WEIGHT MANAGEMENT FOR POSTPARTUM WOMEN

A SCHOLARLY INQUIRY PROJECT SUBMITTED TO THE OFFICE OF GRADUATE EDUCATION OF THE UNIVERSITY OF HAWAIʻI AT MĀNOA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF NURSING PRACTICE

MAY 2015

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Keywords: Postpartum, weight management, breastfeeding

Abstract

Introduction: Failure to lose pregnancy weight can lead to an over-weight or obese status for a lifetime. The purpose of this project was to provide a health promotion program focusing on weight management for postpartum women. Weight management postpartum can be achieved with breastfeeding, appropriate nutrition and physical activity. The Social Cognitive and Self-Regulation Theory are the conceptual frameworks used to structure this program's interventions.

Methods: The program was conducted in the summer of 2014 with 12 postpartum women enrolled in the Women, Infants and Children's (WIC) clinic in Wahiawa. Pre- and post-program questionnaires were used to assess knowledge prior to the program's implementation and to assess changes in health behaviors after program completion. A pedometer was given to track maternal daily steps, along with daily food servings template for breastfeeding moms to use.

Results: The women reported that walking daily with a pedometer was an achievable intervention during the postpartum period. The frequency of maternal walking and increase in steps/day was positively related to social/family support.. There was no change in breastfeeding status for those doing so exclusively, but the participants that were breastfeeding and supplementing at the beginning of the program were exclusively formula feeding at the end of the eight weeks of maternal participation in the DNP Project.

Discussion: The simple physical activity of daily walking allows postpartum women to easily participate. However, social/family support contributes to the continuation of this health intervention. Self-regulation of health behaviors can be a motivator; however, it appears to be ideal for regulation of physical activity but not nutrition. Continuous breastfeeding support is necessary to ensure the health benefits associated with breastfeeding for infants and mothers.

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Chapter 1. Executive Summary

Introduction: The postpartum period is typically hectic for a new mother due to the demands of caring for a newborn and other life demands. During this sensitive period, it is crucial that postpartum women make attempts to reduce and manage post-pregnancy weight to avoid the development of health complications that are associated with overweight or obese status. The Social Cognitive and Self-Regulation Theory are the conceptual frameworks guiding this project due to their emphasis on human behavior and factors affecting the maintenance of health behaviors. Current literature demonstrates that integrating certain components during the postpartum period is central for postpartum weight reduction and management. The three components are breastfeeding, physical activity and a healthy nutrition. The objective of this project was to develop a self-sustaining quality improvement program that supports the initiation and maintenance of healthy lifestyle behaviors for adequate weight reduction and management during the postpartum period.

Methods: This program was a health promotion initiative conducted over a period of 12 weeks. Program participants were provided with educational resources and support for making recommended behavioral changes. Participants were encouraged to breastfeed, adhere to a healthy nutritional regimen for lactating women and engage in the daily physical activity of walking. Pedometers were provided to keep track of daily steps along with a ChooseMyPlate.gov brochure, which is a template specifically for breastfeeding women that provide guidelines for daily food servings. Program implementation was at the WIC clinic in Wahiawa with 25 clinic clients that were in the postpartum period. Participants were comprised of local Hawaiian residents of various ethnicities and dependents of active duty military personnel. Data collected with pre and post-program questionnaires.

Results: All participants were between six weeks to one year postpartum, 12 completed the program out of the 25 women that enrolled. Five women were exclusively breastfeeding and seven formula feeding. Six walked daily as recommended using a pedometer to track steps, four occasionally walked while two participants rarely walked. Average number of daily steps achieved by all the women was 7,312 steps a day. The women reported minimal use of the recommended daily food servings template for nutritional intake. The majority of the women reported that the flexibility of the program's physical activity intervention (i.e., walking) is ideal for the postpartum period.

Discussion: Despite breastfeeding support and resources provided by the WIC clinic, some participants did not continue breastfeeding due to personal reasons including lack of time, fear that breast milk was inadequate nutrition, infant latching difficulties and simply because formula was easier and free. It appears lactating mothers need continuous support to prevent early cessation of breastfeeding due to non-medical reasons. Walking as a daily physical form of activity was easily accomplished by most; however, lack of companionship proved to be a deterrent for some women who did not want to walk alone. It seems social support from family members or interaction with other women might be an enabler for the maintenance of this behavior. Self-regulation of daily activity achieved by tracking increases in daily steps with the pedometer can be a motivator. However, it is more difficult to track other forms of physical activity that postpartum women might engage in. ChooseMyPlate.gov for moms was provided to guide nutritional intake, while allowing each women the option to eat foods of personal or cultural preference. It was not useful for this group of women; it was too difficult to keep track of daily servings of each food group. Overall, the program was successful in initiating a daily physical activity intervention beneficial for postpartum weight management. Further evidence-

based recommendations are necessary to minimize early cessation of breastfeeding and develop an alternative nutritional template that might be more suitable for the postpartum period.

Chapter 2. Problem

Introduction

Postpartum weight retention is the weight gain experienced by a woman during pregnancy that is retained following childbirth. Postpartum weight is expected to significantly decrease the first three months after delivery, and then continue with a slower but steady decline the rest of the first postpartum year (Xuto, Sinsuksai, Piaseu, Nitayasuddhi & Phupong, 2012). Failure to reach pre-pregnancy weight within that first year has been found to be a predictor for further development of excessive weight and obesity a decade later (Rooney & Schauberger, 2002).

Gestational weight gain is the most consistently reported predictor of postpartum weight retention. In 2009, the Institute of Medicine (IOM) published recommendations for gestational weight gain to optimize outcomes for the woman and baby. These recommendations independent of age, parity, race or ethnic background are based only on pre-pregnancy body mass index (BMI) ranges for underweight, normal weight, overweight and obese women. The current target guidelines state that women with a normal pre-pregnancy BMI of 19.8-26 should gain 25-35 pounds during pregnancy; underweight women (BMI <19.8) should gain 28-40 pounds; overweight women (BMI of >26 to 29) should gain 15-25 pounds; and obese women (BMI >29) should gain 11-20 pounds (Rasmussen & Yaktine, 2009).

The Pregnancy Nutrition Surveillance System (PNSS) which collects data on maternal health indicators, including maternal weight gain, obtained the percentage of women whose total pregnancy weight gain exceeded the IOM recommendations in 2011 (Center for Disease Control & Prevention's [CDC] PNSS, 2011). Among those participating in the PNSS, about 21% of pregnant women achieved less than the recommended weight gain, 30.9% were within the ideal

weight for their BMI, and about 48% of pregnant women gained greater than the recommended weight for their BMI (CDC's PNSS, 2011). An ongoing population-based surveillance system which collects self-reported data from maternal questionnaires related to health behaviors found that prevalence of pregnancy-related obesity increased by 69% over a 10-year period among those already overweight, from 13% in 1993-1994 to 22% in 2002-2003 (Leddy, Power & Schulkin, 2008).

Gestational weight gain in excess of current IOM recommendations can lead to significant postpartum weight retention. Inadequate management of postpartum weight has important public health implications as a significant contributor to the development of adverse health outcomes including cardiovascular disease, hypertension and diabetes (Rothberg, Magriples, Kershaw, Rising & Ickovics, 2011). Given the high correlation between postpartum weight retention and the development of adverse health outcomes, the prevention of postpartum weight retention is an important focus for better health in this population. Interventions directed at weight management during the postpartum period are essential to achieve adequate weight loss and to attain pre-pregnancy BMI.

Background/Problem

Postpartum maternal health care is a minimized facet of women's health care (Cheng, Fowles & Walker, 2006). This lack of prominence is evident in the limited national health objectives and guidelines related to maternal health during the postpartum period. There have been relatively few guidelines obtained from intervention studies aimed primarily at reducing postpartum weight retention (Kinnunen et al, 2007). The retention of postpartum weight after pregnancy may contribute to obesity (Amorim & Linne, 2008). Diet and exercise are highly recommended elements of any weight reduction program in the general population; however,

strategies for attaining healthy weight loss among postpartum women have not been adequately evaluated (Amorim & Linne, 2008). In the first national survey conducted on postpartum women by the Maternity Center Association (MCA), about one third of mothers who received a postpartum checkup felt that they did not receive complete information on postpartum health (Cheng, Fowles &Walker, 2006). Weight management is often highlighted during this visit; however, further education is needed due to the continuing process it requires for women with difficulties in returning to pre-pregnancy weight. These missed opportunities for enhancing the health of postpartum women can be minimized by providing educational resources that specifically address the weight management needs of these women. Providing evidence based information on postpartum weight management can have a positive impact on the health practices with a higher efficacy in regaining pre-pregnancy weight.

The purpose of this quality improvement project was to implement an evidence-based guideline for weight management during the postpartum period. The program was implemented at a local WIC clinic on Oahu. The population of women who receive services at the WIC clinic must meet federal income guidelines based on a predetermined gross household income scale and are either pregnant, breastfeeding, in the postpartum period or have children under the age of five years with nutritional needs. These postpartum women have various demographic factors, but are mostly Native Hawaiians and other Pacific Islanders, Asians, with a minority of Caucasians, African-Americans and other ethnic groups. The services offered by WIC include breastfeeding support, nutrition education both for mother and child, and supplemental nutritious foods for the participants who qualify. The objective of WIC is to promote and support healthier lifestyles for its population of women and children as indicated by its substantial focus on breastfeeding and nutrition. Additional efforts that concentrate directly on promoting weight

management within this population may greater benefit the overall health of these postpartum women.

