessed using many different types of devices such as flash drives, web-enabled interfaces, personal computers, smartphones or tablets (Hawley, Janamian, Jackson, & Wilkinson, 2014). According to Hawley et al. (2014), their study showed that most women preferred to have the paper-based health information that they could easily access and show to their husbands, family, and friends. Childbirth educators will need to consider how pregnant women prefer to receive information about their pregnancy and that the paper hand-held record may still be a valuable tool.

In the labor and delivery suite, labor and delivery nurses can use EHRs to their advantage if they are willing to relax and let their patients see what is going on and what is being documented (Peck, 2014). Overcoming barriers and allowing patients to engage in the computer process can lead to increased satisfaction in patient-provider relationships (Peck, 2014). Explaining to expectant parents what is being charted, showing them graphs and pictures and listening to their concerns are ways to encourage a trusting relationship.

Key Points:

- Almost every interaction with a pregnant patient is a teachable moment.
- The public is gaining information about pregnancy and birth from the internet and other sources.
- Earlier contact with patients may encourage more women to consider "normal birth" and decline interventions.
- Childbirth educators have a unique position to help steer women to credible, evidence-based information available on the World Wide Web.
- Having access to credible educational materials via technology may create a more supportive birth partner.
- Electronic health records (EHR) and Personal Health Records (PHR) are now standard documentation. Childbirth educators can help patients understand these documents and put them to meaningful use.

Conclusion

The impact that childbirth education can have on the prenatal and intrapartum experience is well documented. Educating pregnant women about available birth choices empowers women to make informed choices during both their prenatal appointments and during labor. Expectant parents in today's society have unlimited information available to them through technology. Whether it is an application on

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a mobile device, social media or the internet, how women are educating themselves about pregnancy and birth is changing. It is important for childbirth educators, midwives, nurses, and all other healthcare providers to embrace technology and its ability to deliver evidence-based information.

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Education Technology
to Service a New Population of eLearners

by Patti Urso, PhD APRN ANP-BC CNE and Lorraine Rodrigues Fisher, EdD RN

Abstract: New adaptations for the approaches to delivering childbirth education are imperative if we are to engage learners in this era of technology. The large number of learning tools available can overwhelm the senses and yet provide an exciting environment for the educator to innovate lessons in a manner never possible before. 3D virtual worlds are at the cutting edge of today's teaching modalities. A review of the steps in constructing and adapting objectives, as well as tools available for innovating online lessons is presented. A demonstration of the availability of virtual reality (VR) streaming technology to gain access to the birth experience is included.

Keywords: childbirth, education, virtual, simulation, millennials

Approaches to teaching younger adults are evolving influence the way we engage them during childbirth education. Today's younger adult learners are known as the Millennials (18 to 29 years) and Generation X (30 to 45 years), both born after 1980. Befitting their era, they are popularly known as the "digital natives," a term coined term by Prensky in 2001. This group of individuals has not had to adapt to new technologies. On the contrary, this generation is known for their avid uses of it. Born into the age of social media they are Internet connected, users of mobile technology, and connected through social networking and 81% are active in Facebook. (Pew Research Center, 2014)

From what we know about Millennials and Generation X, we can conclude that they are engaged by social networking sites, video games, and according to the Pew Research Center (2010) one-in- five members of the millennial group have posted a video of themselves online. In addition, the millennials believe that technology make their lives easier and helps them keep connected with family and friends.

In order to successfully provide educational experiences for the millennials, savvy educators consider how to use technology effectively. Exploring the myriads of educational technology and tools that can be used can be overwhelming. The latest available tool that can be used for teaching is the virtual reality (VR) is always changing. Educators are able to construct fascinating virtual environments where real experiences can be created and recreated to provide a fertile ground for simulated lessons and assessments. Virtual reality has become a solution to the challenges of finding clinical experiences for undergraduate and graduate nursing students. For example, helmets are used to experience simulated health care settings that produce a sense of reality and provide the clinical experiences that develop critical thinking skills for all educational levels of nursing students. Additionally these experiences facilitate the transition from student to graduates. Today, virtual reality has a central place in enhancing online education where feelings of isolation and anonymity experienced by students have been ameliorated (Simpson, 2002). A guide to the latest virtual reality or virtual environment technologies, which can be used in childbirth education as tools for teaching mobile learners, are presented with some basic specific online teaching approaches for the instructor. Some examples of the technologies discussed are: creating a virtual health care provider, creating virtual scenario of the prenatal health care experience and the virtual experience of giving birth.

Developing Objectives and Selecting Teaching Strategies for Mobile Learners

Begin with the development of a set of measurable objectives, similar to what could be comparable to achievement expectations in a traditional face-to-face classroom. The teaching strategies and tools can be designed to deliver information that engages the various types of learners and helps them retain what is learned. The modes of communication between teachers and students are the variants in mobile learning environments.

