**Baby’n Me: An Abdominopelvic Exercise Class for Postpartum Mothers and their Babies**

**Introduction:**

 Pregnancy is an exciting time in women’s life; however there are many changes (both expected and unexpected) women go through during both the peri- and post-partum period 1. A common occurrence following childbirth is stress urinary incontinence (SUI), approximately 8% of primiparous women who deliver vaginally will suffer from SUI 2. Further research has shown that as number of deliveries increases in women with SUI, quality of life significantly decreases 3. The pelvic floor muscles have an important role in pelvic organ support and the continence control system 4, and damage to the pelvic floor musculature can result in loss of pelvic floor muscle strength and continence 5.

 Research has indicated that once women have experienced postpartum urinary incontinence, it often becomes a persistent and chronic condition that can continue for many years 6,7. However, a recent Cochrane review has demonstrated that pelvic floor muscle training can prevent urinary incontinence up to six months after delivery, and a few studies found long term effects (though more research is indicated for long-term follow-up) 8. SUI incurs a large cost on the healthcare system with both conservative and surgical management 9,10. Incorporating programs to prevent or offer early treatment for SUI would be largely beneficial.

 In addition to the anatomical and physiological changes that happen during the peri- and post-partum periods, mothers often encounter psychological changes that come with fatigue, new emotional challenges, and postpartum mood disorders 1. During this transitional time, mothers are learning new behaviors, how to care for the new baby and themselves, and settling into new habits. According to the Social Cognitive Theory (SCT), human behavior is mainly a product of the dynamic interplay between the environmental, personal, and behavioral influences 11. A number of barriers to women seeking help have identified personal and environmental barriers to seeking healthcare 12,13. The main culprits being too embarrassed to discuss pelvic floor dysfunction with healthcare providers 12, seeking help in their immediate social group 13, and feeling that their general practitioner was more concerned with the health of the baby 12.

**Statement of Need:**

 According to an NIH 2008 research report, nearly 24% of U.S. women are affected with one or more pelvic floor disorders 14. The number of American women with at least one pelvic floor disorder has been forecasted to increase from 28.1 million in 2010 to 43.8 million in 2050 15. These disorders are more prevalent among women who have delivered at least one child 16. Primiparous women have a three times higher prevalence of SUI compared to nulliparous women 17. This condition has been shown to have an increasingly negative impact on quality of life for these women 3. Additionally, the odds of surgical intervention for women with SUI is three times higher in those who deliver vaginally, and even higher with a forceps assisted birth 18. Women with SUI not only demonstrate a decreased quality of life, but also face a large economic burden 19.

 However, there is high-level (level I, grade A) evidence demonstrating that pelvic floor muscle training is an effective treatment for SUI 20. Home-based pelvic floor muscle training or providing written instructions have been shown to increase pelvic floor strength 21. Thus, the evidence demonstrates the education and written instruction on pelvic floor exercises are an effective and beneficial learning method for postpartum women. Unfortunately, it has also been shown that women demonstrate a low adherence rate and low self-efficacy when doing pelvic floor exercises in the home 22. Considering the low adherence and low self-efficacy of a home pelvic floor muscle training program, a low cost or free group-based exercise class for mothers and their newborns is a much needed, excellent way to help prevent or treat SUI.

 Several programs have completed studies on this novel approach to SUI prevention and treatment in postpartum women. Gagnon et al completed a standardized group workshop, with an opportunity to self-select for individual PFMT sessions embedded in the structure 23. This two-tiered approach contributed to significant improvements in pelvic floor dysfunction, quality of life, strength, and satisfaction rates in women who attended the group workshops and those who opted for individual treatment sessions 23.

 Botelho et al conducted a study of abdominopelvic physical therapy intervention in nulliparous women, primiparous pregnant women, primiparous postpartum women, and postmenopausal women 24. The participants attended a total of 10 60-minute sessions over 3-4 weeks, which consisted of breathing exercises, abdominal strengthening, pelvic strengthening, and stretching exercises 24. Pelvic floor muscle strength significantly increased in all groups, with a significant concurrent decrease in urinary symptoms 24.