Social Cognitive Theory and Self-Regulation

The Social Cognitive Theory (SCT), previously known as the Social Learning Theory (SLT) is credited to Albert Bandura as a psychological model of behavior that emphasizes the inter-connected and reciprocal relationship between personal, behavioral and environmental factors (Denler, Wolters & Benzon, 2013) (Figure 1). Initially developed as the SLT in the early 1960s focusing on five constructs, the addition of a sixth construct in 1986 lead the evolution into the SCT (Behavioral Change Models, 2013). The SCT suggests that the ideal goal for health promotion should not only be targeted to the initiation of positive health behaviors, but significant considerations should be given to the maintenance of those health behaviors (Behavioral Change Models, 2013). This theory is pertinent for postpartum women who are having difficulties with weight maintenance; there is a necessity for the stimulation of sustained behavioral changes that can produce prolonged weight reduction and management outcomes.

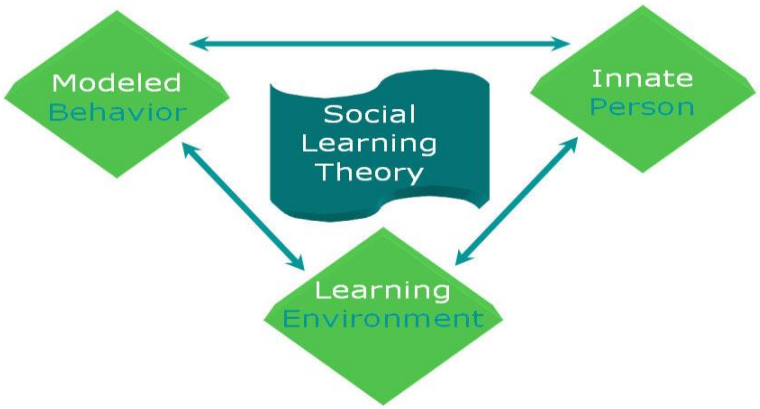

Figure 1. Social Learning Theory Model

The first five original constructs of the SCT are reciprocal determinism, behavioral capability, observational learning, reinforcements and expectations (Denler et al, 2013). Reciprocal determinism presents the dynamic and reciprocal interaction of the individual, environment (external social relationships) and behavior (Denler et al, 2013). Behavioral capability is the individual's ability to execute a behavior after acquiring essential knowledge and skills. Observational learning asserts the notion that when an individual observes demonstrations of a certain behavior (which can be verbal or written descriptions, video or other types of modeling), the behavior can then be replicated successfully by the individual. Reinforcements are the internal and external changes associated with an implementation of a behavioral change, which affects the likelihood of maintaining or terminating the behavior. Expectations are the fifth construct of the SCT and refer to the health and non-health related outcome expectations that influence an individual's participation in certain behaviors. Whereas the first five constructs of the SCT addressed factors related to behavioral changes, the inclusion of the self-efficacy construct illustrates how regulating behavior through actions generated by the individual can increase the maintenance of those behaviors for a greater length of time (Denler et al, 2013). Self-efficacy relates to individuals' levels of confidence in their ability to maintain the behavior despite any internal and external factors that can act as obstacles or facilitators (Behavioral Change Models, 2013).

Self-regulation is a concept derived from the SCT, which came into popularity in the 1980s and continues to enlarge in prominence (Zimmerman & Schunk, 2008, p. 17). Self-regulation is wholly dependent on all of the constructs embedded in the SCT, including behavioral capability, goal setting and self-efficacy (Figure 2). Self-regulation exemplifies the influence of personal and external factors on behavior, and actions taken to achieve outcomes.

Self-regulation is comprised of three parts that are inter-connected including self-observation, self-judgment and self-reaction (Zimmerman, 2002, p. 67). Self-observation refers to the individual's ability to self-evaluate and track behaviors and any associated outcomes. Self-judgment allows the individual to use cognitive reasoning to evaluate effectiveness of actions in reaching desired goals (Zimmerman & Schunk, 2008, p. 18). Last, self-reaction allows the individual to make reciprocal adjustments in behaviors as appropriate to obtain desired results (Bandura, 1991, p. 256).

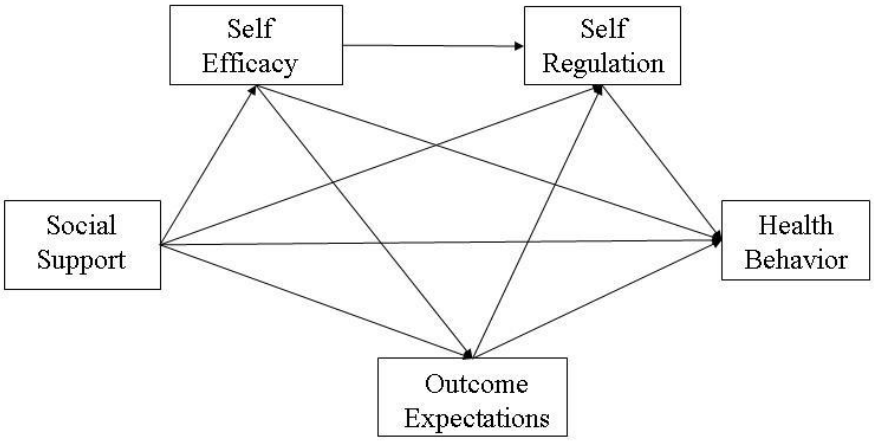

Figure 2. SCT Model and its Relationship with Self-Regulation

The SCT model and its inter-relatedness with self-regulation show that individual knowledge is not sufficient for behavior change; increasing knowledge, training skills and creating a supportive environment are all important components of behavior change. A supportive environment includes an individual's self-motivated actions in modifying the environment for sustained success, as well as actions taken by external forces (other individuals) to support the individual. Researchers have efficiently used the self-regulation theory as a

framework in studies pertaining to the effective management of diabetes and studies dealing with weight control (Gokee-LaRose, Gorin & Wing, 2009). In a study examining the demographic, behavioral and psychosocial characteristics of Web-health users of a healthy-living primary prevention intervention, the SCT provided the framework guidance (Anderson-Bill, Winett & Wojcik, 2011). The study conclusions were that the success of the program's participants depended heavily on individual's ability to use the provided interventions in garnering support for making lifestyle changes and their ability to develop self-efficacy for behavioral changes (Anderson-Bill, Winett & Wojcik, 2011). A derivative of this concept will be applied to the population of postpartum women who participant in this practice project. Using the SCT and self-regulation model, essential knowledge and skills for weight reduction and management was provided through various forms of observational learning. The self-regulation concept was directly related to the project expectations; participants were encouraged to routinely monitor their health behaviors and use resources provided to modify physical activity level and nutrition.

Search of Relevant Literature

An electronic search of the literature was performed using PubMed, CINAHL and Cochrane databases. Search terms included the words "maternal health" combined with "postpartum period", "postpartum women" combined with "weight reduction and maintenance", "exercise" combined with "postpartum period", "self-regulation" combined with "weight maintenance", "breast feeding" combined with "weight reduction", "physical activity" combined with "pedometer", and "weight monitoring", "postpartum depression". A total of 66 articles were evaluated with 22 synthesized for this review. The search filter used to retrieve the articles were only English written articles published between the time span of 1995 and 2013. Mosby's Research Tool was used to rate and critique the strength of all relevant evidence. This hierarchy

of evidence rating system is based on eight levels, rated from weakest (bottom) to strongest (top) (Melnyk & Fineout-Overholt, 2005) (Figure 3).

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Levels of Evidence

Level I	Evidence from a systematic review or meta-analysis of all RCTs or evidence-based clinical practice guidelines based on systematic reviews of RCTs.
Level II	Evidence obtained from at least one well-designed RCT.
Level III	Evidence obtained from well-designed controlled trials without randomization.
Level IV	Evidence from well-designed case-control and cohort studies.
Level V	Evidence from systematic reviews of descriptive and qualitative studies.
Level VI	Evidence from a single descriptive or qualitative study.
Level VII	Evidence from the opinion of authorities and/or reports of expert committees.

Source: Melnyk & Fineout-Overholt (2005).

Source: Urol Nurs © 2008 Society of Urologic Nurses and Associates

Figure 3. Mosby's Rating System for the Hierarchy of Evidence

The synthesized literature includes four articles of systematic reviews and meta-analysis, five articles of well-designed randomized controlled trials and 12 other reports from lower levels of evidence (Figure 4). The smallest sample size used for the synthesized articles had 66 participants; the largest sample size had 2767 participants.

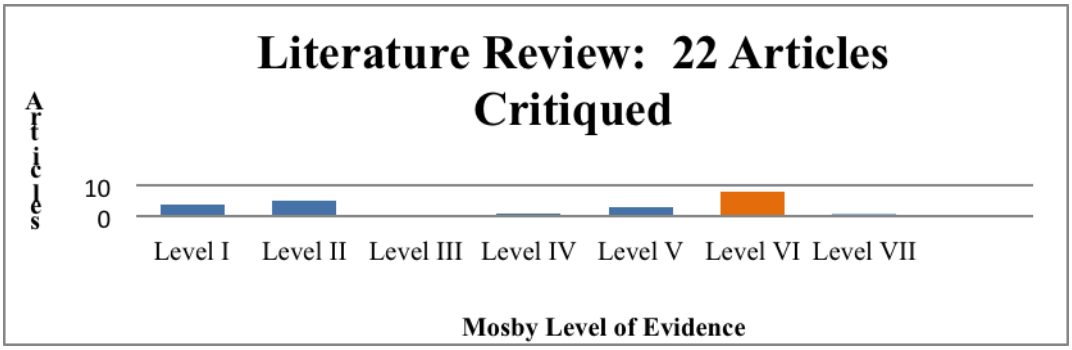

Figure 4. Level of Evidence for Articles Reviewed and Critiqued

Most of the articles focused on postpartum women up to two years after giving birth, but a total of 11 articles focused on weight management in the general population with no specified characteristics other than being over the legal age of 18 with no health complications. No specific demographic factors were isolated, so all the articles included subjects from various socioeconomic and ethnic backgrounds. There was a limited availability of literature specifically directed on weight reduction and management for the postpartum period. The retrieved articles focused on certain concepts including breastfeeding in the postpartum period, the self-regulation concept for weight reduction and exercise, and incorporating the use of a pedometer during physical activity.