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Two important aspects to consider for a successful outcome is first, that technical support is available when the technology is used to assist faculty and students as needed. The second aspect to consider is that there are faculty who have the knowledge and skills for providing supportive instructor-student interactions using this technology. Successful outcomes are measured by assessments which are directly aligned to the objectives of the course and the activities designed to achieve them. (see Table 1)

Figure 1. Process for developing childbirth classes for mobile learners

Online Educational Resources

Developing activities for the eLearner includes a myriad of choices. The selections are based on the purpose of the lesson with the content directly linked to the objective and assessment. The most interactive of all the activities are those related to the virtual reality or virtual environment worlds that serve as a community engager (O'Connor, 2012). Table 2 has an organized list of possible educational technological resources that can be used depending of the purpose of the learning activity (Edudemic, 2012). (see Table 2)

3D Virtual Worlds: Utility in Childbirth Education

Multiple platforms exist which allows for cases to be created in a simulated virtual world to produce a sense of reality. This simulated reality is experienced through the use of avatars, virtual versions of self and others, living in virtual worlds which depict a case or a situation for the purpose of learning. These have become popular in health care education; Second Life by Linden Lab's is thought to be at the top of the popularity list (Boulos, Hetherington, & Wheeler, 2007). The use of Second Life for engaging a community of learners can be used effectively for instruction as well as assessment.

The Present Is the Future: Virtual Birth Experience

It is now possible to place an individual virtually into the birthing room in real time through SamsugLife-LIVE steaming using VR goggles. See how a father that is

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Table 1. Aids for Developing Objectives for Online Childbirth Education Courses

Aids to Develop Objectives	Description	Potential Uses
Illinois Online Network		
www.ion.uillinois.edu/resources/tutorials/id/developObjectives.asp	Reviews on basic principles for developing measurable objectives.	Resource for instructors for developing measurable objectives
University of Colorado Center for Faculty Development		
www.ucdenver.edu/faculty_staff/faculty/center-for-faculty-development/Documents/Tutorials/Assessment/index.htm	Modular online course on objectives and assessment alignment.	Helpful review for instructors on aligning objectives with activities and assessments.
Arizona State University		
www.teachonline.asu.edu/objectives-builder	Step by Step Objective Builder	Helpful in developing measurable objectives desired of the mobile learner using Bloom's taxonomy. Also has a quick review helpful for new instructors
DePaul University Teaching Commons		
www.teachingcommons.depaul.edu/Course_Design/developing_a_course/courses.html	Overview of how to develop an online course	Useful tips on developing an online community and digital communication to engage instructors and students.

Table 2. Possible Educational Technological Resources – Depending on Purpose of Learning Activity

Purpose	Type	Registered Names	Links	Uses
Information Delivery	Audio and Visual	You Tube	www.youtube.com/channel/ UC3yA8nDwraeOfnYfBWun83g	Video Recordings How to make your own video channel www.reelseo.com/edu-playbook
	Screencasting	Jing	www.techsmith.com/jing-features.html	Videoscreen Capture with audible narrative
		Screencast	www.screencast.com	Videoscreen Capture with audible narrative
	3D Simulated multimedia	Second Life	www.childbirtheducation.blogspot. com/2009/07/birth-in-second-life.html	Childbirth Educator Training on Second Life
Memory Retainers	Online Games	Stencyl	www.stencyl.com	How to make a game with Stencyl youtube.com How to make online games www.wikihow.com/Make-Online-Games
		Quizlet	www.quizlet.com	For developing study tools for example flash cards which assist with memorization.
Community Building – socialize, connect and chat	3D Virtual Worlds	Virtual Ability	www.virtualability.org/community	www.virtualability.org/virtual-world-locations
		Second Life	www.my.secondlife.com/obgyn.magic www.sarah-stewart.blogspot. com/2009/01/giving-birth-in-second-life.html www.slideshare.net/midwikied/ midwives-meeting-in-second-life-9308?src=embed	Free Video and text Chat Animated Birth Unit Professional Meetings
	Facebook	Facebook in Education	www.facebook.com/education	See The Facebook for Educator Guide at: www.facebook.com/notes/facebook-in-education/sharing-resources-and-stories-on-digital-learning-day/10152528989295570
	Facebook like	Edomoto	www.edmodo.com	Facebook-like which connects classes online.
	Wiki	Wiki spaces	www.wikispaces.com	Collaborative spaces for sharing online lessons, media, and other materials by building own Wikis.
	Blogs	Edublog	www.edublogs.org	Safe and secure places to create blogs for students and instructor
	Tweets	Twitter	www.twitter.com	Communicate with students and colleagues
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Instructor Student Communication	Skype	Skype in the Classroom	www.education.skype.com	Social learning by connecting students with one another and opening new connections worldwide.
	Adobe Connect	Adobe Education Exchange	www.edex.adobe.com	Share and discuss and connect
Video Role Play	You Tube		Men Experiencing Childbirth Pregnancy Simulator	www.youtube.com/watch?v=piRVp1EJJl4 www.youtube.com/watch?v=5H6MmJvs_Mg
3D Virtual Worlds	Simulated multimedia	There	www.there.com	Main website- Demos
		Active Worlds	www.activeworlds.com	Main website-Demos
		Second Life	www.secondlife.com	Second Life- Examples of Individualized birthing experience www.youtube.com/watch?v=K4XDC17URII www.youtube.com/watch?v=P58y63Ujj14
		Pooky Media	www.pookymedia.com	Midwifery Training www.slenz.wordpress.com/2009/08/24/ slenz-update-no-131-august-24-2009
	Simulation Games	Surgery Squad Virtual Surgery and Patient Education	www.surgerysquad.com/surgeries/ natural-child-birth	Natural Birth
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		Surgery Squad Virtual Surgery and Patient Education	www.surgerysquad.com/surgeries/virtual-c-section-cesarean-surgery	Virtual C-Section
		ITunes Application Natural Childbirth	www.itunes.apple.com/us/app/natural-child-birth/id646852531?ls=1&mt=8	Natural Childbirth