 Pereira et al completed a randomized controlled pilot study in women with SUI to compare the effects of pelvic floor muscle training in group treatment sessions, individual treatment sessions, or no treatment sessions 25. They found that both the group treatment and the individual treatment groups made significant and equal reductions in urinary leakage, increased muscle strength, and increases in their quality of life when compared to the control group 25. This study indicates that group treatment can be just as effective in pelvic floor muscle training as individualized treatment 25.

Thus, the early postpartum period is an pivotal time for teaching new mothers the importance of incorporating abdominopelvic exercises into their daily routine in order to decrease the likelihood of developing pelvic floor dysfunction or decreasing its severity. It is important that proper instruction be given by a physical therapist. It has been found that professional supervision or treatment is paramount to improvements in pelvic floor muscle training 26. However, it is also important that the patients be professionally instructed so that they are performing proper coordination of muscle contractions, posture, and are avoiding movement patterns that are contraindicated for postpartum women. During this postpartum period, women are generally experiencing multilevel healing, lochia, soreness, and pain 1. It is important that the women are instructed by a professional with expert knowledge of the peri- and post-partum norms, as well as being knowledgeable about physical and mental warning signs and when to refer the patient to seek medical attention.

 The proposed postpartum *Baby’n Me* *Abdominopelvic Exercise Class* would be a 6-8 week program offered to women in the North Carolina Triangle region, consisting of classes in the Durham, Orange, and Wake counties. The classes will be offered at select physical therapy clinics in the region, which staff and offer women’s health physical therapy. Thereby ensuring that participants will have resources available if they wish to pursue individual therapy and/or questions. These pro bono or donation-based classes will specifically focus on musculoskeletal education, abdominopelvic exercise instruction, and strategies to promote healing, strength, and muscular coordination.

 Currently, the Triangle area offers a number of programs focused on mood support for postpartum mothers (Triangle Mothercare, Postpartum Support International, etc) and yoga/Pilates classes for postpartum mothers that average about $15 per session. The yoga/Pilates classes may be helpful for many women, however they may not be an option for low-income mothers. There are no free or low cost postpartum gentle exercise group programs focused on abdominopelvic rehabilitation.

 Though the idea of rehabilitation following traumatic injury is not a novel one, it is not a concept that has been fully explored by physical therapy when considering prevention of pelvic floor disorders. Considering the likelihood that a women will have some pelvic floor disorder following childbirth, 2,3,5 it is imperative that these women be given the tools and support to help prevent and/or treat these issues in a low-cost, supportive environment. Additionally, this could help prevent unnecessary future costs associated with treatment for pelvic floor disorders. 9,10

**Background: How this program could prevent or improve health outcomes**

 This program is founded on the principles of the Social Cognitive Theory, which emphasize reciprocal determinism from the interactions between individuals and their environment 11. Meaning that changing the environment, though helpful, is often not the only requirement for behavior change. Through the *Baby’n Me* program, the constructs of reciprocal determinism, outcome expectation, self-efficacy, collective efficacy, observational learning, and facilitation will be utilized to promote behavior change 11.

Additionally, concepts founded in the Social Ecological Model of health and behavior change will address barriers at the organizational, intra-, and inter-personal levels. 27 By targeting these specific levels, the proposed program will systematically target the mechanisms of change directly impacting postpartum women in regards to SUI. The *Baby’n Me* program targets individual intra- and inter-personal levels through direct patient education and clinical group care provided by an expert in the field. This will also facilitate additional support and resources for participating women. As this program will target and recruit women in the labor and delivery floors at local hospitals, there will be an organizational aspect that through structured recruitment within the hospital infrastructure.

 Though the program’s central focus will be on abdominopelvic strengthening, secondary factors for the program design are cultivation of a social setting for new mothers, a reason to get out of the home 1, to facilitate observational learning with both the instructor and other mothers, and increase self- and collective efficacy through social modeling and mastery of the experience 11. Physical and emotional health benefit greatly when new mothers explore new environments with their baby and do not confine themselves to the home 1, this not only supports better mood regulation, but can also help with mother-child bonding 28. Light exercise and increased peer support have also been found to aid those suffering from postpartum depression and other mood disorders 28.

