Creating Nutrition Education for Lactating Parents

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NORTHERN ILLINOIS UNIVERSITY
Creating Nutrition Education for Lactating Parents
A Capstone Submitted to the
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With Honors
Department of
Nutrition, Dietetics, and Wellness
By
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Capstone Title: **Creating Nutrition Education for Lactating Parents**

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Lactation is an important life stage that requires a unique emphasis on nutritional intake; existing educational materials on this topic do a poor job of meeting the needs of lactating parents. The purpose of this project was to work with a community partner, the DeKalb County WIC, to create educational materials that will address this issue. The creation of the educational materials was a multi-step process, involving exploration of the relationship between nutrition and lactation and collaboration with the established community partner. A written paper was synthesized, and three handouts were created. Each handout focused on a specific nutrient of concern for lactating parents and was accompanied with a recipe that emphasized the identified nutrient. The distribution of these educational materials is expected to improve the health of beneficiaries of the community partner.
Literature Review

It is well established that exclusive breastfeeding is the most optimal method of feeding an infant, especially for the first 6 months of their life.\textsuperscript{1} This statement has been agreed upon by multiple professional health organizations, including the Academy of Nutrition and Dietetics, the United States Breastfeeding Committee, the United States Surgeon General, and the American Academy of Family Practitioners.\textsuperscript{2} The support for this statement is due to the fact that breastfeeding has been found to have numerous benefits, for both the lactating parent and the infant being fed. For parents, breastfeeding can decrease their risk of later in life breast and ovarian cancer, promote postpartum weight loss, decrease risk of postmenopausal fracture, and release mood-boosting hormones that help combat postpartum depression.\textsuperscript{3} For infants, the consumption of human milk provides them with the perfect balance of nutrients and fluid they need to properly grow and develop for the first 6 months of their life. The composition of breastmilk even changes throughout the course of the lactation period to meet the rapidly changing needs of the infant.\textsuperscript{2} In fact, breastmilk is such a perfect nutrition source that nutrient recommendations and formula compositions for non-breastfed infants are based upon the composition of human milk.\textsuperscript{4}

Human milk also provides infants with immune support, protecting them against illnesses and chronic diseases such as ear infections, gastrointestinal infections, obesity, type 2 diabetes, lower respiratory tract diseases, asthma, leukemia, and sudden infant death syndrome.\textsuperscript{3} It has even been shown to have positive effects on inflammation biomarkers. One study found that C-reactive protein levels, an important measure of inflammation levels, were 29.6 percent lower in infants breastfed for 6 to 12 months than in those who were never breastfed; this ultimately leads to a lower long-term risk of heart and metabolic disease for these individuals.\textsuperscript{5}
However, despite all the benefit it provides, according to recently reported numbers in the United States, breastfeeding rates tend to decline throughout infancy. Many infants (83.2 percent) start out receiving at least some breast milk. By month 3 of life, this number declines to 69.1 percent, and by month 6, it is only 55.8 percent. Exclusive breastfeeding rates are even lower; 62.6 percent of infants start out being exclusively breastfed. By month 3 of life, this number declines to 45.3 percent, and by month 6, it is at 24.9 percent. This is unfortunate and is likely due to the multiple barriers that exist for parents. Many parents lack knowledge about the benefits of breastfeeding and are uncertain about proper breastfeeding techniques. They may have poor family support, or inflexible jobs with limited maternity leave. Breasts are frequently regarded as sexual objects, which leads people to feel uncomfortable and embarrassed when breastfeeding. There is also a lack of available health education that effectively teaches parents about the unique demands of lactation. For example, lactation is a very different and special stage of one’s life that requires an increased emphasis on proper nutrition; multiple topics must be addressed and considered when educating lactating parents on this subject.