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Educational technologies are being used all around the world, in all of the health care fields to teach patients and students. 3D Virtual Worlds have the greatest degree of appeal, particularly for younger adults, and seem to have the greatest versatility for engaging groups as well as forging learning communities. The evidence for the effective use of these technologies in healthcare education is mounting, but is still in its infancy in the area of childbirth education. Opportunities exist to explore their efficacy in this area.

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Land-Based Exercise During Pregnancy

by Helen M. Binkley, PhD ATC CSCS NSCA-CPT FNSCA ATRIC, Jean L. Binkley, MSN FNP MED BSN-RN, and Stephanie L. Wise, MS ATC CSCS

Abstract: In the absence of any contraindications, exercise during pregnancy has been shown to be extremely beneficial, not only for the mother, but for the fetus as well. It helps to ease pregnancy-related symptoms, maintain glycemic control, and to reduce or maintain pregnancy and post-partum weight gain. Exercise does not affect fetal birth weight, fetal size, or gestational age negatively. The purpose of this article is to inform providers about new research guidelines to be used when recommending exercise, and what modifications may be necessary when talking with their patients.

Keywords: Pregnancy, exercise, strength training, prenatal outcomes

Land-Based Exercise during Pregnancy

Over the past 60 years, much has changed in our knowledge of exercising while pregnant. In 1985 that the American College of Obstetricians and Gynecologists (ACOG) came out with its first guidelines of exercise and pregnancy (ACOG, 2002). Those guidelines were edited and re-released in 2003 with a supplement document of frequently asked questions released in 2011. There still lies a gap between the healthcare provider and patient, with up to 86% of doctors of osteopathic medicine unaware of the new guidelines, who are still cautious when recommending exercise to their patients (Bauer, Broman, & Pivarnik, 2010). Childbirth educators are in an ideal position to recommend safe exercise in pregnancy. This article aims assist when choosing different types of exercise and to provide examples of appropriate programs based on previous exercise level.

Exercise Knowledge and Activity Level

Decades ago, providers limited the maternal heart rate (HR) to no more than 140 beats per min and limited any strenuous activities to no more than 15 minutes. While research now shows that this guideline is no longer needed, 64% of providers still believe in limiting the HR (Bauer at al., 2010). Most of women (73%) believed that moderate exercise was beneficial and 13% believed that vigorous exercise was beneficial during pregnancy (Evenson & Bradley, 2010). Exercising during pregnancy is recommended for both those who exercised before pregnancy and those who did not (Barsky at al., 2012). The majority of women, 71.3%, reported to have exercised or participated in activities before becoming pregnant, and about half of those (47.4%) reported that they continued during their early pregnancy (Fell, Joseph, & Armson, 2008). The remaining 28.7% of women did not participate in any exercise or activities before pregnancy, but 11.1% of those women did decide to initiate exercise during their early pregnancy (Fell et al., 2008).

Benefits to Exercise

Low back pain, attributed to the increased uterine size and compensation on a woman's center of gravity, is a common complaint. Exercise has shown to help decrease back pain intensity (Sternfeld, Quesenberry, Eskenazi, & Newman, 1995) and improve functional ability in those who participated in a 10-week exercise program (Kluge, Hall, Louw, Theron, & Grové, 2011). Women who only participated in a stability ball program reported less low back pain during their third trimester (Yan, Hung, Gau, & Lin, 2014). Exercise can also help keep weight within recommended limits. Significant differences in weight gain exist between those who exercise and those who do not (Haakstad & Bø, 2011).

A concern during pregnancy is the development of gestational diabetes mellitus (GDM). While obesity rates continues to rise, maintaining glycemic control is even more important, as developing GDM poses a greater risk to both

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the mother and fetus during pregnancy but can have an effect on the child later in life, and their children as well. About 4-12% of all pregnancies result in the development of GDM. All women are tested between 24-28 weeks gestation, as per international standards (Barakat, Cordero, Coteron, Luaces, & Montejo, 2011). Although diet is important in maintaining good glycemic control, diet and exercise together improve the mean fasting glucose and less insulin is required in women who exercise versus their non-exercising counterparts (De Barros, Lopes, Francisco, Sapienza, & Zugaib 2010; Jovanovic-Peterson & Peterson, 1991),

Exercise during pregnancy improves sleep, increases energy, reduces constipation, and may be associated with an easier and shorter labor and delivery (Evenson & Bradley, 2010).

