

Google Trends Search Information Related to Breastfeeding in the U.S.

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Abstract

Given the importance of breastfeeding to maternal and infant health, we employed Google Trends to examine search engine use for information related to breastfeeding in the U.S. We conducted an analysis of the use of the Google search engine related to the broad topic of "breastfeeding," as well as patterns for more specific terms related to breastfeeding. Given the significant role that breastfeeding pain plays in influencing breastfeeding persistence, we examined patterns in the use of Google to seek information related to breastfeeding pain and how that compares to other breastfeeding topics. We also examined diurnal patterns in these searches as well as U.S. state-level characteristics that predict search intensity. We found that search intensity related to breastfeeding has increased over time and that searches related to breastfeeding pain were the most common. Searches tended to occur late at night and were more likely to occur in relatively unpopulated states and for states with lower income. The findings illustrate how Google Trends can be analyzed to highlight the concerns of new mothers in real-time and how such data can reveal how mothers and those who support them use the internet to seek out help, guidance, and support for issues related to breastfeeding.

Keywords: *Breastfeeding, Google Trends, pain, time of day*

1. Introduction

The health benefits of breastfeeding for mothers and infants are well established (U.S. Department of Health and Human Services, 2011). These benefits apply to mothers and children in developed nations such as the United States as well as to those in developing countries. Breastfeeding provides numerous emotional and physical benefits as human milk is uniquely suited to the human infant's nutritional needs and has unparalleled immunological and anti-inflammatory properties that protect against a host of illnesses and diseases for both mothers and children. Thus, both mothers and their infants benefit from breastfeeding. Despite this knowledge, only slightly more than half (58%) of mothers in the U.S. are likely to be breastfeeding their infants at 6 months of age and only 25% are doing so exclusively (CDC, 2020).

One of the principal reasons for breastfeeding cessation is the experience of pain during breastfeeding (McClellan et al., 2012). In addition to the discomfort, breastfeeding pain can also cause psychological distress and interfere with general activity, mood, sleep, and bonding between mother and infant (Amir et al., 1996). However, the most effective means of helping mothers establish comfortable and painless breastfeeding to promote continued breastfeeding as long as they wish has yet to be established (Kent et al., 2015).

Given the importance of breastfeeding to maternal and infant health, we used Google Trends to examine mothers' use of the Google search engine to acquire information related to breastfeeding (we assume the users are mostly mothers but acknowledge that there are others who seek such information). We began with a general analysis of the use of the Google search engine related to the broad topic of 'breastfeeding.' Once we established the pattern of use, we then examined more specific terms related to breastfeeding to determine what specifically mothers were searching for. Given the significant role that breastfeeding pain plays in influencing breastfeeding duration and persistence, we examined patterns in mothers' use of Google to seek information related to breastfeeding pain and how that compares to other breastfeeding search terms. We also examined diurnal patterns in searches related to breastfeeding pain to determine if there were specific times of the day that mothers were more likely to seek such information and how these time periods may relate to issues associated with breastfeeding pain. Finally, we examined U.S. state-level predictors of Google searches related to breastfeeding pain to ascertain what demographic factors predict the relative likelihood of mothers relying on the internet for such information. The findings of this research have the potential to elucidate how we might help mothers in their search for answers to questions related to breastfeeding, and breastfeeding pain, to help mothers and their infants sustain breastfeeding as long as possible. The findings highlight how Big Data such as Google Trends can provide insight into important health and developmental processes that have significant short- and long-term outcomes for mothers and their infants, as for our society as well.

2. Methods and Results

Data on search engine use were obtained by using Google Trends (<https://trends.google.com/trends/>). Google Trends data are an unbiased sample of Google searches, and it has become the most popular tool for examining online behavior and interest (Mavragani & Ochoa, 2019). The data are anonymized, categorized, and aggregated. This allows for the assessment of interest in a particular topic across searches for a given time period and/or for a given region of the world. It offers a reflection of the needs, wants, and interests of its users.

