

Productive Pumping: A Pilot Study to Help Postpartum Residents Increase Clinical Time

Ana L. Creo, MD

Heather N. Anderson, MD

Jason H. Homme, MD

ABSTRACT

Background Many female residents choose to start families during training, and they want to breastfeed their infants. Continuing lactation while balancing service and education demands can be challenging.

Objective We hypothesized that the presence of a dedicated and fully equipped lactation room with a hospital-grade pump (HGP) would increase ease and efficiency of lactation during residency.

Methods A quiet HGP was purchased for resident use, and it was stored in a designated room with a computer, telephone, and dictation system. Lactating residents provided information about pumping time and production using their own portable double electric pump (PP) versus the HGP based on the first pump of the morning (for consistency), averaged over the first month back from maternity leave.

Results Among 6 residents, lactation time with PP averaged 24 minutes (range, 15–40 minutes) versus 15.5 minutes with HGP (range, 10–32 minutes). Use of the HGP reduced total pumping time by 8.5 minutes (95% confidence interval 3.8–12.2, $P = .045$). Production volume increased from 6 ounces (range, 3.5–8.5 ounces) with PP to 8.8 ounces (range, 8–11 ounces) with HGP, for a mean increase of 2.8 ounces (95% confidence interval 1.2–4.3, $P = .06$) despite decreased lactation time.

Conclusions In our pilot, an HGP significantly decreased lactation time, while increasing expressed milk volume. Residents completed clinical and educational tasks while pumping. Providing an HGP and equipped lactation space helped residents continue breastfeeding and decreased the burden of lactation on patient care and educational tasks.

Introduction

More women are entering medical training, and interest in family integration and childbearing is increasing.^{1–9} Many residents extend maternity leave, citing the desire to breastfeed as a reason.⁶

Continuing breastfeeding after returning to work is challenging, and research has demonstrated shorter maternity leave is associated with early breastfeeding cessation,¹⁰ and that half of residents discontinued breastfeeding when they returned to residency.¹¹ Recent surveys confirm that lactation barriers remain across specialties.^{6,12–14} Studies have reported methods to improve lactation efficiency in mothers of neonatal intensive care unit (ICU) infants,^{15–17} but none have examined lactation in resident physicians after return from maternity leave.

In this single institution pilot study, we sought to improve resident lactation by comparing high-tech, hospital-grade pump (HGP) use to that of a portable double electric pump (PP).

Methods

Six women in a pediatrics residency at a tertiary hospital were recruited from a group of 7 residents

who were breastfeeding (in a program with 40 residents).

Intervention

We designed a prospective pilot observational study measuring the productivity and efficiency of lactation. A lactation room was established near the general pediatric hospital ward and the ICUs. The room contains a computer, dictation system, telephone, reference material, refrigerator, and means to view scheduled didactic conferences. A quiet HGP (Symphony Breast Pump, Medela LLC, McHenry, IL) was purchased (\$900 contract price) and placed in the room. All residents had their own PP (insurance covered). Participants purchased inexpensive individual tubing (\$10 to \$15) for the HGP. Residents selected when to use each pump, depending on their work schedule. Residents scheduled use of the HGP and lactation room based on the needs of those working in the highest-acuity setting with the least flexibility (often the pediatric ICU). At the start of each rotation block, those requiring use of the room would communicate in person or via e-mail to set schedules. The room was typically used by only 1 person at a time, but it could accommodate 2 if needed.

DOI: <http://dx.doi.org/10.4300/JGME-D-17-00501.1>

TABLE

Characteristics of Resident Participants (N = 6)

Characteristic	Value
Level of training, program year, average (range)	2.5 (1–4 [chief])
Parity, average (range)	1 (1–2)
Maternity leave duration, wk, average (range)	8 (6–12)
Duration of breastfeeding, mo (n = 4), average (range) ^a	11.7 (8–14)
Used portable double electric pump during leave, No. (%)	6 (100)
Started on inpatient rotation after leave, No. (%)	2 (33)
Anticipating further fellowship training, No. (%)	5 (83)
Spouse in medical training, No. (%)	2 (33)

^a Two participants were still breastfeeding at study completion.