Exercise and Pregnancy Related Outcomes

Numerous research studies have been conducted looking at the effects of exercise on multiple fetal outcomes, finding no adverse effects on fetal birth weight, gestational age, and fetal size (Haakstad & Bø, 2011; Kumaran & Tamilvanan, 2013; Nascimento, Surita, & Cecatti, 2012). The variation of exercise frequency and intensity (vigorous exercise 5+ sessions/week, 3-4 sessions, 1-2 sessions, no aerobics, no exercise) did not have any difference on the birthweight, GA, or head circumference of the newborn, as well as those who exceeded the old ACOG guidelines (Haakstad & Bø, 2011). Women who had GDM and did not follow an exercise regimen actually increased the odds of having a birthweight over 4,000 grams than those who did exercise. The combination of pre-pregnancy weight and not exercising during pregnancy showed a positive correlation to the body weight of their newborn (Barakat, Lucia, & Ruiz, 2009).

Women who strength train during pregnancy do not show any differences in fetal outcomes. The length of the newborn and gestational age was not significantly different from those women who did no strength training during their pregnancy (Barakat et al., 2009). A 12-week aerobic and strength program revealed no differences in gestational age among women (Kumaran & Tamilvanan, 2013).

Women who continued to exercise during the third trimester did not show a difference in their BMI in the third trimester than those who did not exercise; however, the same women did have a significantly lower post-partum BMI than the non-exercisers (Downs & Hausenblas, 2007). Women who exercised also had an improvement in their quality of life in regard to general health, bodily pain, physical function, and may be more likely to participate in fun social activities and hobbies (Montoya Arizabaleta, Buitrago, Aguilar de Plata, Escudero, & Ramirez-Velez, 2010) .

Beginning a Land-Based Exercise Program

With any exercise program, it is important to start slowly and progress gradually as strength and endurance allows. More importantly, pregnancy is not the time to start new and intense exercise programs. Intensity interval training, crossfit, heavy weightlifting, or contact that can place a higher risk on the mother and fetus. It is usually safe to continue most types of exercise that were initiated before becoming pregnant. Some modifications may be necessary, and certain conditions may arise that may prevent initiation or continuation of an exercise program. These are listed in Table 1.

Table 1. Absolute and Relative Contraindications

Absolute Contraindications	Relative Contraindications
Incompetent Cervix	Severe Anemia
Persistent Vaginal Bleeding	Extreme Morbid Obesity
Placenta Previa after 26 weeks gestation	Extremely underweight
Premature Labor	Intrauterine growth restriction
Pregnancy Inducted Hypertension Restrictive Lung Disease	Poorly controlled hypertension, seizure disorder, thyroid disease
Pre-eclampsia	Orthopedic limitations
Uncontrolled Diabetes or other systemic disorder	Maternal Cardiac arrhythmia

Adapted from (Artal & O'Toole, 2003; Barsky et al., 2012)

Body Changes That May Affect Exercise

The body goes through multiple physical and physiological changes during pregnancy. Multiple cardiovascular changes are seen such as an increased heart rate, both at rest and with exercise and blood volume increases up to 45% There is also an increase in stroke volume and cardiac output (CO). As early as 24 weeks gestation, CO may increase by up to 40% (Olson, Sikka, Hayman, Novak, & Stavig, 2009). After 30 weeks gestation, CO is greatly influenced by body position; prolonged, motionless standing results in a decreased CO. Increase in respiratory rate up to a 50% and increase in oxygen consumption by 15-20% during exercise (Olson et al., 2009) occur during pregnancy due to the expanding uterus and pressure placed on the diaphragm, increase in body weight, and decreasing lung capacity. Women can feel "out of breath" more frequently, sub-maximum and

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maximum levels of exercise are usually hindered due to the decreased oxygen availability (Artal & O'Toole, 2003). Lastly, pregnant women experience orthopedic changes with the biggest change in ligamentous laxity due to the release of the relaxin hormone (Artal & O'Toole, 2003; Olson et al., 2009). Once pregnant and laxity increases, range of motion can increase and place more stress on certain joints. The metacarpophalangeal joint is most affected; however, research fails to show an increase injury rate in other joints due to ligamentous laxity (Calguneri, Bird, & Wright, 1982). An increase in body weight and breast size, and a change in the center of gravity, can cause women to feel more off balance, and should be taken into consideration. All of these factors are relevant to consider when selecting an exercise.

The type of exercise chosen should be something the woman will enjoy and adhere to…

Exercise Prescription

In the absence of any contraindications, women may continue with their current exercise regimen, and those who were previously inactive may begin exercise. The type of exercise chosen should be something the woman will enjoy and adhere to during pregnancy and post-partum. Many different types of activities are available to help maintain fitness during pregnancy and are listed in Table 2. Cross-training different activities, having support from others (including family, friends, and women's groups), and listening to one's body while exercising are a few recommendations.

There are more benefits to minimal exercise than to none at all. Target heart rates are not widely used in pregnant women.

Each exercise program should be individualized based on previous exercise level, preference, pregnancy symptoms, and current health status. Modifications may be necessary at certain points during their pregnancy, such as cessation of supine exercises after the first trimester. For some women, the increasing changes in the body and discomfort in the third trimester lead to additional modification or to even taper their exercise program in frequency and intensity. Sample exercises are listed in Table 3 based on previous exercise level.

Conclusion

With no demonstrated risk from exercise to fetus or mother in uncomplicated pregnancy, the effects of not exercising are more detrimental than light exercise. A little bit of exervise makes an enormous difference. Although it is recommended to start an exercise program before becoming pregnant, those who were previously sedentary may begin a program once pregnant. Teach your client to listen to their bodies during exercise to determine if modifications are warranted or if another activity needs to be chosen.