 In order to monitor the effectiveness of this program and obtain constructive feedback, the women will be asked to fill out a questionnaire at both the beginning and end of the program. The questionnaire will contain parts relating to self-efficacy 29, social influence, attitude towards the program, and their intentions 30. Additionally, the women will be asked to fill out a brief quality of life questionnaire 31-33 and postpartum depression screen 34. These tools will allow the program instructors to monitor the patients, their experience, and screen for depression in this vulnerable cohort.

 The program itself will focus on the “core” structures, including the abdominal musculature, back extensors, vocal diaphragm, thoracic diaphragm, and pelvic floor 23-25. Physical therapists will offer proper instruction on pelvic floor muscle training, breathing techniques for muscle coordination, use of deep abdominal wall musculature (i.e. transverse abdominus) to reduce diastasis recti and support abdominal viscera, postural exercises, and how to incorporate these tools when caring for their baby and general daily physical activity. The exercises will be those that allow for mother-baby interaction, or can be done independently.

 The decision to create an exercise program that includes the newborn was to utilize the period of maternal leave to which some working mothers are entitled, to facilitate mother-child bonding in a different environment, and to decrease barriers to an exercise program, such as finding childcare. Thus, we hope to create an environment that facilitates adherence to the program.

 Through learning, understanding, and mastering the skills of pelvic floor muscle training in combination with general core training, postpartum women will be empowered with these tools of self-care. Ultimately, leading to decreased instance of pelvic floor disorders and/or a better understanding of where and how to seek help during the early stages of incontinence, pain, or prolapse. This program, founded on the Social Cognitive Theory 11 and Social Ecological Model 27, aims to prevent pelvic floor disorders in postpartum women, and empower them to seek help when it is indicated.

**Program Objectives**

 The *Baby’n Me Abdominopelvic Exercise Class* is a program for postpartum mothers to help decrease or prevent pelvic floor dysfunction through an organized class for 1-8 week postpartum mothers and their newborns. Through instruction on exercises focusing on core/abdominal stabilization, pelvic floor coordination and strengthening, posture exercise/education, biomechanics focused on infant care, breathing exercises, and stretching this program aims to improve pelvic floor function, quality of life, abdominopelvic strength, participant satisfaction, and help facilitate socialization for postpartum mothers. Therefore, through participation in a 6-8 week abdominopelvic exercise class our goal is to improve the abovementioned aims and provide referrals for additional education/therapy as needed.

This two-tiered approach was based off of the successful study by Gagnon et al who offered a free 2-hour workshop for postpartum women, with an option for one-on-one physical therapy following the workshop 23. However, the *Baby’n Me* program will be a 6-8 week progressive group exercise program offered at no cost to the mother. This program will focus on five objectives: 1) pelvic floor function (i.e. pain, urinary symptoms, etc), 2) quality of life, 3) abdominopelvic strength, 4) participant satisfaction, and 5) social support. Participants will receive a questionnaire at the beginning and end of the program to assess changes the participants have made and to further assess the program. This questionnaire will include the function and quality of life scales, Pelvic Floor Distress Index (PFDI-20) and Pelvic Floor Impact Questionnaire (PFIQ-7) 35, a satisfaction rating on a 10-point Likert scale, and social support rating on a 10-point Likert scale. Abdominal and pelvic floor strength can be further assessed if participants choose to have further physical therapy treatment through the Oxford and Modified Oxford scales 36. Participants will also complete an Edinburgh Postpartum Depression Scale 34 as a postpartum depression screen at the beginning of the program. Cut-off scores for each scale will be determined, which will prompt further referral for physical or psychotherapy as indicated.

Each objective of the program will have specific goals to help with patient and program evaluation. After 8-weeks women will indicate mild pain on the 10-point Likert scale (0-3 points) in order to demonstrate optimal pelvic floor function. After 8-weeks women will indicate an individual 3-point improvement on social support on the 10-point Likert scale in order to demonstrate improved perceived social support from group work. After 8-weeks women will indicate great satisfaction on the 10-point Likert scale (8-10 points) in order to demonstrate high satisfaction rates with the program. After 8-weeks women who originally demonstrated decreased pelvic function will demonstrate a 50-point improvement in the PFDI-20 35 in order to demonstrate improved pelvic function. Women who did not initially demonstrate decreased pelvic function with score at or below their original score for maintained pelvic function.

