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Evaluation of a computer-based bilingual breastfeeding educational program on breastfeeding knowledge, self-efficacy and intent to breastfeed among rural Hispanic women

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ABSTRACT

Objective: To evaluate the impact of an interactive, computer based, bi-lingual breastfeeding educational program on breastfeeding knowledge, self–efficacy and intent to breastfeed among rural Hispanic women living in Scottsbluff, Nebraska.

Methods: A two-group, repeated measures quasi-experimental study was conducted to evaluate the impact of a breastfeeding intervention. Forty six rural Hispanic women between ages 18 and 38 years were enrolled at the Regional West Medical Center in Scottsbluff, Nebraska. Study participants were randomized into intervention and control groups, with the intervention group (n = 23) receiving bi-lingual (English and Spanish) breastfeeding education on a touch screen computer program, while the control group received printed educational material. Study participants were enrolled during their last six weeks of pregnancy, with follow up assessments conducted post-partum at days 3 and 7, weeks 2 and 6, and months 3 and 6. The study protocol was approved by the University of Nebraska Medical Center Institutional Review Board (IRB protocol #430-12-EP) and City University of New York Institutional Review Board (IRB protocol # 642980-1).

Results: A significant improvement in the breastfeeding knowledge and intent to breastfeed scores was seen over a 6 month period among all the study participants (p < 0.05). There was a gradual increase in the breastfeeding self-efficacy scores till week 6 followed by a decrease in self-efficacy scores at month 3 (p = 0.46), and month 6 (P = 0.54). Breastfeeding knowledge scores differed significantly between the study participants in the control and intervention groups at week 6 (p = 0.03). There were no significant differences in the breastfeeding knowledge between the control and intervention groups at other time points. The control group showed gradual decline in their self-efficacy scores at month 3 and month 6 compared to the intervention group that showed a gradual increase in their self-efficacy scores at different time points during their follow up period. However, there were no significant differences in the self-efficacy scores between the intervention and control groups at different points. The control group showed significantly higher negative breastfeeding sentiment scores compared to the intervention group at days 3 (p = 0.02) and 7 (p = 0.03) indicating a lower intent to breastfeed.

Conclusion: Hispanic women living in rural settings showed improvement in breastfeeding knowledge, self-efficacy and intent to breastfeed using the computer based bi-lingual educational program. Results show week 6 and month 3 to be the critical time points of intervention so that women continue to breastfeed.

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1. Introduction

Breastfeeding is a vital practice, which provides immense benefits to both mother and child [1]. These benefits range from supporting mental, physiological health and development through its rich nutritive content, to reducing morbidity and mortality rates in children especially during the first few months of life [1–4]. Breastfeeding rates and duration among diverse population groups have been a crucial topic of scientific interest in the United States. This is as a result of inability of several ethnicities to attain the breastfeeding standards set by key stakeholders including; the American Academy of Pediatrics (2012), the Canadian Pediatric
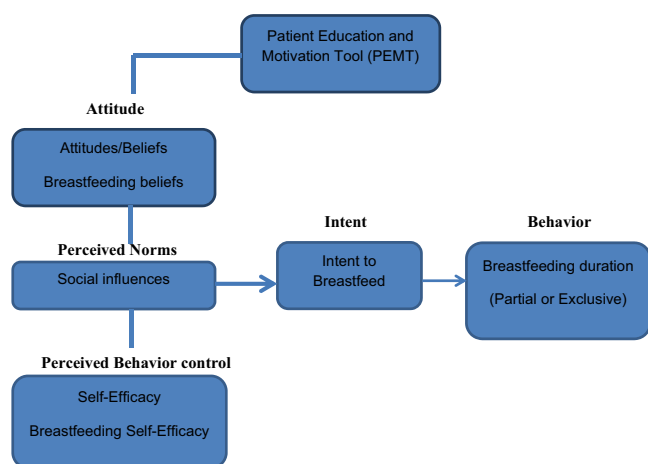
Fig. 1. Sustained breastfeeding framework.

Society (1998) and the World Health Organization (WHO), which recommend exclusive breastfeeding for at least six months or more [1–4]. According to the Center for Disease Control and Prevention, CDC 2013 report, 76.5% of children have ever been breastfed, with 49% breastfed for up to 6 months, and 27% for up to 12 months [7]. Only 37.7% of children are exclusively breastfed for 3 months and 16.4% breastfed for 6 months [7]. In Nebraska, the proportion of children who are breastfed for up to 12 months remain below the National average [7], and differs significantly by race and ethnicity, especially among Hispanics. The goal of Healthy People 2020 (HP2020) is to increase the proportions of children who are 'ever breastfed' to 81.9%, 'exclusively breastfed' to 46.2% at 3 months, and 25.5% at 6 months [2]. Prior research has placed an emphasis on the use of technology enabled breastfeeding interventions in exploring and understanding the relevant factors affecting the high rates of breastfeeding discontinuation among Hispanic women to better inform intervention efforts [5–8].