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Table 2. Types of Exercise to Consider

	Benefits	Activities to Choose
Aerobic Exercise	Maintain cardiovascular fitness Prevent chronic disease Regulate blood sugar in those with gdm Avoid excess weight gain	Walking Running Swimming Bicycling (stationary preferred or leisure biking) Dance Aerobics
Strength Eraining	Maintenance of muscle mass while pregnant Maintenance of muscle strength	Land-based strength training -body weight only -use of weights Aquatic strength training
Yoga	Maintenance of flexibility Maintenance of isometric muscle strength Control of breathing Increases relaxation and well-being	Basic (hatha) yoga Prenatal yoga Power yoga

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Table 3. Sample Exercise Program

	Frequency	Sets/Reps	Sample Exercises	
Beginner	3x/week	1-2 sets 10-12 reps	Yoga/Walking BW squats Bridges Birddog (Figure 1) Incline DB Bench Press (Figure 2) Bicep Curl Tricep Dips	
Intermediate	4-5x/week	2-3 sets 8-10 reps	Elliptical DB Squats (Figure 3) Lunges Seated TB Lateral Raises (Figure 4) DB Overhead Press Incline push-up Seated Row	
Advanced	5-6x/week	3-4 sets	Running	
		8-10 reps	Leg Press (Figure 5a, 5b) BOSU Squats Bent-over Rows Wall ball throws TB push-ups (Figure 6a, 6b) Planks	

**BW = bodyweight; DB = dumbbell; TB = theraball*

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Big Babies: An Exploration of Gestational Diabetes

by Rebecca L. Bone, MSN RN

Abstract: Many disease states are altered by the physiological processes related to pregnancy. Among these changes is the bodies' inability to counterpoise glucose utilization and insulin production, thus 9.2% of pregnant women develop gestational diabetes mellitus (GDM). For most women, these altered physiological processes return to normal following delivery. However, research indicates that 50% to 60% of women diagnosed with GDM are at greater risk of developing Type 2 diabetes and metabolic syndrome in later life. There is a correlation between maternal GDM and life long health complications in the child. Best practices remain controversial with new recommendations on the horizon.

Keywords: gestational diabetes mellitus, glucose intolerance, obesity, IDF

Gestational Diabetes: An Updated Exploration

By 2035, the number of people living with diabetes is expected to rise to 592 million globally, a 53% increase. For many women of reproductive age, diabetes can manifest during pregnancy and remain a lifelong complication. Gestational diabetes mellitus (GDM) has been defined as, "any degree of glucose intolerance with onset or first recognition during pregnancy," (IDF, Diabetes Atlas, 2014). There is a clear correlation between obesity and the development of GDM but the mechanisms of glucose screening and treatment approaches remain controversial.

The aim of this paper is to examine the global impact of GDM on the later development of diabetes. This examination aims to provide doulas and midwives with information that can be disseminated with diet and exercise management.

Prevalence and Incidence

Globally, 387 million people are living with diabetes and by 2035 that number is predicted to rise to 592 million. An alarming 179 million individuals are currently undiagnosed. In 2014, diabetes was the antecedent of 4.9 million deaths, one death every seven seconds (IDF, 2014).

Low-and-middle income countries account for 77% of the population living with diabetes. Ramírez-Torres (2013), reported that 9.2% of the Mexican population are living with a diagnosis of diabetes. By 2035, it is predicted that the number of people living with diabetes in South and Central America will increase by 60% (IDF, 2014). Analogously, the National Diabetes Statistics Report (2014) stated that in 2012, 9.3% of the American population had diabetes; an increase of 1% from 2010 data. In Africa, 76% of deaths occurring in people under the age of 60 are the result of diabetes, with one in 10 adults diagnosed. Almost 50% of the people with diabetes in South-East Asia are undiagnosed. Western Pacific domains account for the largest number of individuals diagnosed with diabetes—138 million adults.

Research has clearly established a link between obesity, hyperglycemia, and insulin resistance during pregnancy with an increased risk of offspring developing diabetes along with metabolic syndrome in later life. The International Diabetes Federation (IDF Diabetes Atlas, 2014) defined gestational diabetes mellitus (GDM) as "any degree of glucose intolerance with onset or first recognition during pregnancy." In 2013, more than 21 million live births globally were affected by diabetes during pregnancy, with more than 79,000 children developing Type 1 diabetes. To significantly reduce the prevalence of diabetes requires the global community to pay particular attention to the medical care of reproductive-age women, especially the daughters of diabetic mothers. There is a vicious cycle; the daughter of GDM mother becomes obese, gets pregnant, develops GDM, has a daughter, who becomes obese. Recent findings support this recommendation in that a profound increase in family history of gestational diabetes was reported in mothers with GDM (König, Junginger, Reusch, Louwen, & Badenhoop, 2014). For ex-

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ample, in Mexico, 50.8% of the inhabitants are women with 24% of those women being of reproductive age ranging from 15-44 years, the probability of pregnant women having some type of diabetes is greater than 13% (Ramírez-Torres, 2013).

There is a vicious cycle obesity and GDM that repeats from mother to daughter.