**Methods**

*Participants & Instructors*

As mentioned earlier, this program is focused on postpartum mothers who are 1-8 weeks postpartum. Flyer and informational packets with all relevant information will be provided to Durham, Orange, and Wake county hospitals, birthing centers, and midwifery clinics to be given to mothers after delivery. Participating physical therapy clinics can also market as they see fit. Mothers will be encouraged to bring their infant, however it is not mandatory for participation.

 The instructors of this exercise class will be certified women’s health physical therapists employed at the included clinics. Due to their credentialing, the instructors will have an in-depth knowledge of anatomy, physiology, how body systems work together, muscle coordination patterns, proper cuing, exercises (both indicated and contraindicated), and a referral base of physicians, physical therapists, psychologists, social workers, etc. As these classes are pro bono, the physical therapists will be offered continuing education credit due to the educational component of creating a comprehensive exercise class. The instructors will meet once every two months to discuss and troubleshoot any issues or concerns that come up regarding teaching. The program directors and instructors will also evaluate general participant progress based on their questionnaires at these meetings. The instructors will be given a basic outline of how to progress the course and the intention of the exercise class. However, the instructors will be able to integrate their own specific exercises as they like, considering they adhere to the basic structure and intention.

*Location*

 As the program begins, six clinics in the Triangle will be selected to host the abdominopelvic exercise class. There will be two clinics per county selected in order to offer multiple locations that may be easier to access for the women. The classes will operate on a rotational schedule (see Appendix A.) so women are better able to begin the class shortly after their delivery, instead of waiting. The clinics will conduct one class per week for the women signed up in their location. These clinics will have at least one pelvic floor physical therapist on staff and space available for a group of women to comfortably participate in these exercises. Necessary equipment will be provided by the *Baby’n Me* program (i.e. exercise mats). The clinics and the *Baby’n Me* program will have an agreed upon contract to ensure the autonomy and best interest of both parties. These contracts will likely dictate the time of day that the clinic can spare the space and whether or not another staff member needs to be present, etc.

*Abdominopelvic Exercise Class*

 As stated before pelvic floor muscle training, breathing exercises, abdominal strengthening, and stretching exercises have been shown to increase pelvic floor and abdominal strength, and decrease symptoms of urinary incontinence in postpartum mothers 21,24,37. Therefore, this exercise program will mainly focus on abdominal and pelvic floor strength, however will also touch on various other topics during this 8 week program.

 The *Baby’n Me* program is an eight-week program, with one session per week per location. Each session will be one and a half hours and will incorporate both education and exercises. The exercise class is meant to be a progressive strengthening program, starting with learning how to properly activate the pelvic floor and deep abdominal muscle. As the program progresses the exercises will get more complex and more challenging. See Appendix B. for a skeleton outline of the exercise and education progression and suggested activities for each week.

 The main exercises that will be enforced are static and dynamic stretches, pelvic floor muscle training, deep abdominal muscle training, and breathing exercises. Other components that will be addressed within the sessions are education on pelvic floor and abdominal anatomy, normal and abnormal healing in the postpartum period, posture training, and biomechanical education specifically relating to infant care. Breathing exercises are an important component of muscle coordination, especially the coordination of the pelvic diaphragm and abdominal diaphragm. Transverse abdominus specific exercises and use of deep abdominal wall musculature will help reduce diastasis recti and support the abdominal viscera. Learning to properly use these muscles will aid in posture and biomechanics specific to lifting and caring for the baby. The back extensors and gluteus maximus, medius, and minimus are important postural muscles and will also be focused on during this program specifically for posture re-education. Although a skeleton outline of the program will be provided to all instructors with suggested exercises (Appendix B.), the instructors will be at liberty to incorporated exercises they feel meet the week’s goal and intention.

 Patients will receive education on the anatomy, physiology, and pathology associated with the postpartum period. They will also receive a handout encompassing the typical healing process of the abdominal and pelvic musculature, as well as information on atypical healing and pathology during the postpartum period. Each week the women in the *Baby’n Me* group will receive printed handouts of the new exercises completed during that class, and will be encouraged to practice the exercises at home 3-5 times prior to the next session. Specific emphasis will be given to complete transverse abdominus and pelvic floor muscle exercises 2-3 times per day.

