The Socio-Ecological Model as a Framework to Enhance Infant Feeding Outcomes

• Objectives
  • *Explain the current evidence related to the relationship between breastfeeding/infant nutrition and healthy weight status*
  • *Describe how factors at various levels of the socio-ecological model (SEM) can influence infant feeding*
Current Evidence: Relationship Between Breastfeeding/Infant Nutrition & Healthy Weight Status

- Though some research reports a leveling off of childhood obesity rates, based on data from the 2013-2016 NHANES collection period:
  - ~12% of children, aged 2 to 5, categorized as having obesity*1,2
  - ~2% of these children categorized as having severe obesity**1
  - Rates, among those aged 6 to 11 and 12 to 19, are increasingly higher in both categories
    - ~21% of 12 to 19 year olds categorized as obese; ~8% of these children categorized as having severe obesity
  - In addition, rates vary by sex, race, and ethnicity...

*≥95th percentile (on age- and sex-specific growth chart)
**>120% of 95th percentile (on age- and sex-specific growth chart)
Current Evidence: Relationship Between Breastfeeding/Infant Nutrition & Healthy Weight Status

- Interestingly, child obesity rates, among 2 to 4 y.o. children participating in WIC* in 2016, significantly lower than those participating in 2010³
  - 2010 - 15.9%  2016 - 13.9%
- Unclear what is driving this, but breastfeeding could explain some of it...

*The Special Supplemental Nutrition Program for Women, Infants, and Children. Federal program serving pregnant women, infants, and children (to age 5), who are at nutritional risk & have incomes < 185% of federal poverty level
Current Evidence: Relationship Between Breastfeeding/Infant Nutrition & Healthy Weight Status

• It's about the weight gain trajectory...
  • *Excessive, rapid weight gain in infancy increases risk for later overweight/obesity*\(^4-6\)
  • *Formula-fed infants at greater risk of rapid weight gain than BF infants*\(^7,8\)
  • *These differences probably driven by type of food and how the food is offered...*

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Current Evidence: Relationship Between Breastfeeding/Infant Nutrition & Healthy Weight Status

• Most infants appear to be born w/ability to self-regulate energy intake\(^9\)
  • *BF infants may be able to maintain this self-regulation longer than infants fed in other ways*
    • BF infants tend to be more in control of the feed, compared to formula-fed infants...but not always\(^10-12\)
  • Complex interplay b/n bioactive compounds in human milk and rapidly-developing infant system(s) likely contributes to more favorable appetite-regulation later in life\(^10\)
Current Evidence: Relationship Between Breastfeeding/Infant Nutrition & Healthy Weight Status

- Protective effect of breastfeeding on risk of later overweight appears to follow a dose-response pattern\textsuperscript{13-15}
  - *Increasing duration of any breastfeeding, especially beyond 4 months, linked to reduced risk of later obesity*\textsuperscript{13}
  - *Exclusive breastfeeding, compared to combo-feeding (e.g., breast and formula) and exclusive formula-feeding linked with reduced risk of child overweight/obesity,*\textsuperscript{14,15} though this remains an important area of research, and this may differ by race and/or ethnicity\textsuperscript{14}

Current Evidence: Relationship Between Breastfeeding/Infant Nutrition & Healthy Weight Status

- Breastfeeding appears to be protective against rapid weight gain, both indirectly and directly -
  - *Indirectly: BF parents more likely to delay solid food introduction to 6 months as compared to FF parents,*\textsuperscript{16} potentially extending time of infant control of feed (as long as infant has access to required amount of breast milk)
  - *Directly: When solid foods are introduced, BF infants more receptive to new foods, likely because of exposure to flavors in breastmilk*\textsuperscript{17}
- This is a very active research area, with new information published all the time!
Current Evidence: Relationship Between Breastfeeding/Infant Nutrition & Healthy Weight Status