IADPSG Recommendations for Prenatal Screening

In 1998, the International Association of Diabetes and Pregnancy Study Groups (IADPSG) was formed to facilitate collaboration between various national and international groups who have a primary interest in pregnancy and diabetes. In June of 2008, the IADPSG held a conference in California to review published results of the Hyperglycemia and Adverse Pregnancy Outcome (HAPO) study in addition to other works that explored the correlation between maternal GDN and adverse outcomes in children. The international HAPO study involved 23,000 pregnant women and confirmed that milder (than previously thought) degrees of hyperglycemia during pregnancy were associated with increased fetal adiposity, caesarean delivery, and neonatal hyperinsulinemia. The intent of the IADPSG conference was to achieve consensus on criteria for the diagnosing of diabetes during pregnancy that would be endorsed internationally. The established criteria were published in 2010 (Table 1, 2).

Table 1. IADPSG Recommendations for the Diagnosis of Overt Diabetes

	Overt Diabetes
Fasting plasma glucose	≥ 126 mg/dL – (≥ 7.0 mmol/L)
HbA1c	≥ 6.5% - (≥ 6.5%)
Random plasma glucose	≥ 200 mg/dL – (11.1 mmol/L)

Table 2. IADPSG Recommendations for the Diagnosis of Hyperglycemia in Pregnancy

	Hyperglycemia in Pregnancy*
Fasting plasma glucose	≥ 92 mg/dL - (≥ 5.1 mmol/L) or
1-hour plasma glucose	≥ 180 mg/dL – (≥ 10.0 mmol/L) or
2-hour plasma glucose	≥ 153 mg/dL – (≥ 8.5 mmol/L)

**Diagnosis is based on one or more of 75-g OGTT thresholds equaled or exceeded.*

Strategies for detecting and diagnosing hyperglycemic disorders during pregnancy should be initiated during the first prenatal visit. Measuring fasting plasma glucose, A1c , or random plasma glucose should be performed on all or only high-risk women. Hemoglobin A1c, also referred to as glycated hemoglobin, is a blood measurement that monitors long-term glycemic control. Metzger (2010) explained that the decision to perform blood testing for evaluation of glycemia on all pregnant women or only on women with characteristics associated with a high risk for diabetes is to be made on the basis of the background frequency of abnormal glucose metabolism in the population and on local circumstances. Otherwise, the IADPSG report (2010) recommends screening should be initiated within 24-28 weeks of gestation. If plasma results indicate overt diabetes as per Table 1, treatment and follow-up for preexisting diabetes should be implemented. If the results are not diagnostic of overt diabetes and fasting plasma glucose are ≥ 92 mg/dL (≥ 5.1 mmol/L) but < 126 mg/dL (< 7.0 mmol/L), then diagnosis of GDM is made (Table 2). If fasting plasma glucose measurements are 92 mg/dL (< 5.1 mmol/L), testing for GDM from 24 to 28 weeks' gestation with a 75-g OGTT is recommended (IADPSG, 2010). All women diagnosed with overt diabetes or GDM should have postpartum glucose testing performed.

Organizations such as the World Health Organization, The Endocrine Society, and the American Diabetes Association endorsed the new recommendations. As recently as 2014, some organizations continue to implement traditional approaches (50 g OGTT followed by 100 g OGTT, if abnormal) based on the concern that the IADPSG recommendations would falsely inflate the number of women diagnosed with GDM (Hadden & McCance, 2014). One study found that a 50-g OGTT had high sensitivity, specificity, and diagnostic accuracy when compared to the 75-g glucose OGTT (Snover, Alam, Muni, Sajjad, & Naz, 2014). To achieve reliable diagnosis and classification in pregnancy, clinical laboratories must measure venous plasma or serum glucose using a methodology with high accuracy and precision, which includes proper sample collection and processing (Metzger, 2010).

Maternal and Offspring Complications

Dabelea et al. (2000) discovered an increase prevalence of Type 2 diabetes and obesity in the offspring of Pima Indian women who had GDM. Exposure to hyperglycemia in utero was associated with an estimated 40% of children between 5-19 years of age being diagnosed with Type 2 diabetes. Seventy percent of persons between 25 and 34

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years of age developed Type 2 diabetes as a result of prenatal hyperglycemia exposure. Vohr and Boney (2008) found that maternal GDM, maternal glycemia in the third trimester, and maternal obesity doubled the risk of offspring developing obesity and metabolic syndrome compared to children born to nondiabetic mothers. In a retrospective single center cohort study of mothers with GDM (n = 130) and those with normal glucose levels (n=77), König et al. (2014) found that children of mothers with GDM had significantly higher body mass index (BMI) at 6 month follow-up than the children of normal glucose level mothers (17.07 kg/m2 vs. 16.59 kg/m2, p = 0.042). Conversely, Donovan and Cundy (2015) stated that offspring obesity and the development of diabetes are best explained by confounding factors such as maternal and paternal body mass index, rather than maternal body mass index independently. According to Reece (2009), babies born to women with GDM are at risk for respiratory distress syndrome as a result of insufficient surfactant production and lung immaturity. Although evidence supports that hyperglycemia delays fetal lung maturity, specific reasons for this syndrome occurring at a higher rate in GDM mothers remains unclear (Reece, 2009).