**Program Evaluation**

 Program evaluation is an important practice in managing and furthering public health programs. 38 The *Baby’n Me* program will conduct self-evaluations based on the progress of the participants from questionnaire data, participant feedback, and participant dropout rates. As previously stated, the program instructors will meet every other month to discuss issues and/or troubleshoot the program. At these meetings, instructors will report on how the participants are meeting their goals, which goals were not met, why these goals were not met, and how to address these issues. This way, the program will complete practical, ongoing evaluation that involves the program staff and indirectly the stakeholders. 38 Additionally, these meetings will be an important place to discuss the program, the marketing materials and recruitment, the ideal participants and how to better target them, highlight strengths of the program, and identify shortcomings. 39

At 6-months the *Baby’n Me* program will contact participating locations to evaluate the cost-effectiveness of lending space. At this time the financial considerations will be re-evaluated to determine if pro bono work is the most effective method, if the program should apply for a grant, or if the program should be offered for a small fee to the participants.

**Limitations**

 This program is designed on previous studies that have looked at effects of an 8-week exercise program on SUI outcomes. 23 However, the realities of working American women dictate an average of 6-weeks maternity leave. Thus, this program’s 8-week length may be unreasonable for some women, and there is a potential for dropouts at the 6-week mark. If this potential issue comes to fruition, the program length and exercise/education schedule may need modification.

 There is also the potential that many postpartum mothers feel the need to better acquaint themselves with their roles as new mothers, and determine that those needs are greater than postpartum abdominopelvic rehabilitation needs. Evidence supports the idea that postpartum women with SUI issues are agreeable to postpartum therapy 12,13, however there is no such evidence on postpartum women without SUI on performing rehabilitation prophylactically.

 Additionally, this program does not take into consideration emotional stressors such as the loss of a child at birth or postpartum mothers with infants in the NICU. Due to the trauma and stress of these situations, it may be too difficult for a postpartum woman in this situation to attend a *Baby’n Me* group class with other mothers who have healthy children. Instead of this being a supportive environment for women who have lost a child or have a very sick child, this space may be a trigger for emotional distress.

**Conclusion**

 The *Baby’n Me Abdominopelvic Exercise Class* is founded on a multitude of evidence supporting the effects of abdominopelvic strengthening in the postpartum period on reduction of SUI symptoms. 8,20,23 Considering the prevalence of SUI in the postpartum population, 2,3 a specific rehabilitation program addressing the underlying issues is an important step in reversing or preventing SUI. Pelvic floor muscle training, breathing exercises, abdominal strengthening, and stretching exercises have been shown to increase pelvic floor and abdominal strength, and decrease symptoms of urinary incontinence in postpartum mothers. 21,24,37 The *Baby’n Me Abdominopelvic Exercise Class* will utilize these findings in order to decrease symptoms of urinary incontinence or prevent urinary incontinence in postpartum mothers within the Triangle area.

 Furthermore, this program is cultivated on a theoretical foundation of behavior change through utilization of the Social Cognitive Theory 11 and the Social Ecological Model 27. This framework will help in the implementation and evaluation of the program, and will aid in offering a program influences behavior change on multiple levels.

 Ultimately this program offers a method of empowerment to postpartum women to reclaim their bodies in a safe, professional environment. With the help of certified women’s health physical therapists, postpartum women within the Triangle will acquire the tools necessary to heal quicker, regain lost strength, relearn proper muscle contraction, be part of a social support group, and decrease dysfunction associated with SUI.

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**Appendix A.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8  | Week 9 | Week 10  |
| Orange County 1 | Start |  |  |  |  |  |  | Finish |  |  |
| Orange County 2 | Finish |  |  | Start |  |  |  |  |  |  |
| Durham County 1 |  |  |  | Finish |  |  | Start |  |  |  |
| Durham County 2 | Start |  |  |  |  |  |  | Finish |  |  |
| Wake County 1 | Finish |  |  | Start |  |  |  |  |  |  |
| Wake County 2 |  |  |  | Finish |  |  | Start |  |  |  |

Weekly blocking chart depicting how the four start-up clinics will start sessions on a rotating basis so that women have a choice (at least within the county if not the entire Triangle) as to when to start their session. This chart allows for a two week break for the clinic. However, this could be amended in order to allow for longer break periods if necessary.