The identified articles showed consistencies about the importance of physical activity and the traditional measures that incorporate breastfeeding and proper nutrition. Self-regulation and physical activity that integrate the use of pedometers as interventions geared towards both postpartum women and the general population were frequently examined in the literature. A total of three articles were of well-designed studies examining ideal evidence-based interventions for weight management in the postpartum period.

Literature Review

Breastfeeding. Breastfeeding is recommended immediately following delivery and during the postpartum period because of the associated health benefits for both the infant and mother. A quality improvement project to increase the exclusive breastfeeding practices in a hospital was successful after changes were made to the care delivery model, exclusive breastfeeding rates increased from 6% to 44% after 24 months (Magri & Hylton-McGuire, 2013). Project changes included establishing skin-to-skin contact immediately after birth,

encouraging mothers to room-in with infants, as well as other adjustments to the structural and staff workflow (Magri & Hylton-McGuire, 2013). Breastfeeding is recommended for the first year of an infant's life or longer as desired by infant and mother (American Academy of Pediatrics [AAP], 2012). A longer duration of breastfeeding during this period also contributes to decreased incidence of postpartum weight retention (Baker et al., 2008; Olson, Strawderman, Hinton & Pearson 2003). A barrier to achieving this weight reduction is excess caloric intake and decreased physical activity because it offsets the energy deficit produced by lactation (Krause, Lovelady & Ostbye, 2011). Two studies found that providing counseling on nutrition and physical activity, in addition to encouraging breastfeeding, increased the proportion of women returning to pre-pregnancy weight (Kinnunen et al., 2007; Ostbye, Peterson, Krause, Swarny & Lovelady, 2012). Even though the importance of breastfeeding with proper nutrition should be encouraged in the postpartum period, physical activity is another major intervention modality to be considered for weight reduction in this population of women.

Physical Activity. Most of the existing literatures identify limited evidence-based physical activity interventions aimed at weight reduction and management during the postpartum period (Althuizen, Poppel, Vries, Seidell & Mechelen, 2011; Evenson, Aytur & Borodulin, 2009; Kuhlmann, Dietz, Galavotti & England, 2008). The guidelines published by the American Congress of Obstetricians and Gynecologist (ACOG, 2002) recommends regular exercise during pregnancy and the postpartum period for its overall health benefits, but these guidelines lack a specificity for physical activity interventions especially in the postpartum period (Artal & O'Toole, 2003; Evenson et al., 2009). "Regular" exercise is defined as a wide range of non-strenuous recreational activities that are safe during pregnancy without the high risk of falling or for abdominal trauma (Artal & O'Toole, 2003; Evenson et al., 2009). It concludes that pre-

pregnancy exercise routines can be resumed gradually as soon it is physically and medically safe for a woman. Safely resuming routine pre-pregnancy physical activity in the postpartum period has been associated with a decreased incidence of postpartum depression, but only if the physical exercise is stress relieving and not stress inducing (Artal & O'Toole, 2003; Evenson et al., 2009).

Postpartum women benefit from weight management interventions, and seem to have significantly better weight-related outcomes than non-postpartum populations (Kuhlmann et al., 2008). The systematic review of randomized controlled trials with individual or group interventions provided versus control groups which received standard of care written information on nutrition and exercise reported a significant treatment effect (Kuhlmann et al., 2008). Results of a study to better understand the weight control needs and preferences of postpartum women from the WIC Nutrition program and an Adult Education Parenting (AEP) program found that, independent of weeks postpartum and breastfeeding status, both groups of women experienced high postpartum weight retention (Phelan et al., 2010). The women from both settings reported greatest interest in attending weekly face-to-face group meetings, but greater than 60% of all the women reported needing childcare help to attend the meetings (Phelan et al., 2010). Among postpartum women, the most common barriers to physical activity were lack of time and childcare, whereas the most common enablers were partner support and self-efficacy (Evenson et al., 2009). Therefore, an effective physical activity intervention for postpartum women has to exhibit flexibility for the time required for exercise and provide other structurally modalities that decrease childcare barriers.

Physical Activity Interventions. According to ACOG guidelines, postpartum women may gradually resume pre-pregnancy exercise routines as soon as medically and physically safe, which can be 4-6 weeks postpartum (Evenson et al., 2009). Several studies have cited that the

most effective interventions in postpartum weight reduction were exercise programs with objectively defined goals (Kang, Marshall, Barreira & Lee, 2009; Nascimento, Pudwell, Surita, Adamo & Smith, 2013).

Regular engagement in physical activity has been shown to be essential for the promotion and maintenance of health. Walking is considered an ideal form of physical activity to promote and maintain health status in the general population (Strath et al., 2011). It is an activity that requires no additional physical skills or training, and is generally achievable by all ages with little risk of injury. Collected data indicates that healthy adults typically take between 4,000 and 18,000 steps/day and that achieving a goal of 10,000 steps/day is reasonable for a healthy adult (Tudor-Locke et al, 2011).

Some studies have shown that the use of a pedometer is a valid method for assessing walking and providing positive motivational feedback (Bravata et al., 2007; Stovitz, Van Wormer, Center & Bremer, 2005; Strath et al., 2011). Two studies involving both postpartum women and other adults from the general population indicated that the use of a pedometer is associated with significant increases in individual physical activity and weight reduction and significant changes in anthropometric measures (such as lower BMI) (Matun, Afshary & Abedi, 2011; Sounan et al., 2013). Another study of adult age women suggests that the effectiveness of minimal contact physical activity interventions can be enhanced by using pedometers, step logs and personal remainders (Heesch, Dinger, McClary & Rice, 2005). The minimal contact interventions meant that the participants received only weekly emails with strategies and remainders for physical activity, with no face-to-face contact or visits. The women were expected to wear pedometers and complete weekly logs of daily steps taken. Results from the focus groups conducted at the end of the intervention showed that wearing pedometer was

beneficial in goal setting and motivation, while submitting step logs increased participant accountability (Heesch, Dinger, McClary & Rice, 2005).

Self-regulation. The concept of self-regulation is another area of focus in the literature that affects weight reduction and management. A number of studies have found that any successful weight reduction programs must contemplate incorporating behavioral interventions that teach weight loss maintenance skills (Burke, Wang & Sevick, 2011; Butryn, Phelan, Hill & Wing, 2007; Wing, Tate, Gorin, Raynor & Fava, 2006). These interventions include self-monitoring of exercise and self-weighing.

According to Butryn et al. (2007), consistent self-weighing leads to increased weight reduction and maintenance because it allows individuals to detect weight gain and adjust behaviors to prevent additional gain, whereas decreasing self-weighing frequency is also independently related to greater weight gain (Butryn et al., 2007). There are suggestions from expert professionals that even though regular weighing can motivate healthy behavior change promoting weight loss, in some cases it might generate a negative mood and increase body dissatisfaction, possibly undermining weight loss efforts (O'Neil & Brown, 2005). A systematic review of the literature concluded that more frequent self-weighing was associated with greater weight loss and weight gain prevention, but could not find clear negative psychological consequences associated with the self-monitoring behavior (VanWormer, French, Pereira & Welsh, 2008). Hence, self-monitoring and self-weighing is a safe and easy tool that can be used for the maintenance of weight reduction among postpartum women.

There is scarce literature on the impact of the self-regulation theory on the emotional state of women during the postpartum period. Postpartum depression is a mood disorder that

affects 10 to 15 percent of new mothers, and can have a significant impact on both the woman and the development of her baby (Castle, 2009). Affected women usually have loss of interest, sadness, appetite changes, anxiety as well as many other symptoms that can affect their ability to function and complete activities of daily living. This is different from the postpartum blues which has a more common occurrence among new mothers; characterized by relatively mild symptoms that can develop shortly after delivery, resolves in a few weeks and does not overly impact the mother's ability to function (Castle, 2009). There are suggestions that implementing a self-regulation exercise intervention is only effective for non-depressed individuals when compared with individuals with depressive symptoms (Pomp, Fleig, Schwarzer & Lippke, 2012). Another study observing the long-term effects of a self-management intervention on physical activity and depressive symptoms found that the intervention group, which received brief self-regulatory guidelines, reported a reduction of depressive symptoms (Scholz, Knoll, Sniehotta & Schwarzer, 2006). The control group, which received the standard of care, did not have a similar reduction, implying that the perceived attainment of exercise goals contributed to the reduction of depressive symptoms for the intervention group (Scholz, Knoll, Sniehotta & Schwarzer, 2006).

The effect of cultural considerations with body image and perceived attractiveness is another area of limited knowledge, especially for minority groups; most of the available literature is specific to non-Hispanic white women and African American women. Many findings suggest that African American women are more satisfied with their bodies than white women (Chithambo & Huey, 2013). A study conducted by Chithambo & Huey (2013) found that African American women reported a lower perceived weight and higher attractiveness than white women, despite higher body mass for African American women (Chithambo & Huey,

2013). This supports the suggestion that African American women are less susceptible to body dissatisfaction due to cultural ideals that perceives a heavier body type as attractive and discourages rigid body weight-loss efforts (Kahn & Powell, 1995). Another study found that European American women whose self-worth and body satisfaction were reliant on their weight had a greater drive for thinness (Sabik, Cole & Ward, 2010).