Interestingly, studies have found that a lactating parent’s food choices do not significantly influence the amount of many of the nutrients in the milk they produce. Typically, it is only long-term, severe nutritional deficiencies from a situation such as a long-term famine that result in suboptimal breastmilk. However, because the production of breastmilk depletes nutrient stores, parents will feel the negative effects of not consuming a proper diet. These effects may include a weakened immune system and low energy levels. So, to support their child’s growth while maintaining their own health and replenishing the nutrient stores they lost during pregnancy, parents do need to place additional focus on their macro- and micro-nutrient intake.
One of the most necessary changes during this time is that parents need to be consuming additional calories and nutrients. The exact amount that one should be consuming will vary depending on multiple factors such as age, activity level, and size.¹ But, for the first 6 months of lactation, the general recommendation is that breastfeeding parents should be consuming an additional 330 calories per day. This increases to an additional 400 calories if lactation is continued for another 6 months.⁸ It is best that these additional calories come from nutrient dense foods; that is, foods that contain lots of vitamins and minerals, and not much added sugar, saturated fat, and sodium.¹ The best way to achieve this goal is to follow a general healthy diet pattern, as recommended by the Dietary Guidelines for Americans. These guidelines recommend consuming a variety of colorful vegetables, whole fruits, whole grains, low-fat dairy, lean protein, and limiting added sugars, saturated fat, and sodium.¹ Although this recommendation seems straightforward, the current estimates of intakes in America show that many are failing to reach these goals. Lactating parents are reported to be under consuming vegetables, whole grains, fruit, and dairy, and overconsuming protein, refined grains, added sugar, saturated fat, and sodium.¹

When parents do follow these guidelines, their health will benefit; additional positive outcomes for the infants they feed will also occur. For example, human milk contains flavor compounds that originate from the producer’s diet. It has been found that formula-fed infants are less accepting of new flavors than breastfed infants are. In one study, infants were exposed to caraway flavor via human milk. These infants were later more accepting of a caraway-flavored puree than were the control group of formula-fed infants.⁹ So, by following the Dietary Guidelines which suggest consuming a varied diet, parents may end up with less picky eaters on their hands once solid foods are introduced.
As previously stated, following the Dietary Guidelines for Americans will meet the requirements for the majority of the specific nutrients lactating parents need, and it is recommended that health care providers be consulted regarding specific dietary supplements such as vitamins.\(^1\) There are, however, a few specific micronutrients that require extra attention during this stage of life regardless. According to the Centers for Disease Control, the demand for iodine and choline increases during lactation.\(^10\) Iodine is important for the neurocognitive development of infants, and it is estimated that lactating parents need nearly double the amount of iodine than usual.\(^2\) Many brands of table salt have iodine added to them; the easiest way to ensure adequate intake of this nutrient is to make sure that lactating parents are using this type of salt. Dairy products, seafood, and eggs are also good sources of iodine.\(^1\) Choline supports the growth and development of the infant’s brain and spinal cord.\(^1\) Foods to emphasize in a diet pattern that contain this nutrient include eggs, meats, beans, and lentils.\(^10\)

Also, lactating parents who do not consume animal products should discuss a vitamin b12 supplement with their health care provider. Vitamin b12 is extremely important for an infant’s nervous system development and growth.\(^2\) Studies have found that infants who are breastfed by parents with a vitamin b12 deficiency due to consuming a diet that contains inadequate animal protein have multiple severe manifestations. These manifestations included weakness, failure to thrive, vomiting, irritability, anemia, and developmental delay. Healthcare providers were able to pinpoint the deficiency as the issue; when b12 supplementation was introduced to the infants, they showed improvement in their symptoms.\(^1\) The easiest way to avoid this issue would be for lactating parents who are vegan or vegetarian to consider taking a supplement of this micronutrient, under the guidance of their health care team.
Lactating parents also need to be consuming an adequate amount of omega-3 fatty acids; omega-3s are important for neurocognitive development.\(^4\) This can be accomplished by the consumption of fish; it is recommended that one should consume 8 to 12 ounces of seafood per week. However, some fish is high in mercury. This can accumulate in the body and be harmful to the brain and nervous system of both the lactating parent and infant and should be avoided as much as possible.\(^1\) Seafood choices that are low in mercury include canned chunk light tuna, salmon, and herring; choices to avoid include pike, mackerel, and swordfish.\(^2\)