- Breastfeeding also reduces risk of chronic ear infections, upper & lower respiratory tract infections, g.i. infections, and, for premature & low-birth weight infants, reduced risk of necrotizing enterocolitis (NEC)\textsuperscript{18,19}
- Though we have made significant strides to increase breastfeeding initiation, exclusivity, and duration as a nation, there is much left to do!
  - \textit{This will be revisited several times over the course of the afternoon}

Current Evidence: Relationship Between Breastfeeding/Infant Nutrition & Healthy Weight Status

- Other nutrition-related infant-feeding factors associated with later overweight/obesity:
  - Sugar-sweetened beverage consumption, including juice, <1 year\textsuperscript{20,21}
  - \textit{Feeding styles...The way an infant/child is fed/learns to eat may play critical role in weight gain trajectory}\textsuperscript{20,22}
    - \textit{The RWJF comprehensive guide,\textsuperscript{20} describing \textit{responsive feeding approach}; provides age-appropriate strategies to put approach into practice: http://healthyeatingresearch.org}
    - \textit{This concept is at the heart of the popular baby-led weaning method, which you will learn more about today!}
Infant Feeding & the Socio-Ecological Model

- The socio-ecological model, or SEM, is a useful tool to conceptualize dynamic interactions between individual and environment
  - *In general, the central circle represents the individual*
  - *The individual is ‘nested’ in a set of concentric rings, each of which represents an additional layer of interaction beyond the individual*
  - *Though models can vary in number of circles/levels, we will use the CDC’s 4-level model to demonstrate different types of infant-feeding interventions*

https://www.cdc.gov/violenceprevention/publichealthissue/social-ecologicalmodel.html

Infant Feeding Interventions: Individual Level\textsuperscript{23-24}

- Prenatal breastfeeding education
  - *Motivational interviewing*\textsuperscript{24}
    - During 3\textsuperscript{rd} trimester - Increased any BF at 1 mo postpartum, compared to no intervention; Improved BF attitudes, but only among 1\textsuperscript{st}-time mothers
  - Empowering mothers and providing her with support services are critical components of increasing breastfeeding rates

https://www.cdc.gov/violenceprevention/publichealthissue/social-ecologicalmodel.html
Infant Feeding Interventions: Relationship Level\textsuperscript{23,25}

- Increasing support from maternal support system
  - \textit{Co-parenting BF support intervention}\textsuperscript{25}
    - Intervention group significantly increased any BF at 12 weeks, compared to control (differed by \~10\%); No differences in exclusivity
    - Partners significantly more involved in infant care and had better attitudes
  - We will see a couple of examples of individual/relationship level approaches to infant-feeding today...

https://www.cdc.gov/violenceprevention/publichealthissue/social-ecologicalmodel.html

Infant Feeding Interventions: Community & Societal Levels\textsuperscript{23,26,27}

- Worksite Support\textsuperscript{26}
  - \textit{Though support in the workplace is associated with positive BF outcomes, research conducted in industries employing low-income individuals is needed}
- Changing social norms\textsuperscript{27}
  - \textit{Interventions designed to increase positive attitudes among non-parents, or soon-to-be parents, may increase BF rates, as artificial constraints such as avoiding BF in public could be removed}
  - At least one of our speakers will be discussing how activities at the community or social level have ramifications on infants and their families...

https://www.cdc.gov/violenceprevention/publichealthissue/social-ecologicalmodel.html
Conclusion

- Reducing obesity risk early in life, and maintaining healthy eating behaviors as children grow, is a critical component of solving our obesity crisis.
- The SEM helps us to understand how interventions or changes at one level might affect other levels, or how developing approaches to change at more than one level may have a greater impact than focusing on one level at a time.
- Today, presentations will focus on different levels of the SEM, as well as on how interventions might be different based on factors such as population and/or maternal characteristics.
- Please enjoy this great set of speakers!

References

References

References


27. Foss KA, Blake K. "It’s natural and healthy, but I don’t want to see it": Using entertainment-education to improve attitudes toward breastfeeding in public. *Health Commun* 2018:1-12.