Google Trends produces a real-time index of the volume of Google searches by category and geography. Google Trends does not report the absolute number of queries for a search term(s) but instead reports a *search intensity index* that reflects the fraction of a given area’s Google searches devoted to that term or topic. The index reflects the total search volume for a term in a given geographic region divided by the total number of searches in that region at a particular time. The resulting numbers are then normalized between 0 and 100 and are available worldwide and for individual countries.

2.1. Breastfeeding Google Search Intensity

Our first step in assessing interest in issues related to breastfeeding was to examine the pattern of use of the search term “breastfeeding” in the U.S. and neighboring countries across the period of time available in Google Trends (2004 to the present).

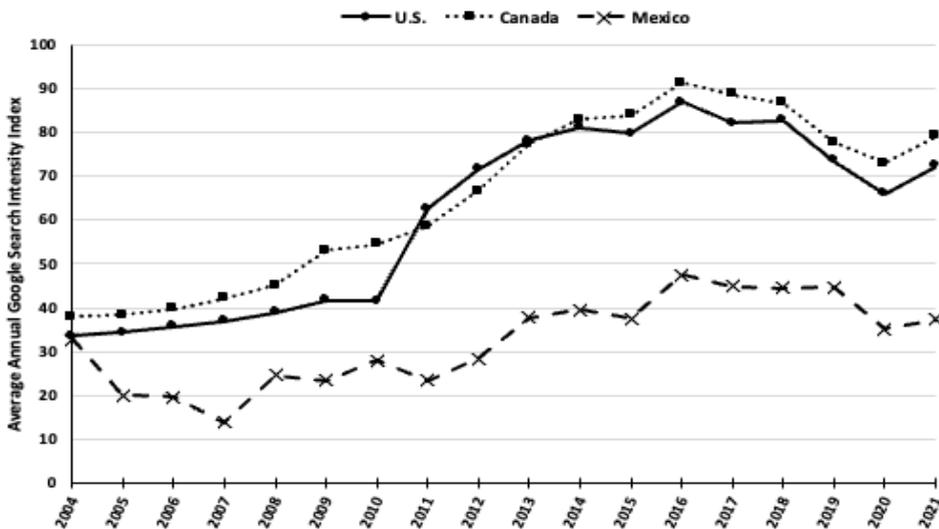


Figure 1. Google Search Intensities for “Breastfeeding” from 2004 to 2021.

The results of this search are presented in Figure 1 and reveal a positive trend in search intensity in all three countries related to breastfeeding. The figure also reveals an uptick in intensity in the U.S. beginning in 2011. Google notes an improvement in geographical assignment in 2010 that may partially account for this increase. However, this spike in 2011 did not take place in the data for either Canada or Mexico. It is interesting to note that in 2011 the U.S. Surgeon General issued a “Call to Action to Support Breastfeeding” (U.S. Department of Health and Human Services, 2011). This increase in the U.S. may reflect the impact of this society-wide emphasis on the need to support mother and their babies who are breastfeeding.

2.2. Breastfeeding Google Search Intensity Patterns Over Time

To examine the specific types of searches that may account for the increases in interest in the U.S. reflected in Figure 1, we conducted a Google Trends search using popular search topics related to breastfeeding. Specifically, we separately entered the search terms “breastfeeding pain,” “benefits of breastfeeding,” “breastfeeding latch,” “breastfeeding help,” and “breastfeeding tips.” The results of these searches are presented in Figure 2, along with the slope for each of the terms. Figure 2 reveals some clear patterns. First, although each of the lines show an increase in 2011, the increases in search intensity vary in strength.