A study published in the *Journal of Pediatrics* examined the effect of postpartum docosahexaenoic acid (DHA) intake, which is an important omega-3 fatty acid, on infant outcomes at 5 years of age. In this study, lactating parents received either a high-DHA supplement, or a placebo, from delivery until 4 months postpartum. Researchers found that at 30 months of age, children from parents who had received the DHA supplement performed better on a psychomotor development test than did children whose parents received the placebo. They also found that at 5 years of age, the children from the test group had higher measures of sustained attention.\(^12\)

Finally, the amount of fluid that a lactating parent needs will change during this period of their life. The exact amount needed again will vary due to multiple factors such as body size, climate, and physical activity level. However, because of the additional output of fluid in breastmilk, overall intake of fluid will need to increase.\(^13\) The general guideline is that while lactating, parents should drink 3.8 liters of water per day, which is about 128 ounces.\(^14\) The best advice to give to lactating parents, though, is to drink enough to satisfy their thirst, with their first choice of liquid being water.\(^2\) Following this guideline should satisfy the parent’s increased need during this life stage.
Infancy is a vulnerable period of life; infants cannot tolerate and process some substances that older adults can. Because of this, there are some things lactating parents should avoid consuming as certain substances can pass through their milk and harm their infants. The first item of concern is caffeine. It is agreed upon by professionals that around 300 milligrams of caffeine per day can be consumed while lactating without upsetting the infant being fed; this is the equivalent to about 3 small cups of coffee. However, when amounts are consumed in excess of this, infants may become fussy and overstimulated, and their sleep can be interrupted. If this happens, parents should decrease their intake accordingly until their infant agrees with the amount they are consuming.²

One study followed 885 infants in an attempt to determine if maternal caffeine consumption during pregnancy and lactation led to sleep interference in infants. This study was derived from a larger population-based prospective cohort study that followed all children born in Pelotas, Brazil, in 2004. A subsample of this cohort (those born from October to December) were asked additional questions about their child’s sleeping pattern to facilitate the study on caffeine consumption. By doing this, researchers were able to track maternal caffeine consumption and the number of times an infant awoke during the nighttime. They found that the highest prevalence of nighttime waking episodes occurred in breastfed infants whose parents consumed greater than 300 milligrams of caffeine per day during the pregnancy and postpartum periods. From these results, researchers suggested that the advised limit of 300 milligrams of caffeine per day is a safe and smart recommendation to continue giving to lactating parents.¹⁵ It should be noted that there is a need for additional studies with larger and more diverse sample sizes to be completed on this topic.
Alcohol should also be extremely limited by lactating parents. Alcohol passes into human milk; when it is consumed by infants, it can cause a host of problems, such as short-term interruption of sleep patterns and long-term psychomotor developmental delay. If a lactating parent does decide to have a drink, they should limit themselves to only one drink, and wait until the alcohol has completely cleared from their system before nursing or expressing milk again. The amount of time this takes will vary from person to person; a good rule of thumb is to wait for at least 3 hours. Some people believe that pumping their milk and discarding it will eliminate the alcohol from the breastmilk; this is a myth. Alcohol will pass into the milk for as long as it is in the bloodstream; the only way to ensure no alcohol is given to the infant is to wait the proper amount of time for it to completely clear from the bloodstream.

To show the negative effects of maternal alcohol consumption, researchers analyzed participants in a longitudinal study to determine if the consumption of alcohol during lactation affected children’s cognitive scores. These participants were sourced from the Longitudinal Study of Australian Children (LSAC), which is a long-term study that follows a sample of children and adults representative of the population of Australia. For the study on alcohol consumption, 5107 participants who had been enrolled in the LSAC since infancy were identified for analysis. Ultimately, researchers found that infants exposed to alcohol via human milk did have reductions in cognitive ability at ages 6 to 7 years old compared to infants who were never breastfed, as measured by reductions in Matrix Reasoning scores. This study suggests that alcohol exposure via breastmilk is dangerous to the long-term cognitive development of children.

Because of the recent increase in the legalization of the medicinal and recreational use of marijuana, it is important to discuss its use during lactation. The main active ingredient in
marijuana, tetrahydrocannabinol (THC), transfers to infants through human milk. Some initial studies have shown that THC can have negative impacts on an infant’s motor development.