Summary of Literature Synthesis and Innovation

The review of the literature has shown certain strengths due to the quality of evidence, quantity and consistency of some of the major concepts. The importance of breastfeeding and proper caloric intake are undeniably aspects that should be taken into consideration during the postpartum period. Integrating a physical activity intervention is another integral element that requires great feasibility and flexibility given the sensitive and busy time period for this population of women.

Limitations in the relevant body of literature are due to the scarcity of high quality studies specifically aimed at physical interventions for postpartum women. Most of the current knowledge of physical activity interventions for the postpartum period is derived from studies conducted in the general population, which are theorized to be applicable to postpartum women who are deemed physically and medically safe. There is consistent evidence in the literature regarding the importance of resuming a pre-pregnancy level of physical activity or beginning an adequate form of physical activity once medical clearance is given, but there remains a gap in identifying the particular types of physical interventions appropriate for the postpartum period.

There is a scarcity of knowledge concerning the effects of weight management or a self-regulation intervention on the depressive symptoms for postpartum women. It is also important

to note that cultural considerations concerning ideal body weight will be an influential factor when implementing a weight management program for a diverse population. There is a possibility that women who identify with a culture that perceives thinness as attractive might be more inclined to adhere to weight management goals. However, limited literature for minority ethic groups of women restricts the ability to deduce the exact influence this will have on the diverse population of postpartum women.

Recommendations for practice change focused on capitalizing on the enablers of weight reduction for postpartum women, while minimizing the barriers related to childcare issues and time. Postpartum women have various demographic factors affecting their ability to effectively focus on weight management. Therefore, it was important that this practice change acknowledge the unique situations of these women in order to provide a program plan that is straightforward, flexible and adjustable to each participant's circumstance. The simple daily physical activity intervention of walking affords a postpartum woman the opportunity to engage whenever suitable to her schedule, in addition to eliminating the childcare issue because it is a low-impact activity that can be done with a baby in a stroller or infant carrier. The use of a pedometer objectively measures the individual's ability to achieve the daily steps goal. To promote self-regulation and behavior maintenance, there is a recommendation to keep a daily log of physical activity.

Given the identified gaps in the evidence on step-based recommendation during physical activity for postpartum women, guidelines from other studies of the general population were used. According to a systematic review, a healthy adult between the ages of 19 to 65 should safely have a daily step goal ranging from 6,000 to 10,000 (Tudor-Locke et al, 2011) (Figure 5). A literature review conducted within the general population suggests that a daily 10,000 steps

goal is appropriate for maintaining an adequate level of physical activity for health (Choi, Pak, Choi, & Choi, 2007). Therefore, the recommendation for postpartum women was to start with a goal of 6,000 steps/day, then increase the daily steps for an end goal of 8,000 steps/day over a period of eight weeks

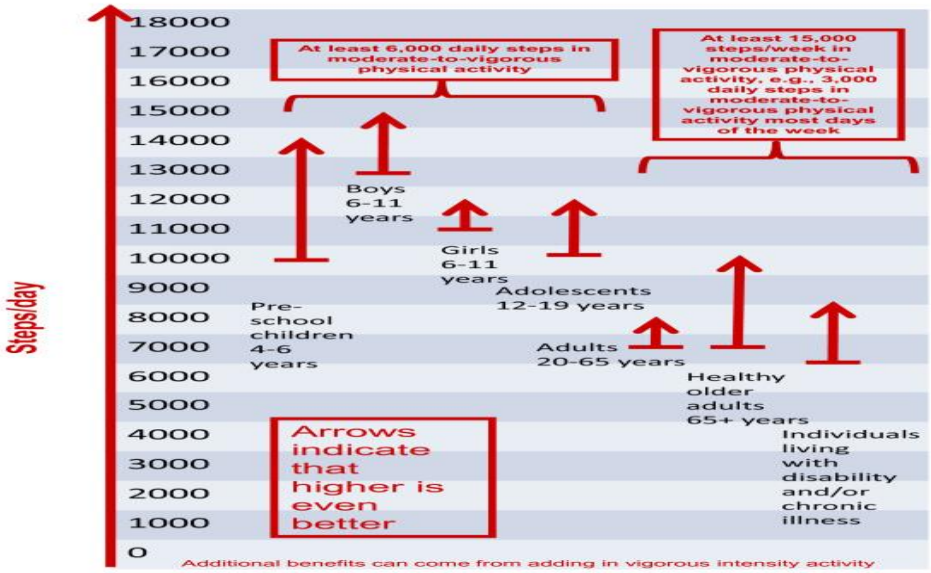

Figure 5. Steps/day scale based on age

Source: "How Many Steps are Enough? For Adults" by C. Tudor-Locke et al., *2011, International Journal of Behavioral Nutrition and Physical Activity 8*, p. 80, doi:10.1186/1479-5868-8-80.

Chapter 3: Methods/Implementation Process

Overview

The goal of this program was to support the initiation and maintenance of certain health behaviors for postpartum weight management. Given that this guideline was specifically being targeted for the postpartum women at the local WIC clinic, its implementation methods were tailored to meet the clinic's organizational structure and be suitable for the busy postpartum mother. The program incorporated the essential triad of breastfeeding, nutrition and physical activity for postpartum weight reduction and management starting at six weeks up to one year after giving birth. For early and sustained weight management postpartum, it is imperative that the importance of all three aspects is properly combined for greater effectiveness (Lovelady, 2011).

Design

The self-regulation concept, which is derived from the SCT, was used to model the evidence-based practice interventions that were recommended for postpartum weight management. The SCT proposes that any measure taken to promote healthy living should not only focus on the initiation of those ideal health behaviors, but considerable attention should be given to the preservation of those health behaviors on a long-term basis (Behavioral Change Models, 2013). The self-regulation concept which is completely contingent on all of the elements embedded in the SCT goes further by concentrating on the personal and external factors that affect an individual's behavior.

The use of the SCT model along with self-regulation was appropriate for this pilot program. Given the population of interest and the hectic time period, there might be unique individual constraints for time and flexibility depending on family structure and support. It was important that interventions aimed for this period are flexible and have the ability to be individualized by each postpartum woman. The SCT model and the self-regulation concept stress the individual's role in initiating and maintaining health behaviors, which is essential for longevity and success. Using the model provides the opportunity to increase knowledge, provide training, create a supportive environment and promote self-efficacy for sustained behavioral changes (Denler, Wolters & Benzon, 2013). The program was being modeled after the above concepts to increase the likelihood that postpartum women can take complete ownership of their individual progress and be active participants whose success is driven by their own actions and behaviors.

Definitions of Terms

Postpartum period: Period beginning after the birth of a child lasting up to one year.

Weight reduction: Safe and intentional reduction of an individual's total BMI and weight from a conscious effort that focuses on implementing positive behavioral changes and lifestyle practices.

Weight management postpartum: Long-term approach to engaging in healthy lifestyle practices which include appropriate nutrition, physical activity and breastfeeding.

Breastfeed: To feed a baby with milk from a mother's breast (Breastfeed, n.d.).

Physical activity: Body movement that works the muscles and requires more energy than resting (U.S. Department of Health and Human Services [HHS], National Institutes of Health [NIH], National Heart, Lung, and Blood Institute [NHLBI], 2011).

Health Behaviors: Actions, attitudes, interests and opinions that affect an individual's physical activity, healthy eating and emotional well-being.

Pedometer: Device worn while walking or running that estimates the distance traveled by recording the number of steps taken (Dictionary.com, n.d.).

Setting and Sample

The WIC program, a national public health nutrition program under the jurisdiction of the United States Department of Agriculture (USDA), was established as a pilot program in 1972 and made permanent in 1974 (WIC, 2014). It is a domestic discretionary program funded annually through the U.S. Senate and House Appropriations Committee. The WIC program is a short-term intervention program designed to influence lifetime nutrition and health behaviors in a targeted, high-risk population (WIC, 2014). The WIC program is for low-income pregnant and postpartum women, infants, and children up to age 5 who are at nutritional risk. In Hawai`i, there are 17 local agencies operating 36 WIC clinics that serve over 37,000 participants enrolled in the program (Women, Infants and Children, 2014). In order to qualify to receive services at a WIC clinic in the state, one must be either a pregnant, breastfeeding, or postpartum woman, or have children under 5 years of age who have nutritional needs, meet federal income guidelines and be a resident of Hawai`i. This program was implemented at the WIC clinic of Wahiawa, which is one of the local clinics on the island of Oahu that provides information on nutrition, vouchers for

certain food items, breastfeeding promotion and support, with screenings and referrals for healthcare and other social services.

The clinic is managed by a clinic coordinator who holds the highest administrative position in the Wahiawa local clinic and supervises the daily operation of the services that are provided. Even though the Wahiawa clinic is under the jurisdiction of the USDA, the clinic coordinator has the authority to manipulate the individual services provided to meet the needs of its local clinic clients. The clinic staff is comprised of counselors and nutritionists/dietitians who provide nutritional and breastfeeding guidance. Clinic clients are comprised of local Hawaiian residents of various ethnicities and the dependents of active duty military personnel who are stationed on Oahu. There is a mixed cultural composition of the clinic clients including whites, native Hawaiians, other Pacific Islanders, Asians, African Americans and other groups who qualify to receive support from the clinic based on their total household gross income.