**Appendix B.**

|  |  |
| --- | --- |
| **Week One** | **Suggestions** |
| * Introductions & Paperwork (**entrance questionnaire**)
* Education on course content, basic anatomy of the pelvic floor and core musculature
* Light stretching
* Large amount of time dedicated to teaching Kegel exercises (or proper contraction and relaxation of pelvic floor)
 | * Education on what is normal and healthy healing during the postpartum period and what is pathological (pain, incontinence, stitches healing, etc)
* Light dynamic stretching such as cat/cow, obtorator inturnus stretching, glutes, adductors (stretches that help relax the pelvic floor and surrounding musculature)
* Pelvic floor muscle training. Can use the ‘Elevator Technique’, endurance contractions, starting in supine
* Breathing techniques, such as diaphragmatic breathing
 |
| **Week Two** | **Suggestions** |
| * Dynamic stretching
* Re-visit pelvic floor muscle training exercises
* Education on diastasis rectus, core anatomy, and how to reduce diastasis rectus
* Transverse abdominus training and exercises
 | * See above stretches, can also incorporate a light yoga flow such as sun salutation (can modify to include baby)
* Start to focus on pelvic floor muscle training in conjunction with breathing
* TA training could follow the Sahrman Abdominal Activation Exercises. There are various ways to teach TA activation including the use of a rolled up towel, a sphygmomanometer, feeling in the lower lateral abdominal area for TA activation, etc
 |
| **Week Three** | **Suggestions** |
| * Dynamic stretching
* Pelvic floor muscle training
* Transverse abdominus exercises
* Combining pelvic floor muscle activation with TA muscle activation
* Introducing biomechanics
 | * When revisiting the TA exercises can suggest doing a pelvic floor muscle contraction simultaneously, and always reinforce breathing through exercises
* For introductions on biomechanics can discuss getting out of bed (how one uses their abdominal muscles, perhaps that affects diastasis rectus) and how to get up from the floor. Starting to raise awareness to daily actions that can either be productive or counter-productive
 |
| **Week Four** | **Suggestions** |
| * Dynamic stretching
* Pelvic floor & Transverse abdominus exercises
* Biomechanics day
 | * Education on biomechanics could easily take up most of the day today.
* Focus on mother/baby related activities such as, picking baby up off of the floor, out of the crib, changing tables, etc
* Can also discuss ways to make modifications in the home, best ways for carrying, etc
 |
| **Week Five** | **Suggestions** |
| * Dynamic stretching
* Pelvic floor & Transverse abdominus exercises
* Posture education (may be revisiting if touched on during biomechanics)
* Exercises focused on back extensors and gluteus complex
 | * Should now be advancing both the pelvic floor and transverse abdominus training exercises
* New exercises may include bird-dogs, bridging, planks, prone active back extension
 |
| **Week Six** | **Suggestions** |
| * Dynamic stretching
* Pelvic floor & transverse abdominus exercises
* Re-visit back extensor and glute exercises
* As they are starting to transition out of the program and many may start needing to go back to work, focus on exercises they can do at home
* **Fill out exit questionnaire now**
 | * Can start to included squats, lunges, side-lunges with baby, planks, etc
* As each group may be different, can hone in on what they women’s goals are and use that to start influencing what exercises to do
 |
| **Week Seven** | **Suggestions** |
| * Similar to week six, may have fewer women attending
* Dynamic stretching
* Pelvic floor & transverse abdominus exercises
* Re-visit back extensor and glute exercises
* As they are starting to transition out of the program and many may start needing to go back to work, focus on exercises they can do at home
 | * Continue advancing exercises
* Good time to take suggestions from the mothers and focus on their specific goals
 |
| **Week Eight** | **Suggestions** |
| * Similar to week six, may have fewer women attending
* Dynamic stretching
* Pelvic floor & transverse abdominus exercises
* Re-visit back extensor and glute exercises
* Questions, referrals, etc
 | * Continue advancing exercises
* Good time to take suggestions from the mothers and focus on their specific goals
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