The most commonly referred to research article on this topic examined the effect of exposure to marijuana via human milk on infants’ motor and mental development. At age 1, motor development was determined to be significantly lower as measured by the Bayley index in infants who were exposed to marijuana via the consumption of human milk versus those who were not exposed. It is also important to note that by using matched controls, this study was able to control for any additional effects that alcohol, tobacco, and cocaine use might have had. Because of the demonstrated negative implications that tetrahydrocannabinol has on development, it is recommended that all consumption of marijuana should be avoided by lactating parents.

Parents may also be concerned about avoiding major allergens in their diet such as peanuts, wheat, eggs, and cow’s milk, when lactating. However, the National Institute of Allergy and Infectious Diseases has advised against this practice. Avoiding certain foods while breastfeeding or avoiding breastfeeding altogether will not prevent the development of food allergies in children. In fact, breastfeeding has been shown to reduce the incidence of allergies in infants, while allergen avoidance has been shown to increase risk of allergy. A study published in the Journal of Allergy and Clinical Immunology sought to determine the relationship between maternal peanut consumption during lactation and peanut allergy in children by age 7. Researchers found that the lowest risk of peanut allergy was shown in children whose parents had consumed peanuts during lactation and who had been introduced to peanuts during their first year of life. Overall, 9.4 percent of children were found to have a peanut allergy, while the risk for this group was only 1.7 percent.
Although following this guideline will lower the risk for allergy development, sometimes infants may still have a reaction to a food that a lactating parent has been consuming. Symptoms of this allergy may include diarrhea, colic, eczema, and bloody stools. If an allergy is suspected, it is recommended that parents try removing allergens from their diet and seeing if the infant’s symptoms improve. If so, this was likely the cause of their reaction, and allergy testing can be done to further confirm this.13

To reiterate, breastfeeding is the most optimal method of feeding an infant for the first 6 months of their life. The practice leads to multiple positive outcomes for both the lactating parent and the infant. For lactating parents, this stage of life does require some additional focus to be placed on nutrition. In general, the best practice is to follow a healthy diet pattern as recommended by the Dietary Guidelines for Americans. Any specific supplementation can and should be discussed with a health care provider. Consuming adequate calories, iodine, choline, fluid, and omega-3s and avoiding alcohol, marijuana, and excessive amounts of caffeine are recommended. With continued education and an increased access to accurate and clear information on this topic, hopefully, the low rates of this best practice that persist in the United States will increase over time. The health of individuals and the nation as a whole will likely improve as a result.
Community Partner

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in DeKalb County served as the community partner for this project. All communication was directed through Cristina Cruz, a Breastfeeding Coordinator for this organization. WIC is a federally funded program that aids low-income women, infants, and children up to the age of 5-years old. They provide eligible participants with nutrition education, supplemental foods, and necessary referrals to other services. This was an ideal collaboration as WIC educators emphasize the importance of exclusive breastfeeding to participants, and food packages participants receive are specifically designed to target their unique nutritional needs during this life stage.

Creation Process

After writing the literature review and establishing a partnership with WIC, it was time to begin creating the educational materials. Communication with stakeholders was vital to first determine the needs of the target audience and learn about important details that were to be kept in mind. In particular, the materials created needed to accommodate varying levels of health literacy. The information provided was asked to be congruent with other education that WIC participants receive, and foods available through the program needed to be emphasized in the materials and recipes. A visit was made to the DeKalb County WIC to gain more insight into the nutrition education participants already receive. Rough drafts of the materials were then created and adjusted based on feedback from the project advisor, Dr. Julie Patterson, and educators, nurses, and nutritionists that work for WIC. Ultimately, three handouts were created. Each focused on an identified nutrient of concern for lactating parents: choline, iodine, and omega-3s.
A recipe was also developed to complement each handout and give readers an easy meal idea to help consume the identified nutrient.

**Expected Outcomes**

The materials created will be distributed to pregnant and lactating women by educators at the DeKalb County WIC. The overarching expectation is that this will improve the health of these parents and their infants. Specifically, WIC participants will increase their nutrition knowledge base, and have a better understanding of the role that choline, omega-3s, and iodine have during lactation. They will also feel more confident in their ability to identify foods included in their WIC packages that will help them reach their daily needs for each nutrient. Finally, it is expected that WIC participants will gain new ideas for easy and healthy recipes that are beneficial to them during this unique life stage.