Data Collection

Participants were asked to conduct at least 6 pumping sessions and record the duration of the session and volume of milk produced (in ounces) for their first morning pump at work using either the PP or HGP during their first month back to work. Upon study completion, investigators conducted brief interviews, inquiring (1) What do you do while pumping with the HGP and PP? (2) How does the use of the pumps impact your workflow? and (3) Any other comments about your pumping experience?

Participants provided verbal consent, and the study was approved by the Institutional Review Board.

Data Analysis

Data were collected, and lactation time and production volume means were compared between the PP and HGP using a paired *t* test from JMP software package (SAS Institute Inc, Cary, NC). The authors summarized open-ended resident feedback into commonly occurring responses.

Results

Participants were at various levels of training, postgraduate year 1 (PGY-1) to PGY-4, including 3 residents in their final year of training (TABLE). Most (83%, 5 of 6) were first-time mothers. Average maternity leave duration was 8 weeks (range, 6–12 weeks). All residents had their own PP, which they had experienced using before returning to work. Of the 4 residents who weaned during the study period, the average duration of breastfeeding was 11.7 months (range, 8–14 months).

Mean lactation time with PP was 24 minutes (range, 15–40 minutes), compared with 15.5 minutes with HGP (range, 10–32 minutes), resulting in a significantly decreased average lactation time of 8.5 minutes using the HGP (95% confidence interval 3.8–12.2, *P* = .045). Mean production volume increased from 6 ounces (range, 3.5–8.5 ounces) with PP to 8.8 ounces (range, 8–11 ounces) with HGP, for an average increase of 2.8 ounces (95% confidence interval 1.2–4.3, *P* = .06). The data were analyzed and found to have normal distribution.

The most common responses to the open-ended study questions were improved ability to stay in touch with active patient care (6 of 6, including less time missed from rounds, able to stay in communication while pumping, able to monitor test results), greater ability for task completion (6 of 6, including note completion, lecture attendance, study time, research completion), increased comfort (5 of 6, including less irritation, improved emptying, less concern for leaking after pumping), and reduced anxiety and guilt (comments from peers and faculty, and perceptions about work-life balance).

All participants chose to work while pumping. The quieter nature of the HGP compared with the PP allowed for completion of a wider variety of clinical work because residents felt comfortable completing tasks, such as answering pages and calling families, which previously were postponed when using a louder pump. Many residents also reported letdown was improved due to working instead of relaxing. One resident explained, “If I just sit there, I start to get anxious about all the things I should be doing, and cannot make much milk. Once I start dictating or writing notes I can let down much easier as I’m less anxious I’ll get behind.” Another resident explained, “I don’t want to miss good conferences, and with a limited window to pump and attend conferences, I used to skimp on pumping, but now appreciate I am able to do both.”

Discussion

Providing residents with an HGP and necessary equipment increased their availability for education and service. All participants decreased lactation time while increasing production volume. With extrapolation of our data, a resident working a 16-hour shift would save an average of 34 minutes over the course of the day, and a resident on a 24 + 4-hour call would save 60 to 90 minutes. Another positive effect of the designated lactation space was improved productivity. Residents reported that working improved milk output, in contrast to conventional studies suggesting that relaxation maximizes milk letdown.^{18,19} This

outcome may be unique to medical residents, and may warrant further study.

This study has several limitations. All work was carried out at a single institution and in a single discipline, which limits generalizability. We acknowledge that not all institutions may have resources to replicate the study. In lower-resource settings, having a consistent space and protected time (1 block every 4 hours) is likely most important, followed by availability of an HGP. We were able to justify the modest cost of the HGP by the reduced lactation time and increased clinical productivity.

Conclusion

This study demonstrated that a private space outfitted with an HGP and materials to promote continued clinical and educational tasks for lactating residents resulted in reduced time for pumping, increased volume of milk, ongoing task completion, and high resident satisfaction.