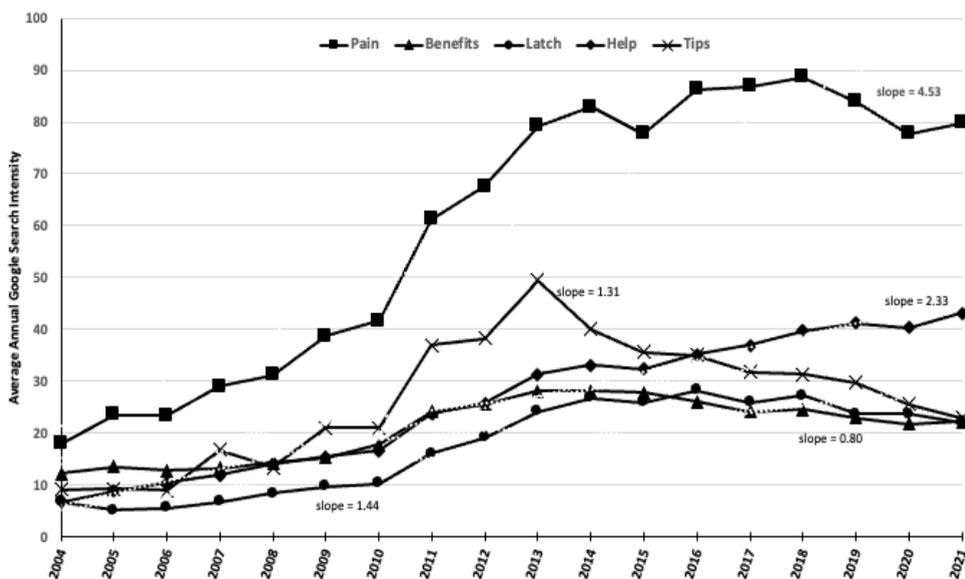


Figure 2. Google Search Intensities for popular breastfeeding terms in U.S. from 2004 to 2021.

Second, search intensity related to breastfeeding pain showed a pattern that was similar to the pattern seen for the U.S. data in Figure 1. None of the other terms showed this similarity with the general pattern found for U.S. data in Figure 1. The largest slopes were found for

“breastfeeding pain” and “breastfeeding help” – both reflecting searches for information that likely reflect mothers’ concerns related to breastfeeding and an effort to find information that may help them overcome problems or issues they may be having.

2.3. Diurnal Variation in Google Search Intensity for “Breastfeeding Pain” Searches

The use of the internet as a source of information about breastfeeding pain opens up options for mothers who can access this information any time of day and from almost any location. Such a conclusion is consistent with research that has shown that new mothers often use the internet to seek information after the birth of their infants with the most common online topics searched including information about establishing breastfeeding and dealing with lactation issues (e.g., Alianmoghaddam et al., 2019). But when do mothers search for this information and are there consistent daily patterns in U.S. mothers’ searches for information related to breastfeeding pain? What can daily search patterns reveal about mothers’ efforts to obtain information related to breastfeeding pain?

We addressed these questions by entering “breastfeeding pain” into a Google Trends search for the U.S. over a week of data Feb 28-March 7, 2022). This search option in Google Trends provides users with hourly data across the week, up to the date of entry. The results are presented in Figure 3 and revealed a consistent pattern in Google searches. Over this week, mothers were most likely to be searching for information related to breastfeeding pain at night, typically peaking each day around midnight with lows during the daytime (results from other weeks show a similar pattern).

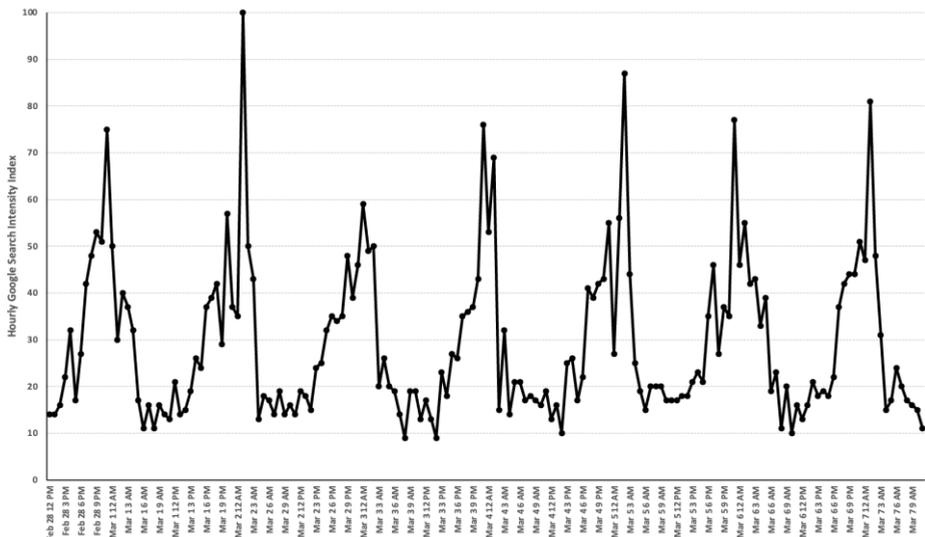


Figure 3. Google Search Intensity for “Breastfeeding Pain” by Time of Day (Feb 28 – March 7, 2022)