**Reflection**

Working with Christina and the DeKalb County WIC was an extremely beneficial experience. Nutrition throughout the life cycle has always been of interest to me, and I enjoyed the opportunity to spend additional time learning more about nutrition during lactation. My community partner also expressed their excitement to collaborate with me; they stated their lack of funding makes it difficult to find the time and assistance they need to create the educational materials such as these. Knowing that the materials I created will be used to improve the health of the people that utilize the services of my community partner makes me feel extremely satisfied with my work.
References


CHOLINE

HOW DOES CHOLINE HELP ME?
Choline is an important nutrient that helps your muscles to work properly. It can improve your memory. Choline also regulates your mood.

HOW DOES CHOLINE HELP MY CHILD?
Choline is needed for your child's spinal cord to grow and develop. It also helps keeps their brain healthy.

HOW CAN I TELL IF I AM NOT GETTING ENOUGH CHOLINE?
You need more choline when you are pregnant and breastfeeding. It is not always included in prenatal vitamins.
- The recommended daily amount while pregnant is 450 milligrams.
- The recommended daily amount while breastfeeding is 550 milligrams.

If you are not getting enough choline, you might notice you:
- Have trouble remembering things
- Get tired easily
- Have achy muscles
- Have more mood changes than usual

WIC APPROVED FOODS HIGH IN CHOLINE:
- Eggs
- Canned salmon
- Tofu
- Beans and lentils
- 1% or skim milk
- Vegetables like broccoli and Brussel sprouts
- Green peas
- Peanut butter

Other foods high in choline:
- Meats
  - Beef
  - Chicken
  - Seafood
  - Pork

*Foods with the most choline are at the top of each list.

DID YOU KNOW?
Two eggs provides almost half of your daily requirement for choline!

References

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Scan for more resources on healthy eating during pregnancy and lactation!
## Cheesy Breakfast Muffins

This recipe includes eggs, milk, cheese, and black beans. All of these foods are high in choline! One muffin provides about 34% of daily choline needs for pregnancy and 27% of daily needs for breastfeeding.

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<td>35-40 minutes</td>
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### Ingredients:
- 1 cup canned black beans*
- 1 cup canned corn*
- 1 cup shredded cheddar cheese*
- 10 large eggs*
- 1/4 cup 1% or skim milk*
- 1 teaspoon salt
- 1/2 teaspoon ground black pepper
- 1-2 tablespoons hot sauce (optional)

*Foods available in WIC package

### Instructions:
- Wash prep area and your hands.
- Preheat oven to 375 degrees F. Spray or lightly grease the bottom of a muffin tin.
- Drain the black beans and corn. Evenly distribute them into the bottom of the muffin tin.
- In a large bowl, whisk together the eggs, cheese, milk, salt, pepper, and hot sauce until well combined.
- Pour the egg mixture into the muffin tins until each cup is almost full.
- Bake for 20-25 minutes, until the center of the egg muffins is fully cooked.
- Serve right away, or store in the refrigerator for up to 5 days and enjoy later!
3. Iodine Handout

IODINE

HOW DOES IODINE HELP ME?

Iodine is an important mineral that is found in food. It helps to make hormones that change the food you eat into energy. It also keeps your nerves and muscles healthy.

HOW DOES IODINE HELP MY CHILD?

Iodine will help your child grow properly. It also keeps their brain healthy.

HOW CAN I TELL IF I AM NOT GETTING ENOUGH IODINE?

You need more iodine when you are pregnant and breastfeeding. It is not always included in prenatal vitamins.

- The recommended daily amount while pregnant is 220 micrograms.
- The recommended daily amount while breastfeeding is 290 micrograms.

If you are not getting enough iodine, you might notice:
- Feel tired and weak
- Get cold easily
- Have dry skin and hair

WHAT IS THE BEST WAY TO GET MORE IODINE?