Knowledge of breastfeeding practices, self-efficacy, intent to breastfeed and maternal demographics such as age, working status, and parity, have been identified as factors which were significantly associated with breastfeeding duration and exclusiveness in previous research [5–8]. Maternal knowledge of breastfeeding health benefits especially to children, as well as comfort with breastfeeding in public has been associated with a higher intention to breastfeed ($p < 0.05$) [5]. Results of a randomized breastfeeding support intervention showed that mothers who were aware of the advantages of breast milk, and disagreed that infant formula was as good as breast milk were 3 times more likely to breastfeed compared to their counterparts (OR = 3.44; 95% CI; 1.80–6.59) [5]. Important predictors of breastfeeding self-efficacy in prior studies included: having seen pictures or videotapes of other mother's breastfeeding ($p < 0.01$), having received professional assistance ($p = 0.02$), older age, working status, social support and parity ($p < 0.001$) [6–8]. Numerous studies have examined the influence of these factors on breastfeeding practices among women of varying ethnicities; very few have been focused on Hispanic women especially in rural settings. Hispanic women are a major minority racial group with low breastfeeding rates, high rates of breastfeeding cessation and high rates of formula supplementation within the first week of their baby's lives [8]. This has been largely attributed to acculturation, as evidenced by a higher prevalence of breastfeeding in less acculturated Hispanic women [7]. These factors have been shown to differ considerably by geographic location, with higher breastfeeding rates among urban Hispanic women (59%) compared to their rural counterparts (49%) [7]. Results of our preliminary study showed that self-efficacy was an important predictor of

intent to breastfeed among rural Hispanic women, and this was consistent with prior research [9]. Factors influencing breastfeeding initiation, continuation and exclusiveness in this ethnic group are yet to be fully understood [8–11]. The objective of our study was to explore the effect of a bilingual, interactive touch screen computer based breast-feeding educational program on improving breast-feeding knowledge, breast-feeding self-efficacy and predicting breastfeeding attrition among pregnant Hispanic rural women living in Scottsbluff, Nebraska.

1.1. Intervention framework: patient education and motivation tool

Patient Education and Motivation Tool (PEMT) is a touch screen computer-based interactive health education program which integrates a variety of cognitive-behavioral theories. PEMT was developed to facilitate health information and messages to be adapted depending on the psychosocial elements including attitude, self-efficacy, expectations, personal norms, and social influences. The core objective of the PEMT is to present health information in an interactive tailored manner considering multiple factors influencing health status and health behaviors. A detailed description of the PEMT is provided in our preliminary study [9].

1.1.1. Modifying PEMT framework to design and develop interactive, bi-lingual breastfeeding education kiosk

The existing PEMT was modified to develop an interactive, tailored, computer-based breastfeeding educational support program to educate Hispanic women living in rural settings. The computer-based Breastfeeding Education Kiosk aims to provide modular, culturally relevant, bilingual (English/Spanish) breastfeeding education tailored to the needs of the mothers. The theoretical framework for the proposed study was the Sustained Breastfeeding Framework based on Predicting and Changing Behavior Theory (PCBT). PCBT proposes that attitudes, perceived norm, and perceived behavioral control are inter-related and that together they influence intention to engage in the behavior which is proposed to be the primary determinant of behavior [10]. The modified PEMT was utilized to operationalize the sustained breastfeeding framework.

The theoretical basis of content tailoring included Elaboration Likelihood Model which states that people are more likely to actively and thoughtfully process information if they perceive it to be personally relevant [11]. Messages processed in this way tend to be retained for a longer period of time and are more likely to lead to permanent attitudinal change [11]. The entire finalized breast-feeding educational content was broken down into series of modules, each module into sub-modules and each sub-module into a series of educational messages. The messages were delivered in varied learning styles such as text-only, audio and text, or text, audio and images to account for health literacy of the individuals. Messages were tailored to perceived breast-feeding concerns. The modules of the finalized breastfeeding educational content were made available both in Spanish and English so that the study participant can use either language to navigate through the program. The modules included: (a) Basics of breastfeeding (b) How to breastfeed (c) Benefits of breastfeeding to mother and child (d) Normal feeding signs (e) Problems during breastfeeding (f) Formula feeding (g) Coping with breastfeeding (h) Ability to get pregnant while breastfeeding.

1.2. Intervention

The difference between the two study groups was that subjects in the intervention (bilingual Computer based Breastfeeding Educational Support program) group entered their baseline