It has been well documented that women experience significant sleep changes after the birth of a baby (Richter et al., 2019). Mothers have been found to sleep less at night and more during the day (Gay et al., 2004). Given this, it is not surprising that mothers were searching for information on breastfeeding pain late at night while they were up and less during the day when they may have other sources to turn to, or may be sleeping, dealing with family, working and have less free time to spend on the internet. Up at night, frequently by themselves with their infants, these data support the conclusion that mothers appear to use this time to seek help related to breastfeeding pain via the internet and/or in seeking or providing virtual social support.

2.4. U.S. State-level Predictors of Google Search Intensity for “Breastfeeding Pain”

To better understand the predictors of mothers’ use of Google to obtain information related to breastfeeding pain, we conducted a multiple regression in which we predicted the Google search intensity index for “breastfeeding pain” for 38 of the U.S. states that had data to calculate a search intensity index for the past 4 years (before and after the onset of COVID-19; March 2018 to March 2022). Using 2020 U.S. Census data, we entered state-level variables of total population, per capita income, percent of population that was white, and had a bachelor’s degree. We also entered data on the proportion of mothers who were breastfeeding at 6 months (CDC, 2020). The results revealed that the population of a state and per capita income were inversely related to Google search intensity for “breastfeeding pain” whereas percent of mothers who were breastfeeding at 6 months was positively related ($Bs = -.34, -.47, \text{ and } .74, ps < .017, .0005, \text{ and } .001, \text{ respectively; } R^2 = .59$). Google search intensity related to “breastfeeding pain” was relatively greater in states that were less populated, had lower per capita incomes, and had more mothers who were breastfeeding at 6 months. Although we do not have data that explicate these patterns, they highlight regional differences that affect the use of Google for information about pain during breastfeeding. Such findings may suggest that when there are limitations in access to health care providers in states, either due to a more rural region or due to income limitations, mothers are relatively likely to turn to the internet for information related to breastfeeding pain.

3. Considerations and Implications

Despite much preparatory effort, numerous studies find that new mothers report feeling overwhelmed and unprepared for breastfeeding (Lansinoh, 2012). The U.S. Surgeon General’s *Call to Action to Support Breastfeeding* (2011) listed several barriers to breastfeeding in the U.S., including lack of knowledge, social norms, poor family support, embarrassment, and problems with access to health services. Online breastfeeding information and support may help women meet their breastfeeding needs, particularly when they have limited access to health care providers or peer support systems.

As with all studies, there are important limitations that need to be considered. First, Google Trends data are aggregated, and we cannot disentangle the qualities of various users and any variation in search engine use for individual mothers. Second, the focus of the present research was on data from the U.S. It will be important for future research to explore these trends across different countries to compare how cultural and technological differences impact the use of the internet for information related to breastfeeding. Third, caution must be used when examining long-term trends in Google search intensity as the population of users changes over time. Moreover, Google changed its methodology over this period of time. Fourth, Google search intensity depends on the number of queries in a location. As a result, trends over time can sometimes be misleading as an increasing pattern can be found while the total number of searches declines (or vice versa). Finally, it will be important for future research to focus on how search engine information is used and how this use is related to important outcomes related to breastfeeding. For example, using a convenience sample, one study found that when online breastfeeding resources were deemed to be helpful to first-time mothers, they were more likely to continue to breastfeed and reduce their use of formula with their infants at 6 months of age (Newby et al., 2015). How patterns of use of Google search engine related to breastfeeding outcomes is an important step in understanding the impact the internet has on mothers' breastfeeding decisions.