An expanding body of evidence suggests a correlation between maternal glucose intolerance and the increased risk of offspring developing schizophrenia. After a review of existing literature, Van Lieshout and Voruganti (2008) concluded that the offspring of mothers who experienced GDM are 7 times more likely to develop schizophrenia, compared with offspring whose mothers experienced glucose tolerance during pregnancy. The authors contributed this association to three prenatal mechanisms: hypoxia, oxidative stress, and increased inflammation. In a sample comprising 1051 offspring from 315 Finnish families, Wegelius et al. (2011) found that the offspring of GDM mothers had a 1.66-fold increased susceptibility to developing schizophrenia. Kandhal and Miller (2013) reviewed variables significant to schizophrenia and found several common risk factors such as gestational diabetes and high birth weights.

A number of studies have suggested that GDM during pregnancy predisposes women to metabolic syndrome in later life, particularly if she has a family history of Type 2 diabetes. Carr et al. (2006) found after comparing women with and without a history of GDM that those who experienced GDM were more likely to have not only cardiovascular risk factors, including metabolic syndrome and Type 2 diabetes, but to also had experienced cardiovascular events at a much younger age. Gunderson et al. (2009) reported that women with GDM had a 2.5 fold increase of developing metabolic syndrome, while Shah and Retnakaran and Booth (2008) predicted a 1.7 fold increase in the development of cardiovascular disease.

Treatment for GDM

Weight Control and Exercise

The antenatal period provides an excellent opportunity to implement weight management interventions, as pregnant women are more motivated to make the necessary changes to decrease the obesity-associated risks. Unfortunately, most GDM cases are diagnosed during the 2nd-3rd trimesters. The Institute of Medicine (2009) revised the recommendations for total and rate of weight gain during pregnancy to serve as a guideline for implementing weight management programs during pregnancy (Table 3). To meet the suggested guidelines, caloric consumption should be carefully calculated to promote adequate weight gain and fetal growth. The American Diabetes Association (ADA) recommends an intake of 2,000 to 2,500 kcal/day, which is based on 35 kcal/day of present pregnancy weight (Toiba, 2014). However, a few studies have shown that this recommendation has led to significant weight gain and elevated postprandial blood sugar, which required instituting insulin therapy. Subsequently, Toiba (2014) reported that researchers recommended calculating energy intake based on 30 kcal/kg of present

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pregnancy weight for normal-weight women, 24 kcal/kg for overweight women, and 12 kcal/kg for morbidly obese women. Normally, weight loss diets are not recommended during pregnancy; however, for women with GDM who are considerably overweight, the IDF (2009) reported that reducing energy intake by no more than 30% of habitual intake is not associated with ketosis and does not cause harm.

Table 3. Recommendations for Total and Rate of Weight Gain during Pregnancy, by Prepregnancy BMI

Prepregnancy BMI	Total Weight Gain	Rates of Weight Gain* 2nd and 3rd Trimester
Underweight (< 18.5 kg/m²)	28 - 40 lbs.	1 (1.0 - 1.3 lbs/week)
Normal Weight (18.5 – 24.9 kg/m²)	25 - 35 lbs.	1 (0.8 - 1.0 lbs/week)
Overweight (25.0 – 29.9 kg/m²)	15 - 25 lbs.	0.6 (0.5 - 0.7 lbs/week)
Obese (≥ 30.0 kg/m²)	11 - 20 lbs.	0.5 (0.4 - 0.6 lbs/week)

**Calculations assume a 0.5-2.0 kg (1.1-4.4 lbs) weight gain in the first trimester. These recommendations are intended to be used among women of the United States.*

Exercise is beneficial in the treatment of GDM and may be an alternative to the use of insulin when diet alone has proved ineffective. The IDF (2009) suggests a minimum of 30 minutes exercise on most days of the week during pregnancy. Shelton (2013) specifically recommended 30 minutes of brisk walking three to four times per week. Snapp and Donaldson (2008) found that women who walked for at least 30 minutes, three or more times per week, for six or more months of pregnancy were less likely than those in the non-exercise group to have delivered a large infant ($F[1, 4314] = 9.82$, $p = .0017$) for gestational age. However, advice on exercise should be tailored to the previous habits of the individual and other co-morbidities they may have. If they were previously sedentary, then arm exercises may be a good starting point. Exercises that effectively avoid excessive abdominal muscular contraction are preferred. Women requiring insulin for glucose management should monitor their blood sugar before, during, and after exercise to avoid exercise-induced hypoglycemia.

Thangaratinam et al. (2012) conducted a systematic review of 88 studies that evaluated any dietary, physical activity, or behavioral counseling intervention with the potential to influence weight change in pregnant women, excluding those underweight. Dietary interventions included a balanced diet consisting of carbohydrates, proteins, fats, and maintenance of a food diary. Physical activity interventions consisted of walking for 30 minutes, weight-bearing exercises, and light-intensity resistance training. The authors revealed these interventions did not increase the risk of small-for-gestational-age or low-birth weight babies. Interventions that were primarily based on diet were effective at reducing obstetric complications such as gestational hypertension, pre-eclampsia, and shoulder dystocia and trend towards reduction in gestational diabetes. There were no changes in other neonatal morbidity or mortality outcomes with the interventions.