The pilot program was to be conducted with a sample size of 25 postpartum women who receive care and support from the Wahiawa WIC clinic. All program participants were required to be over the age of 18 and at a minimum of six weeks post-partum with clearance from their healthcare provider stating that it is safe to resume normal activities of daily living including light to moderate physical activity. The WIC clinic clients with greater than ideal BMI were encouraged by the program coordinator and clinic staff to enroll in the program. The pilot program was also open to all other WIC clinic clients who demonstrated an interest in obtaining additional resources on weight reduction and management postpartum. Exclusion criteria for the program included: postpartum women who either experienced a complicated pregnancy or a complicated delivery and who had not received physical clearance from their healthcare provider; postpartum women who were unable to walk due to medical or personal reasons; and

postpartum women who weighed less than the ideal BMI according to the recommendation of the IOM.

Practice Change

This weight management program focused on using the combination of physical activity, breastfeeding and proper nutrition to promote a healthier lifestyle in the postpartum period. As an organization, WIC advocates breastfeeding and promotes good nutrition for postpartum women in support of better infant health. But there is no additional emphasis highlighting the combination of physical activity, breastfeeding and appropriate nutrition as facilitators for post-pregnancy weight reduction. The program aimed to emphasize how well the above triad works to decrease post-pregnancy weight and optimize the overall health of the postpartum woman.

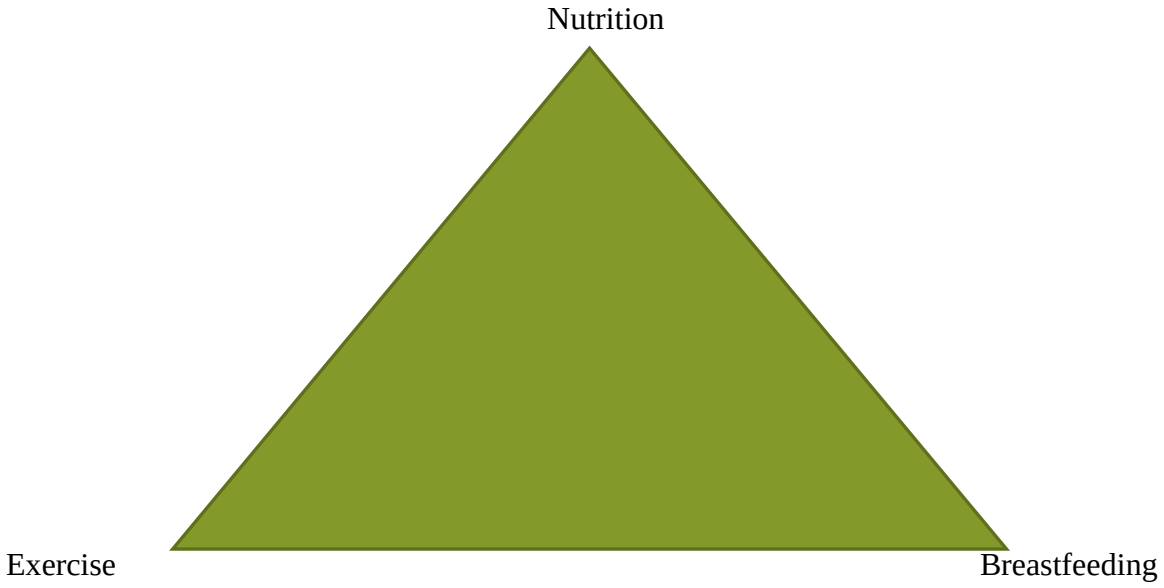

Figure 6. Program Triad

Positive Health Behaviors:

Physical Activity

Most women with an uncomplicated delivery receive clearance from their healthcare provider to resume normal activities six weeks post-delivery. Women are often encouraged to gradually increase physical activity for health safety measures. Walking is a physical activity measure that presents very minimal risk to a healthy postpartum woman. Walking is an ideal physical activity intervention because it is an activity that any postpartum woman can accomplish independently and does not require any additional preparation. Participants who lack childcare were encouraged to include the infant in the activity by walking with the baby in a stroller or infant carrier. The goal was for participants to engage in walking as a physical activity intervention on a daily basis.

Self-Regulation

Goal of walking was set at a minimum of 6,000 steps/day. Participants were provided a pedometer to keep track of their steps to ensure that they were meeting their daily physical activity goal. Participants were to keep a log tracking daily physical activity and steps completed. They were encouraged to increase their daily step goal to 8,000/day by the end of the eight-week pilot program.

Breastfeeding

For any traditional weight management plan, physical activity and healthy eating are the two adjustments individuals are prompted to make in their daily lives for program success. In addition to physical activity and health eating, many postpartum women are breastfeeding their infants. Research has shown that breast milk is the ideal food for an infant's first year of life

because of the many nutritional and emotional benefits it provides for mother and infant (American Nurses Association (ANA), 2010).

In the Wahiawa WIC clinic, there is an organizational focus on breastfeeding to improve the nutritional status of infants. All clinic clients are offered educational materials with counseling on breastfeeding in addition to participation in the breastfeeding support group, which meets routinely. Exclusively breastfeeding clinic clients receive an enhanced food package and are eligible to participate in WIC postpartum supplement program longer than non-breastfeeding clients. Additionally, breastfeeding clinic clients can receive breast pumps and pumping accessories at no charge to encourage the initiation and continuation of breastfeeding.

WIC clinic promotion for breastfeeding is geared towards the well-being of the infants; however, there is no additional promotion to specifically highlight how breastfeeding is a necessary aspect for postpartum weight reduction. The program resources do include an informational brochure emphasizing the breastfeeding benefits to the mother, including its role in weight reduction and management. There is also an inclusion of all the additional resources provided by WIC to support breastfeeding. Mothers who are unable to breastfeed their infant due to personal or health reasons were still encouraged to participant in and focus on the other elements of this pilot program.

Nutrition

Nutrition is another focus of WIC that has a supplemental food program that provides families with healthy foods and nutrition education. The foods provided by WIC are high in nutrients, specifically focusing on foods low in fat and high in fiber. These foods are given in

the form of monthly vouchers, which can be used as cash value to buy vegetables, fruits, whole grains and other specified food options.

ChooseMyPlate.gov is a resource created by The Center for Nutrition Policy and Promotion (an organization of the USDA) to help improve the nutrition and wellbeing of Americans. Participants were encouraged to use the ChooseMyPlate.gov nutritional guide provided by the pilot program to help them determine estimates of recommended daily amounts of food from each food group for their dietary intake. This template is specifically for the breastfeeding mother and varies during certain months of breastfeeding to meet her changing nutritional needs. Participants were also encouraged to use the additional tools available on the resource website, including "The Super Tracker" that gives a personalized diet plan and tracks what an individual eats and drinks.

Figure 7. ChooseMyPlate.gov

Source: http://www.choosemyplate.gov/mypyramidmoms/

Enrollment Procedure

All program participants were enrolled at the Wahiawa local WIC clinic. Informational posters about the program were posted throughout the clinic a month prior to program initiation. Clinic clients who inquired about the program were forwarded to the program coordinator for further information. The clinic staff was also provided with program information so they could rely to clinic clients who are interested in participating in the program on an individual basis. Before program initiation, clinic clients received an informational packet outlining enrollment criteria and program details. Due to the informal and non-invasive nature of this program, consent for enrollment was assumed with active participation after receiving the informational materials. No other formal form requiring participants' signatures was necessary to be signed.

Data Collection Tools and Procedure

Data collection was obtained pre and post program intervention. These participant surveys were formatted by the program coordinator with the approval of the WIC clinic coordinator. Qualitative data were collected prior to the program's implementation through a self-reported questionnaire. This was a quick survey (i.e., required less than 5 minutes for participants to complete) with appropriately formatted questions requesting demographic factors; and to assess participants' attitudes, knowledge and barriers that can affect the weight management practices of postpartum women. The post-program questionnaire evaluated frequency in physical activity, total daily steps achieved, daily use of pedometer during physical activity,, use of the nutrition template, breastfeeding status, and the overall program's feasibility and effectiveness for the postpartum period

Even though this was a weight management program, the emphasis for success was not placed on numerical changes seen in weight or BMI (i.e., there was no weekly weight check required or recorded by participants). Instead, the focus of the program was on the promotion and maintenance of healthy lifestyle practices in the postpartum period. As a result, there was minimal quantitative data collected for program evaluation. The main quantitative data collected at the completion of the pilot program were participant's daily activity log specifically including steps per day using a pedometer. The participants were informed to maintain this daily log through the duration of the eight weeks pilot program to track progress in reaching the goal of 6,000-8,000 steps/day. Completing the daily physical activity log was a requirement for program participation in order to properly evaluate the group's ability to meet program objectives.

Marketing and Business Plan

A staff meeting was conducted two months prior to program implementation to inform all clinic staff members of the program objectives and explain planned interventions and program expectations for the staff. A month prior to the beginning of the pilot program at the Wahiawa WIC clinic, informational flyers and posters were made available in the common areas of the clinic promoting the new pilot program. During the same time period, the clinic staff, including the nutritionist and counselors, was available to inform and encourage participation from postpartum clinic clients who they identified to have met the inclusion criteria for participation. The pilot program coordinator was available as a resource to support any clinic staff or postpartum clinic client about the program.

The ultimate goal of this program was to provide a service that will be beneficial to the overall health and wellbeing of postpartum WIC clients; therefore, it was important to acquire

the full support and participation of the clinic clients as they were the primary users of the program. The women were informed that the program had been developed in a way that allowed great flexibility and individualism for each mother. In addition, they were given the necessary resources to adhere to the program's interventions during the postpartum period.

The ability to achieve positive results from the pilot program could impact the long-term investment of the WIC organization towards this program. Weight management for postpartum women is not a central focus in services provided to clinic clients; however, certain findings from this program can be useful in demonstrating the importance of this issue to the organization. Therefore, it was essential that this program be able to easily fit into the organization's current structure and manner in which services are provided. To achieve permanent support and inclusion of this health promotion initiative into WIC's organization structure, the program was created as a self-sustaining one, similar to the breastfeeding and nutrition educational programs offered by the organization.

