Probiotics in the Child Care Center: Context Matters

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In the United States, 3 of 5 children <5 years of age are in a child care arrangement.[1] In addition to potential opportunities for early socialization and education for children, parents often rely on child care to participate in the work force. However, child care exposure has also been associated with an increased risk in children for gastrointestinal (GI) and upper respiratory infection. Thus, any intervention that can prevent child care associated illness can have public health as well as economic and educational implications.

Probiotics are defined as "live microorganisms that, when administered in adequate amounts, confer a health benefit on the host."[2] Probiotic interventions in child care settings have been reported to decrease the risk of common infections and, as a result, decrease the number of missed days at child care.[3] However, in this issue, Laursen et al[4] conduct a high quality study that suggests the daily administration of *Bifidobacterium animalis* subsp *lactis* and *Lactobacillus rhamnosus* for 6 months did not decrease days absent from child care in healthy infants. Furthermore, there were no differences in secondary outcomes, including the number of children with upper or lower respiratory tract infections or the occurrence and duration of diarrhea. These results seem to run counter to several positive studies that show an impact in decreasing respiratory infection, GI infection, and days absent from child care.[5,6]

An intervention utilizing a probiotic supplement occurs in the context of many potential exposures that can influence the risk of childhood illness and child care attendance. For example, in the study reported by Laursen et al,[4] almost half (47%) of the infants enrolled were breastfed and thus exposed to human milk oligosaccharides. These complex carbohydrates found in breast milk are not digested but selectively influence the development of infant GI microbiota and also inhibit the attachment of viral and bacterial pathogens associated with GI infections.[7] Two commonly cited child care studies are reports by Weizman et al[8] and Smerud et al,[9] which both documented a positive effect of a probiotic supplement on GI infections; however, both studies only included infants who were not breastfed. Given the positive effects of breastfeeding in preventing common infections and the high percentage of infants who were breastfed, it may be difficult to discern the effects of a probiotic supplement in the Laursen study.

Patient age may also play a role in the effectiveness of a probiotic supplement in influencing the GI microbiota. Randomized controlled trials by Hojsak et al[5] and Garaiova et al[6] report that probiotic supplementation was successful in decreasing the number of days absent in child care. However, both studies included children who were >4 years of age compared with the children enrolled in the Laursen et al[4] study who were between 8 and 13 months of age. It is unlikely that children >1 year of age will still be exposed to breast milk. In addition, the GI microbiome of a 5-year-old is different from that of a 10-month-old. Changes in diet, such as the cessation

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of breastfeeding and the introduction of "table foods," are associated with the evolution of the microbiome to a more "adult-like" composition.[10]

This important study by Laursen et al[4] leads to further questions; however, the results may add more information toward understanding the appropriate context when probiotic supplementation may have the greatest impact. Any child care intervention occurs in the context of other dietary and environmental exposures, which can also impact attendance. Indirectly, this study suggests additional information on the relative value of a probiotic intervention compared with breastfeeding and diet and perhaps another reason to encourage breastfeeding as long as possible.

ABBREVIATION

GI: gastrointestinal

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