Oral hypoglycemic Agents and Insulin

Insulin has been the standard therapy for women with GDM. However, recent evidence suggests that the use of oral hypoglycemia agents may be undervalued. According to a meta-analysis conducted by Balsells et al. (2015), oral agents are an attractive alternative to insulin for their easier administration, lower costs, and better acceptance. In a large nationwide retrospective study in the United States which examined 10,778 women with drug treated gestational diabetes, the use of glibenclamide (Glyburide) increased from 7.4% in 2000 to 64.5% in 2011, becoming the most common treatment since 2007 (Camelo et al., 2014).

Conclusion

GDM ideally subsides after pregnancy. However, over half of women with GDM will develop Type 2 diabetes. It is imperative that GDM women continue with glucose screening. In order to eradicate the mother-daughter cycle of GDM, the importance of maintaining an ideal body weight through diet and/or exercise in the postpartum phase, and thereafter, should be explained. Currently, the IDF is conducting a pilot project in India to better define a model of care for women with GDM. Taking existing guidelines for care and treatment for GDM, the IDF's goal is to derive at international best practices of identifying and managing GDM to a high standard of quality care in low-resource settings. Results are expected to be disseminated this year at the World Diabetes Congress in Vancouver and published in peer-reviewed journals.

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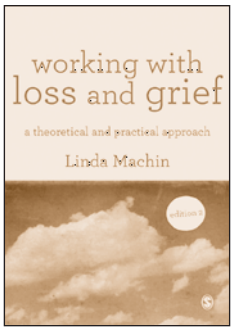
Working With Loss And Grief: A Theoretical and Practical Approach, 2nd ed.

by Machin, L.

Sage Publications, London
2014
173 pages
$39.00

reviewed by Diane Campbell, RN DNP-PHN FNP-BC

This book provides an overview of conceptual models and practice tools used in identifying broad patterns of loss and methods of identifying an individuals' reaction to loss. Machin identifies several themes associated with concepts of loss and grief and described each concept with lived experiences. The themes are: (1) The social context of grief and loss; a society's perception of life and death. Machin describes several themes in identifying one's reaction to loss. A society's perception of life and death issues and how grief is regulated. The author implies that grief has evolved over the past century and death and loss has been changed by the rise in secularism and cultural diversity that contributes to the variations in expressions of public and private grief. In order to understand the nature of loss experienced by others, it is necessary to recognize the importance of related factors. (2) The broad spectrum of life losses / the landscape of loss describes diverse situations in which loss may be experienced but often overlooked. She emphasizes the most readily overlooked losses occur with developmental change, such as starting school, leaving school, moving, and retirement, for example, which is absorbed in everyday life circumstances that may not be noticed. The author suggest that practitioners should engage and be sensitive and expertly involved in the various stages of grief with a basic knowledge and understanding being essential. (3) Theoretical perspectives on grief and therapy-establishing theoretical bearings. A description of grief using several theoretical conceptual bases for understanding loss as a part of life's' course of development. Erickson, Havinghurst, Levingson, Reese, and Smyer were among development theories used by the author to understand life-course development. The author suggest that using culture as a way of viewing grief gives recognition to the way in which individuals can understand one's definition of problematic grief. (4) A practice model for understanding grief and a tool for its implementation - implies the use of a compass and a map. Machin introduced and defined the Range of Response to Loss Model (RRL) and the associated Adult Attitude to Grief Scale (AAG), as a framework for thinking about loss and a measure for profiling individual grief. Loss reactions were described as overwhelming, controlled or a balanced resilient response. The AAG scale was used to test the validity of the model and was found to be a psychometrically effective tool for identifying vulnerability. The author indicates that both clients and practitioners affirmed the validity to the therapeutic focus on grief. (5) Therapeutic ways of working with the Range of Response to Loss model and the Adult Attitude to Grief scale- the territory of loss and the journey through grief. It was emphasized that distress alone is not an indication or a measure of vulnerability. She suggests that one must be able to discern the difference in strong feelings which are understood and accepted and distress which persist, symptomatic of an inability to accept the loss. She denotes the RRL model is a tool the practitioner can use to appraise the client's grief reaction and gives focus to helping the process. (6) Practitioner's perspective- travelling with grief. Machin suggest that in focusing on loss, providing a theoretical model and tool, the process of engaging with grief can be used by a wide range of practitioners as the demands of working with another person's grief are challenging at all practice levels, especially with children.



In conclusion, the book seeks to make a clear connection between theory and practice and provides a practice model to look at loss across the life cycle and ways of giving support to those that may be grieving. Different scenarios relating loss and grief concepts of children were the strengths of the book based on lived experiences. Weaknesses were in the statistical methods used to test the validity of the RLL model. Suggested audiences for reading would be master's level nurse practitioners and faculty seeking to teach the concepts and supportive methods of death and dying.

Dr. Diane Campbell RN, DNP-PHN, FNP-BC is an Associate Professor in the Master's Program at Tennessee State University and holds a Doctorate in Nursing Practice with an emphasis in Public Health Nursing. In her current position, Dr. Campbell teaches courses in Advanced Nursing Research, Health Policy, Community /Public Health, Advanced Health Assessment and is Concentration Coordinator for the TSU RODP FNP program.

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