Required Resources

Each program participant required a pedometer to keep track of daily steps as recommended by the program. A personal pedometer calibrated by the program coordinator was provided to each postpartum program participant at enrollment. Additional required resources included some educational materials outlining the program triad and a nutrition template. Each participant was encouraged to keep a notebook or paper log in which they could keep track of daily steps.

Ethical Considerations

The inclusion criteria for program enrollment was limited to only women who were at least six weeks postpartum and who had uncomplicated pregnancies and births. The project coordinator completed the required Collaborative Institutional Training Initiative (CITI) course in Humans Subjects protection. Project approval from an institutional review board was unnecessary due to the minimal exchange of participant identifying or personal information, since this was a quality improvement initiative aimed at enhancing the services offered at the WIC clinic. Informal approval to conduct the pilot program at the Wahiawa WIC clinic was given by the clinic coordinator for the state and the coordinator for the local clinic. The program format was flexible and informal to support the current organizational structure of the company and the autonomous behaviors of its postpartum clinic participants. Even though the program was being offered in the clinic, clients had the right to decline participation in the program. Implemented interventions were derived from standard evidence-based literature and principles to ensure its quality.

Limitations

Limitations can be seen in the design of the program, which lacked participant randomization or the use of controls; therefore, there is an inability to prove causality between the variables. Planned program interventions extrapolated from the existing scientific literature were implemented, but the program was offered as a health promotion initiative. The postpartum weight reduction and management program was conducted using an observational and descriptive design.

This was a continuous quality improvement program; therefore, it lacked validity of instruments or the ability to generalize findings. Given the observational and descriptive design

due to the informal and non-invasive structure of the program, a higher level of data analysis like inferential statistics could not be used for evaluating results. Instead, descriptive analysis was utilized for the collected data.

The allotted time of eight weeks to conduct this pilot program was another observable limitation. Realistically, it takes almost a year for some women to completely lose their post pregnancy weight using healthy methods. Therefore, the shortened time period given for this pilot program did not allow enough time to adequately assess program long-term effects on other possible variables (specifically weight and BMI). The program focused on the initiation and maintenance of positive health behaviors. There was no program emphasis for the weekly monitoring of weight and BMI due to the clinic coordinator's recommendations against it.

Another limitation was due to the type of physical activity intervention used in the program. Participants were expected to walk daily, while keeping track of steps to monitor progress, with no provision for an alternate physical activity intervention. Therefore, WIC clients who are physically disabled or unable to walk due to certain medical conditions were unable to participant in the program.

Program Timeline

The participant enrollment process within the clinic began early summer of 2014 with program start occurring in July. All of the participants were less than six weeks postpartum when joining the program. All were advised to receive clearance from their healthcare provider between 6 to 8 weeks postpartum prior to starting the physical activity portion of the program. Due to the delay in initiating the third intervention component, the program was extended to be a total of 12 weeks; however, only eight weeks of physical activity were included in these 12

weeks and began after the first month of the program. For the first month, the participants were encouraged to utilize breastfeeding and healthy nutritional modifications as weight management interventions until there was documentation that their health care provider had cleared them to begin an exercise program. Data collection and analysis started fall of 2014.

Summary

In conclusion, this quality improvement program was aimed to assist postpartum women participants from the Wahiawa WIC clinic in the reduction and management of their post-pregnancy weight. The purpose statement and program objectives guided many aspects of the program procedure, including design, data collection and analysis. Due to the observational design of the program as a health promotion initiative, expected results were descriptive in nature. These results were used to gauge program's acceptance and efficacy among the postpartum women participants from the local WIC clinic, which can ultimately impact its permanence within the organizational structure.

Chapter 4. Results

Introduction

The objective of this project was to implement a quality improvement program that would be beneficial for postpartum weight management. The goal was to have a program that focuses on the initiation and maintenance of certain health behaviors that can facilitate postpartum weight reduction and management.

Description of Sample

Twenty-five postpartum women verbalized interest in joining the pilot program with12 actively participating for the entire duration of the program. The women were between the ages of 19 to 38 years, with an average age of 24 years. The ethnicity of the participants' was as follows: four Caucasians, two African American, three from Pacific Islander decent, three unknown as shown in Table 1.

Ethnicity	**Number**	**%**
Caucasian	4	33
African-American	2	16.7
Pacific Islander	3	25
Unknown	3	25

Table 1. *Ethnicity of Participants*

All of the women experienced singleton pregnancies, with eight (66%) having vaginal births and four (33%) giving birth by cesarean section. The estimated weight gain during pregnancy ranged from 10 to 52 pounds, with the lesser weight reported for women with above

normal BMI's. Body mass index was calculated for each woman using their reported current weight and height. Based on these BMI calculations, seven (58.3%) women were classified as over-weight and five (41.7%) were obese. At the initiation of the program, five women were exclusively breastfeeding, three were breastfeeding and supplementing with formula, and four were exclusively formula feeding their infants. Nine women were married and three women were partnered but not married. The participants' educational levels varied as follows: trade school six (50%), high school diploma two (16.7%) and Bachelor's degree four (33.3%).

Results of Pre-Program Questionnaire

Descriptive analysis was used to summarize the results of the pre- and post-intervention questionnaires. All the participants reported that their healthcare provider discussed the importance of losing the pregnancy weight during the postpartum period for improved overall health. However, less than one third of the 12 women received a specific recommended exercise plan to achieve that goal. All reported that they would have preferred specific recommendations from their healthcare providers about strategies to achieve weight reduction. There were collective positive responses of the participants' about their understanding of the dual benefits of breastfeeding for the mother and her infant, as well as the importance of incorporating proper nutrition and physical activity for positive weight changes after giving birth. All of the participants indicated that good nutrition was essential during the postpartum period especially for breastfeeding and weight reduction, but none identified a specific diet or guideline they used to ensure adequate nutrition. None of the women had participated in any physical activity (i.e., exercise) since giving birth.

Results of Post-program Questionnaire

At the program's conclusion, five women were still exclusively breastfeeding; the three breastfeeding women who were supplementing at the beginning of the program made the choice to join the other four women in exclusively formula feeding their infants as shown in Table 2.

	Exclusive Breastfeeding	Breastfeeding/supplementation	Formula feeding
Pre-program	5 (41.7%)	3 (25%)	4 (33.3%)
Post-program	5 (41.7%)	0	7 (58.3%)

Table 2. *Breastfeeding Status Pre and Post-Program*

Six participants reported walking very frequently as suggested by the program, four walked occasionally, and two participants rarely walked as shown in Table 3. In addition to walking, three participants engaged in other forms of physical exercise that included running, using the elliptical machines and weight training. All participants kept a log of physical activity that included the amount of steps taken daily. Six participants constantly used a pedometer to track their steps (50%); however, the other six (50%) reported occasionally forgetting to take the pedometer and were unable to use it during those activity periods. The average number of steps achieved by all the participants at the completion of the program was 7312, with a range of 6,250 to 8,520 steps.

Frequently(daily)	**Occasionally (2-3 X a week)**	**Rarely (once a week)**	**Never**
6 (50%)	4 (33%)	2 (16%)	0

Table 3. *Frequency of Daily Physical Activity of Walking*

There was limited use of the ChooseMyPlate template to guide nutritional intake. Two women (16.7%) consistently used it to ensure adequate nutrition and avoid excessive caloric intake. The other ten (83.3%) denied using any specific guide to manage their nutritional intake during the program. Finally, the program met its goal of achieving high feasibility scores for a busy postpartum woman. Ten (83.3%) of the women agreed that the flexibility of the program was ideal for a busy postpartum woman, while the other two (16.7%) did not agree or disagree with the statement.

Effectiveness of Marketing and Business Plan

During the participant enrollment timeframe, a total of 25 participants were obtained through two main methods. Ten postpartum women verbalized an interest in joining the pilot program after seeing the informational flyers in the clinic and requested additional program information as noted in the flyers. The other 15 participants were referred from the clinic staff. Overall, informing the clinic staff about the program and providing essential materials to be given to potential participants proved to be quite effective. The staff of counselors, lactation consultants and clinic coordinator worked closely with the clinic clients; therefore, it was easier for them to identify the women whose health would greatly benefit from the program due to their higher than normal BMI.

Evolution of Project

The program was designed to initiate self-motivated lifestyle behavioral changes involving breastfeeding, physical activity and nutrition that participants could maintain at an independent level once the pilot program ended. However, after program initiation, participants showed more interest in the breastfeeding and physical activity component of the program, with

minimal focus on nutrition. Midway through the program, the group was divided into participants using breastfeeding and physical activity, while others were only focusing on using physical activity. All reported adequate nutrition, but could not clearly pinpoint their daily intakes.

A few participants verbalized interest in walking with other participants so that they could support each other during the process. Due to fiscal restrictions, the local WIC clinic was unable to help with this endeavor. The clinic staff could only assist in promoting the program and allowing implementation at the clinic. The pilot program coordinator attempted to form informal walking groups but, ultimately, these efforts were unsuccessful due to the logistics of coordinating participants' schedules. However, four participants reported that routinely walking with their partner or another adult family member was a source of instrumental motivation. The SCT and self-regulation framework used to structure the program was a major facilitator for the whole process, especially for the 12 women who completed the pilot program. These postpartum women were initially self-motivated to join the program, and were, for the most part, able to stay on track after they were given the program educational materials. The WIC staff functioned as facilitators by not only supporting and educating the women about breastfeeding, but also by incorporating the physical activity intervention and nutrition template for healthy postpartum weight reduction as part of their education of the women enrolled in the pilot program. In addition, the women who were exclusively breastfeeding and those who were breastfeeding with formula supplementation were able to receive individual support from the lactation consultants.