References

1. Fox G, Schwartz A, Hart KM. Work-family balance and academic advancement in medical schools. *Acad Psychiatry*. 2006;30(3):227–234.
2. Gordon MB, McGuinness GA, Stanton BF, et al. Part-time training in pediatric residency programs: principles and practices. *Pediatrics*. 2008;122(4):e938–e944.
3. Sectish TC, Rosenberg AR, Pageler NM, et al. Making pediatrics residency programs family friendly: views along the professional educational continuum. *J Pediatr*. 2006;149(1):1–2.
4. Kahn JA, Parsons SK, Pizzo PA, et al. Work-family issues and perceptions of stress among pediatric faculty and house staff. *Ambul Pediatr*. 2001;1(3):141–149.
5. Berkowitz CD, Frintner MP, Cull WL. Pediatric resident perceptions of family-friendly benefits. *Acad Pediatr*. 2010;10(5):360–366.
6. Dixit A, Feldman-Winter L, Szucs KA. Parental leave policies and pediatric trainees in the United States. *J Hum Lact*. 2015;31(3):434–439.
7. Brotherton SE, Etzel SI. Graduate medical education, 2014–2015. *JAMA*. 2015;314(22):2436–2454.
8. Smith C, Galante JM, Pierce JL, et al. The surgical residency baby boom: changing patterns of childbearing during residency over a 30-year span. *J Grad Med Educ*. 2013;5(4):625–629.
9. Frintner MP, Cull WL. Pediatric training and career intentions, 2003–2009. *Pediatrics*. 2012;129(3):522–528.
10. Guendelman S, Kosa JL, Pearl M, et al. Juggling work and breastfeeding: effects of maternity leave and occupational characteristics. *Pediatrics*. 2009;123(1):e38–e46.
11. Miller NH, Miller DJ, Chism M. Breastfeeding practices among resident physicians. *Pediatrics*. 1996;98(3, pt 1):434–437.
12. Dixit A, Feldman-Winter L, Szucs KA. “Frustrated,” “depressed,” and “devastated” pediatric trainees: US academic medical centers fail to provide adequate workplace breastfeeding support. *J Hum Lact*. 2015;31(2):240–248.
13. Sandler BJ, Tackett JJ, Longo WE, et al. Pregnancy and parenthood among surgery residents: results of the first nationwide survey of general surgery residency program directors. *J Am Coll Surg*. 2016;222(6):1090–1096.
14. McPhillips HA, Burke AE, Sheppard K, et al. Toward creating family-friendly work environments in pediatrics: baseline data from pediatric department chairs and pediatric program directors. *Pediatrics*. 2007;119(3):e596–e602.
15. Larkin T, Kiehn T, Murphy PK, et al. Examining the use and outcomes of a new hospital-grade breast pump in exclusively pumping NICU mothers. *Adv Neonatal Care*. 2013;13(1):75–82.
16. Meier PP, Engstrom JL, Janes JE, et al. Breast pump suction patterns that mimic the human infant during breastfeeding: greater milk output in less time spent pumping for breast pump-dependent mothers with premature infants. *J Perinatol*. 2012;32(2):103–110.
17. Eglash A, Malloy ML. Breastmilk expression and breast pump technology. *Clin Obstet Gynecol*. 2015;58(4):855–867.
18. Feher SD, Berger LR, Johnson JD, et al. Increasing breast milk production for premature infants with a relaxation/imagery audiotape. *Pediatrics*. 1989;83(1):57–60.
19. Keith DR, Weaver BS, Vogel RL. The effect of music-based listening interventions on the volume, fat content, and caloric content of breast milk produced by mothers of premature and critically ill infants. *Adv Neonatal Care*. 2012;12(2):112–119.



All authors are with the Department of Pediatric and Adolescent Medicine, Mayo Clinic, Rochester. **Ana L. Creo, MD**, is a Fellow in Pediatric Endocrinology; **Heather N. Anderson, MD**, is a Fellow in Pediatric Cardiology; and **Jason H. Homme, MD**, is Assistant Professor of Pediatrics and Residency Program Director.

Funding: The authors report no external funding source for this study.

Conflict of interest: The authors declare they have no competing interests.

Corresponding author: Jason H. Homme, MD, Mayo Clinic, Department of Pediatric and Adolescent Medicine, 200 First Street SW, Rochester, MN 55905, 507.284.2511, fax 507.284.9744, homme.jason@mayo.edu

Received July 15, 2017; revision received October 15, 2017; accepted October 30, 2017.