An easy way to get iodine is to use the right table salt! Many salts have iodine added to them. So, make sure the salt you buy has the word “iodized” on the label.

WIC APPROVED FOODS ALSO HIGH IN IODINE:

- 1% and skim milk
- Yogurt
- Eggs
- Canned tuna
- Potatoes

Other foods high in iodine:
- Seaweed
- Cod
- Prunes
- Cottage cheese

References:

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Scan for more resources on healthy eating during pregnancy and lactation!
### Potato and Egg Tacos

This recipe includes potatoes and eggs, which are high in iodine. To add even more iodine, use iodized salt! One serving provides about 57% of daily iodine needs for pregnancy and 43% of daily needs for breastfeeding.

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<td>6</td>
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**Ingredients:**
- 2 tablespoons vegetable oil
- 4 russet potatoes*
- 6 eggs*
- 1 teaspoon iodized salt
- whole wheat or corn tortillas*
- optional toppings:
  - sour cream
  - salsa
  - green onion

*Foods available in WIC package

**Instructions:**
- Wash prep area and your hands.
- In a large bowl, whisk the eggs and iodized salt together.
- Wash the potatoes. Dice them into 1/2 inch chunks.
- Cook the potatoes in boiling water for 5 minutes. Drain.
- In a large pan, heat the oil over medium heat. Add the potatoes and cook until they are soft on the inside and crispy on the outside. This will take 7-8 minutes.
- Add the eggs and cook until they are fully set. Stir frequently. This will take 4-5 minutes.
- Serve immediately with the tortillas and optional toppings.
5. Omega-3 Handout

OMEGA-3'S

HOW DO OMEGA-3'S HELP ME?

Omega-3's are an important type of fat. Eating enough of them helps to protect you from heart disease and some cancers. They can also lower inflammation and symptoms of depression.

HOW DO OMEGA-3'S HELP MY CHILD?

Omega-3's can help your child to improve their learning, memory, and motor skills. It also keeps their brain and eyes healthy!

WHAT IS THE BEST WAY TO CONSUME OMEGA-3S?

Eat fish! Fish is high in a type of omega-3 called DHA, which is important for brain development. Pregnant and lactating women should eat 8 to 12 ounces of fish every week.

Some types of fish are high in mercury and should be avoided. They are dangerous for you and your child.

DID YOU KNOW?

Some WIC food packages include canned pink salmon and canned chunk light tuna. These are both great sources of Omega-3s.

If you decide to eat canned tuna, try to choose tuna in water. It has more Omega-3s than tuna in oil. Avoid canned albacore tuna, which is higher in mercury.

OTHER SAFE SEAFOOD CHOICES:

- Salmon
- Trout
- Herring
- Sardines
- Cod
- Catfish
- Tilapia

Fish to AVOID:

- Swordfish
- Shark
- King mackerel
- Tilefish

References


This institution is an equal opportunity provider. Scan for more resources on healthy eating during pregnancy and lactation!
6. Omega-3 Recipe

# Easy Salmon Wrap

This recipe includes canned pink salmon, which is a convenient food that is high in Omega-3's. Eating one of these wraps will get you about 25% of the way to reaching your weekly seafood goal!

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</thead>
<tbody>
<tr>
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<td>2</td>
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</tbody>
</table>

**Ingredients:**
- 2 whole wheat tortillas*
- 1 - 5 oz can of pink salmon*
- 1/4 cup plain yogurt*
- 1 teaspoon Dijon mustard
- 2 tablespoons diced onion*
- 2 tablespoons diced celery*
- 2 lettuce leaves*
- salt and pepper, to taste
- optional ingredients:
  - sriracha or hot sauce
  - other vegetables like carrots, cucumber, and avocado
  - chopped walnuts

*Foods available in WIC package

**Instructions:**
- Wash prep area and your hands.
- Drain the excess water from the salmon.
- Add the drained salmon, yogurt, Dijon mustard, onion, celery, and any other optional ingredients to a large bowl and mix.
- Season with salt and pepper to taste.
- Top each tortilla with a lettuce leaf and half of the salmon mixture. Roll tightly like a burrito and enjoy! These would also be a perfect meal to pack when on the go.

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