Major barriers to the success of the program were identified and included the challenge of coordinating the various schedules of participants and inconsistencies with communicating with the program coordinator. The pilot program required each participant to routinely communicate

with the program coordinator in order to receive individual feedback and evaluate progress. However, there was a dropout rate of more than half of initial participants due to lack of time for them to fully commit to the program and effectively communicate as necessary. For the remaining participants, bi-monthly telephone calls initially intended for providing program support to each individual participant also proved to be difficult to complete. There were many occasions in which some participants did not answer their phones or were unable to hold an extensive conversation with the program coordinator due to the demands of their home life. The program coordinator tried to accommodate for this by communicating via text messages and emails; however, this did not provide the adequate interaction necessary to evaluate participant progress and offer appropriate support.

Chapter 5. Discussion

Interpretation of Findings

Results from the pre-intervention questionnaire indicate that, although the participants were informed it was important to lose pregnancy weight gain, most were lacking a detailed plan presented to them by healthcare providers or others to help them achieve this goal. The decline in breastfeeding among participants implies that there needs to be continued promotion of breastfeeding beyond the initiating period (i.e., in the hospital after giving birth) for postpartum women. The main benefit offered by this pilot program was the effective utilization of women to reduce pregnancy weight through a postpartum weight management approach that incorporated breastfeeding, physical activity and adequate nutrition. Additional benefits were the positive aspects of breastfeeding that extend to other areas of maternal health including lower rates of breast and ovarian cancer and forming a stronger bond with the infant that often decreases occurrences of post-partum depression (ANA, 2010). Breastfed infants benefit by receiving the most optimal form of nutrition due to its immunological properties, as well as other long term benefits such as lower mortality rates, healthy weights and reduced risk of hospitalization due to lower respiratory tract diseases (ANA, 2010). Also, research has shown that the overall risk of Sudden Infant Death Syndrome (SIDS) is reduced by half for breastfed infants compared to formula-fed infants (ANA, 2010). Breastfeeding is protective against SIDS, and this effect is greater for infants exclusively breastfed (Hauck, Thompson, Tanabe, Moon & Vennemann, 2011. Lastly, breastfeeding confers an economic advantage. The average family in the U.S. spends $1,200-$1,500 annually to purchase infant formula (ANA, 2010). Moreover, there is an additional cost from direct and indirect medical expenses that can be present for infants not

exclusively breastfeed for the first six months of life that can amount to an estimated annual cost of $13 billion (ANA, 2010). However, despite receiving adequate information about the many benefits of breastfeeding at the program's initiation, half of the program participants were no longer breastfeeding at program completion. Various reasons were cited for early infant weaning and cessation including fear the infant was not adequately satiated with only breast milk, lack of time due to school or work demands, mother/infant discomfort due to inefficient infant latching, or simply that it was easier to formula feed. It is possible that the easy convenience and accessibility to free formula products from WIC was a hindrance to sustaining breastfeeding for some women. This decline in breastfeeding within this group is identical to the trends of breastfeeding seen in Hawai`i and throughout the U.S. Data from the Breastfeeding Report Card 2012 for the state of Hawai`i reveal that 85.1% of women start breastfeeding after birth, 51.1% are breastfeeding at six months, and only 32.4% are breastfeeding by 12 months (CDC, 2012). These data include women exclusively breastfeeding and women who breastfeed with formula supplementation. The percentage is even lower for exclusively breastfeeding women in the state, with only 42.6% who are exclusively breastfeeding at three months and 20.7% who are exclusively breastfeeding at six months (CDC, 2012). The AAP recommends exclusive breastfeeding up to 6 months of age and breastfeeding at least up to 1 year of age with supplementary feeding (AAP, 2012). However, despite such recommendations from experts, breastfeeding rates remain low. To combat this trend and improve breastfeeding duration, more effective strategies using education and social support are necessary.

Adherence to walking as a physical activity intervention was high and there was no indication the activity was either too strenuous or demanding for the busy postpartum mothers. The daily physical activity intervention seemed to be an achievable task for the women who

were committed to reducing their postpartum weight. Despite the flexibility provided with the intervention of walking daily either alone or with the baby in a stroller or infant carrier, some women wanted the company of another adult. Participants who did not walk daily cited the lack of partner support (i.e., walking with their partners) or the company of another adult when walking as a major reason for a decreased frequency of walking. For these individuals, the benefit of this simple intervention was outweighed by the minimal social interaction that was experienced during the daily walking.

The self-regulation requirement to log daily activity steps seemed to inspire participants' accountability. The participants were often able to report their numerical progress in steps that could be compared to their prior weeks' results during the frequent follow-up conversations conducted during the program's implementation. For those who frequently forgot to take their pedometers during walks, they often recorded an estimate of the time (i.e., duration) they spent for the daily physical activity. All the participants were able to surpass the minimum goal of 6,000 steps within the first few weeks of initiating physical activity, with many close to reaching the maximum goal of 8,000 by program completion; and some even incorporating other forms of cardiovascular activity.

Finally, there was minimal focus on nutrition by the women despite the flexibility of the ChooseMyPlate template for breastfeeding mothers that was provided as part of the program. Due to the fact that the template only provides recommendations for servings but not strict guidelines, many women reported that they tried to modify their intake accordingly but were unsure if it was accurate and, therefore, primarily used their personal judgment during meal times. There appeared to be a greater focus by the women on the other two elements of the

program's triad, with less excitement for following the loose national recommendations from ChooseMyPlate.

Implications/Recommendation

This program highlights some implications for adequately addressing the weight reduction needs of postpartum women. Using the triad of physical activity, breastfeeding and nutrition can provide a postpartum woman with a gradual and safe way to return to her pre-pregnancy weight, while providing the infant with an optimal form of nutrition. Promotion of the benefits of breastfeeding and postpartum nutrition is necessary for this population of women. Without a specific guideline for nutrition, some of the women did not really focus on their dietary intake. The flexible nutritional template that only suggested daily serving sizes proved to be an ineffective tool for the postpartum women. It is possible this population might benefit from a more structured nutritional guideline to minimize inaccuracy and non-compliance. Therefore, to ensure adequate nutrition without excessive or insufficient caloric intake, more attention should be focused on formulating a nutritional intake guideline that is appropriate for the postpartum period (i.e., examples of specific meal plans), as well as exploring existing community weight reduction programs that have such information already prepared and can be easily and safely implemented by postpartum women.

Postpartum women require a flexible physical activity intervention given the hectic nature of this time period. However, providing adequate social interaction is a component of the activity that should not be minimized. Arranging optional informal walking support groups similar to the breastfeeding support groups supported by the WIC organization or in local communities might be beneficial for postpartum women who want to participate in the program

and need some form of social interaction to successfully continue in this physical activity intervention.

Finally, the program recommended physical activity for postpartum women is also ideal for pregnant women. According to the ACOG guidelines, moderate exercise of 30 minutes or more is recommended for pregnant women in the absence of either medical or obstetric complications (Artal & O'Toole, 2003). Walking daily as a form of moderate exercise is ideal for pregnant women with a low risk of abdominal trauma. Pregnancy can be a vital time for behavior modification due to the strong motivation to improve both maternal and infant health. Pregnant women who receive care at the WIC clinic will greatly benefit from recommendations to begin walking during their pregnancy. Moderate physical activity (i.e., walking daily) may improve the long-term health of pregnant women, reduce excessive gestational weight gain and play a protective role in the development of obstetric health complications (i.e., gestational diabetes) (Downs, Chasan-Taber, Evenson, Leiferman & Yeo, 2012). Early introduction to this health behavior might positively impact the woman's ability to adapt and maintain the health behavior through the postpartum period.

Conclusion

As an institution, WIC aims to influence the lifetime nutrition of women, infants and children by providing informational and practical support (WIC, 2014). Postpartum weight reduction has not been an overly emphasized goal of WIC, but the alarming increase in pregnancy weight gain above the recommendations of the IOM both in the state of Hawai`i and throughout the nation demands that this prominent organization take action. The purpose of this program was to implement a flexible weight management program for postpartum mothers using

the triad of breastfeeding, physical activity and nutrition. Findings from this pilot program indicate that self-regulation of lifestyle, including monitoring daily activity and progress in health daily activities, raises the accountability and adherence of participants to maintain these behaviors. Additionally, the flexibility offered within the simple physical activity intervention is feasible even for a busy postpartum woman.

Current program limitations include the initial financial commitment that establishing such a program requires, allocating staff to coordinate the program, and providing the necessary program materials (pedometers and log books) to all participating postpartum women. However, the long-term benefits a program such as this confers to the overall health and wellbeing of postpartum women can be of great value. Formalizing such a program on a larger scale requires full organizational support, since it necessitates using the services of clinic counselors and nutritionists who are adequately trained to educate and offer support to postpartum women. Given that the postpartum period is often unpredictable and hectic, maintaining the program's flexibility is essential to the ensuring the feasibility of its interventions for busy mothers. It is important that the implemented program focus on supporting the self-regulated behavioral activities of postpartum women. This can be accomplished by providing necessary educational support, breastfeeding support, nutritional counseling, and creating optional walking groups or other forms of physical activity for women who may be unable to walk.

Due to fiscal restrictions, the essentials of this program have only been offered in the form of an informational flyer with limited support for only breastfeeding and nutritional counseling. It does not provide any additionally forms of program support, such as other program resources, and does not coordinate any optional physical activity group meetings. However, postpartum

women who receive care at the WIC clinic will greatly benefit from joining this program as a formal clinic service offered in a flexible and supportive environment. Establishing a program at WIC clinics that focuses on highlighting the benefits of breastfeeding, physical activity and adequate nutrition is essential for effective postpartum weight reduction and management.