Despite these limitations, the findings of the present study were the first to use Google Trends to highlight how such data can be used to better understand issues related to breastfeeding and how mothers use the internet to seek out help, guidance, and support. Although health care professionals do an excellent job of trying to help new mothers with issues related to breastfeeding and lactation, it is not possible for them to provide such support and guidance 24/7. As the diurnal data show, online searches for information related to "breastfeeding pain" took place late at night when women are likely alone with their infants. It is during these times of stress, emotional strain, and solitude that many women decide to give up on breastfeeding (Bennett, 2018). The U.S. state-level data presented in this paper suggest that this may be particularly true for mothers who live in relatively unpopulated states and in states with less overall per capita income. Thus, the internet may be an even more important source of information for these women and their infants. The research also confirms that a careful analysis of Google Trends may help health professionals develop timely interventions that help new mothers find appropriate and accurate information and support online.

References

- Alianmoghaddam, N., Phibbs, S., & Benn, C. (2019). "I did a lot of Googling": A qualitative study of exclusive breastfeeding support through social media. *Women and Birth, 32*(2), 147–156. <https://doi.org/10.1016/j.wombi.2018.05.008>

- Amir, L. H., Dennerstein, L., Garland, S. M., Fisher, J., & Farish, S. J. (1996). Psychological aspects of nipple pain in lactating women. *Journal of Psychosomatic Obstetrics and Gynecology*, 17(1), 53–58. <https://doi.org/10.3109/01674829609025664>
- Bennett, V. (2018). Could artificial intelligence assist mothers with breastfeeding? *British Journal of Midwifery*, 26, 212–213. <https://doi.org/10.12968/bjom.2018.26.4.212>
- CDC. (2020). *Breastfeeding report card United States 2020*. CDC. <https://www.cdc.gov/breastfeeding/pdf/2020-Breastfeeding-Report-Card-H.pdf>
- Gay, C. L., Lee, K. A., & Lee, S.-Y. (2004). Sleep patterns and fatigue in new mothers and fathers. *Biological Research for Nursing*, 5(4), 311–318. <https://doi.org/10.1177/1099800403262142>
- Kent, J. C., Ashton, E., Hardwick, C. M., Rowan, M. K., Chia, E. S., Fairclough, K. A., Menon, L. L., Scott, C., Mather-McCaw, G., Navarro, K., & Geddes, D. T. (2015). Nipple pain in breastfeeding mothers: Incidence, causes and treatments. *International Journal of Environmental Research and Public Health*, 12(10), 12247–12263. <https://doi.org/10.3390/ijerph121012247>
- Lansinoh. (2012). *Moms feel unprepared for and unsupported during postpartum*. <https://lansinoh.com/blogs/birth-prep-recovery/moms-feel-unprepared-for-and-unsupported-during-postpartum>
- Mavragani, A., & Ochoa, G. (2019). Google Trends in infodemiology and infoveillance: Methodology framework. *JMIR Public Health Surveillance*, 5(2), e13439. <https://doi.org/10.2196/13439>
- McClellan, H. L., Hepworth, A. R., Garbin, C. P., Rowan, M. K., Deacon, J., Hartmann, P. E., & Geddes, D. T. (2012). Nipple pain during breastfeeding with or without visible trauma. *Journal of Human Lactation*, 28(4), 511–521. <https://doi.org/10.1177/0890334412444464>
- Newby, R., Brodribb, W., Ware, R. S., & Davies, P. S. W. (2015). Internet use by first-time mothers for infant feeding support. *Journal of Human Lactation*, 31(3), 416–424. <https://doi.org/10.1177/0890334415584319>
- Richter, D., Krämer, M. D., Tang, N. K. Y., Montgomery-Downs, H. E., & Lemola, S. (2019). Long-term effects of pregnancy and childbirth on sleep satisfaction and duration of first-time and experienced mothers and fathers. *Sleep*, 42(4), zsz015. <https://doi.org/10.1093/sleep/zsz015>
- U.S. Department of Health and Human Services. (2011). *The Surgeon General's call to action to support breastfeeding*. U.S. Department of Health and Human Services. https://www.ncbi.nlm.nih.gov/books/NBK52682/pdf/Bookshelf_NBK52682.pdf