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Appendices

Appendix A: Program Introduction and Details

A Healthier "YOU" postpartum program

This will be a simple program directed at improving the overall health of the postpartum mom. To participant in the program, you simply have to be between 6 weeks and up to two years postpartum with a post delivery health clearance from your health provider allowing you to resume normal activities.

The program is structured to allow great flexibility and independence for moms, so you are able to participant in a way that better suits your schedule and life. All program informational resources and materials are within the provided packet. A demographics form as well as two questionnaires has been included to be completed before starting the program and again at the end. Please feel free to contact the program coordinator with any questions, comments or concerns at 240-838-6905 or musmith@hawaii.edu.

Mahalo,

Mary Smith

Appendix B: Thank you Letter

June 2nd, 2014

Dear Postpartum mom,

I would like to thank you for your participation in the "Healthier YOU" postpartum program offered through the Wahiawa WIC clinic. We understand that this is a very hectic period due to the constant demands of caring for a baby and we greatly appreciate your participation and feedback for this program. Your valuable input will help us to understand the effectiveness of this program for the postpartum period in our efforts to enhance the services provided for the overall health of our moms.

Please take a look at the enclosed documents outlining program details

Mahalo,

Mary Smith, MSN, APRN-RX, FNP-BC |
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musmith@hawaii.edu
240-838-6905 Mobile

Appendix C: Demographic Form:

Date:
Age:

Ethnicity:

Type of Pregnancy (Single or Multiple births) :

Type of Delivery (vaginal or cesarean) and Delivery Date:

Pre-pregnancy Weight : Pregnancy Weight: Current Weight Height:

Breastfeed exclusively: ___ Formula- feeding: ____ Breastfeeding/ formula supplement____

Marital Status ("√" one):

- ❑ Single[1]
- ❑ Married[2]
- ❑ Partnered/not married[3]
- ❑ Widowed[4]
- ❑ Divorced[5]
- ❑ Separated[6]
- ❑ Other[7], specify:_____

Education ("√" one):

- ❑ less than high school[1]
- ❑ high school diploma[2]
- ❑ some college/trade school[3]
- ❑ trade school diploma[4]
- ❑ college degree[5]
- ❑ graduate degree[6]

Appendix D: Pre-program questionnaire

Please complete form before starting the program

(Circle your answer)

1. Did your provider discuss the importance of losing your pregnancy weight during the postpartum period for improved overall health? Yes or No
2. Did your provider discuss any specific exercise plan that is recommended for the postpartum period? Yes or No
3. If NO to the above answer, would you have preferred if your provider gave you a specific recommendation for weight reduction? Yes or No
4. Who does breastfeeding benefit the most?
    a. Baby
    b. Mom
    c. Both
5. Is it normal to gain more weight when breastfeeding? Yes or No
6. If you are breastfeeding, are you supposed to eat as much as you want to make sure you are eating enough? Yes or No
7. Can you exercise when breastfeeding? Yes or No
8. How often do you exercise
    a. Very rarely (Never)
    b. Rarely (once a week)
    c. Occasionally (2-3 times a week)
    d. Frequently (4-5 times a week)
    e. Very frequently (Daily)
9. What kind of exercise program do you prefer for the postpartum period?
    a. Structured daily exercise with specified times
    b. Flexible exercise program that can be performed independently
    c. No program at all

10. Which element is most important for weight reduction during the postpartum period
    a. Breastfeeding
    b. Nutrition
    c. Exercise
    d. All of the above

Appendix E: Post-program questionnaire

Please complete this form at the end of the program (Circle your answer)

1. How often did you go walking as suggested by the program?
    a. Very rarely (Never)
    b. Rarely (once a week)
    c. Occasionally (2-3 times a week)
    d. Frequently (4-5 times a week)
    e. Very frequently (Daily)

2. Did you engaged in any other form of physical activity? Yes or No (If yes, please specify what and frequency).

3. Were you able to keep a log of your daily activity as suggested by the program?
    Yes or No

4. Did you use the pedometer to track you daily steps? Yes or No

5. How many steps per day are you able to achieve today?

6. Were there any barriers to achieving your daily step goal?

7. Did you use ChooseMyPlate for food servings recommendations? Yes or No

8. What is your current status:

Breastfeed exclusively: ___ Formula- feeding: ____ Breastfeeding/ formula supplement____

9. What is your overall impression of the program requirements?

    a. Did not understand
    b. Understood a little
    c. Understood most of it
    d. Understood very well

10. This program is ideal for a busy postpartum mom.
    a. Strongly agree
    b. Agree
    c. Neither agree or disagree
    d. Disagree
    e. Strongly disagree

Appendix F: Front page of Information Brochure

BREASTFEEDING

Benefits mom and baby

Mother's milk is the best source of nutrition for your little one plus mom can burn up to 500 calories a day breastfeeding

Breastfeeding support available at the Wahiawa WIC clinic

Inquire within the clinic for breast pumping materials

EATING RIGHT

Good nutrition while breastfeeding is essential for weight management

The calories and amounts of food you need change over time while breastfeeding.

Use the provided food chart insert from ChooseMyPlate.gov to get estimates on daily recommended amounts for each food group

A healthie
YOU
postpartum

A simple program
postpartum wome
focused on weight
management and
overall increase in
health

For program questi
and comments cont
Mary Smith at
240-838-6905 or
musmith@hawaii.e

Appendix G: Back page of Informational Brochure

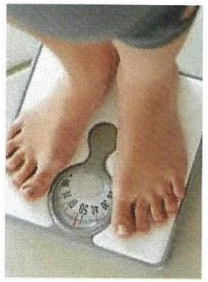
Let's Move with the Baby

- Daily Exercise: Mom can go walking by herself or in a group around the neighborhood or to a nearby park
- If childcare is an issue, mom can go walking with the baby in a stroller. Best time is after the baby is well-fed and diaper changed, so baby will be less fussy and might even nap during walk
- Walking provides adequate exercise, with great flexibility and less structure for mom and baby

Take Charge of you Health

- Set a daily step goal
- Start at 6,000 steps per day
- Use a pedometer to track your daily steps
- Aim to slowly and safely progress to 10,000 steps per day = 2 miles

Track Your Success



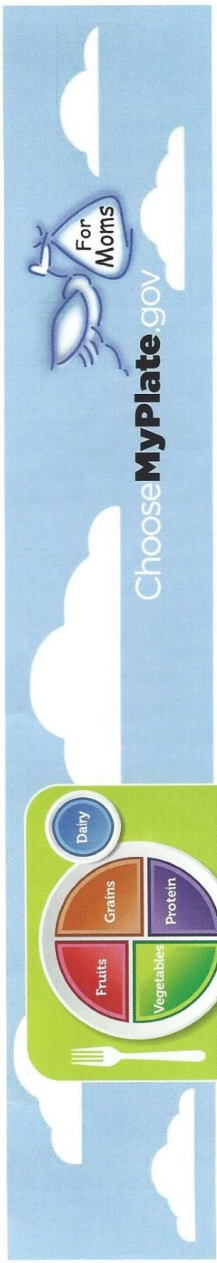
Set a daily step goal and a weekly weight loss goal

Keep a journal to log your dai steps for each day of the wee

Weigh yourself each week t monitor progress

You can contact program coordinator for details on obtaining program materia

Appendix H: ChooseMyPlate.gov Template for Moms



Based on the information you provided, these are your recommended amounts from each food group. For more information, go to ChooseMyPlate.gov.

	GRAINS Make half your grains whole	VEGETABLES Vary your veggies	FRUITS Focus on fruits	MILK Get your calcium-rich foods	MEAT & BEANS Choose lean with protein
Birth to 6 Months **Mar - Sep** Based on a 2600 calorie pattern*	**9 ounces a day** Aim for at least 4½ ounces of whole grains a day	**3½ cups a day** Aim for this much weekly: Dark green veggies - 3 cups Orange veggies - 2½ cups Dry beans & peas - 3½ cups Starchy veggies - 7 cups Other veggies - 8½ cups	**2 cups a day** Eat a variety of fruit Go easy on fruit juices	**3 cups a day** Go low-fat or fat-free when you choose milk, yogurt, or cheese	**6½ ounces a day** Choose low-fat or lean meats and poultry. Vary your protein routine—choose more fish, beans, peas, nuts, and seeds.
6 to 12 Months **Oct - Mar** Based on a 2600 calorie pattern*	**9 ounces a day** Aim for at least 4½ ounces of whole grains a day	**3½ cups a day** Aim for this much weekly: Dark green veggies - 3 cups Orange veggies - 2½ cups Dry beans & peas - 3½ cups Starchy veggies - 7 cups Other veggies - 8½ cups	**2 cups a day** Eat a variety of fruit Go easy on fruit juices	**3 cups a day** Go low-fat or fat-free when you choose milk, yogurt, or cheese	**6½ ounces a day** Choose low-fat or lean meats and poultry. Vary your protein routine—choose more fish, beans, peas, nuts, and seeds.

Know your limits on fats, sugars, and sodium

	OILS Aim for this much:	EXTRAS Limit extras (solid fats and sugars) to this much:
Birth to 6 Months	8 teaspoons a day	410 calories a day
6 to 12 Months	8 teaspoons a day	410 calories a day

* These are only estimates of your needs while you breastfeed. Check with your health care provider to make sure you are losing the weight gained during pregnancy.

The calories and amounts of food you need change over time while you are breastfeeding. Your Plan may show different amounts of food for different months, to meet your changing nutritional needs.

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