

Associations between nutritional, environmental, and sociodemographic factors and early childhood development

Streszczenie w języku angielskim

The rapid development of a child and their health during the first years of life are determined by a range of mutually interacting nutritional and lifestyle factors. Identifying the determinants of desirable eating behaviors or habits, as well as other factors related to children's health (e.g., bone quality), may constitute an important element contributing to public health improvement. However, the literature contains few studies analyzing the simultaneous impact of these factors.

The aim of this study was to assess the relationships between early nutritional, environmental, and sociodemographic factors and the development of children aged 1–7 years. The study was conducted in two stages between 2020 and 2023. Stage I – a survey study – was carried out using a computer-assisted web interview (CAWI) and included 467 mothers of children aged 1–3 years. The questionnaire included questions on, among other things, the child's early and current feeding and the Children's Eating Behavior Questionnaire (CEBQ). Stage II consisted of a survey and an assessment of bone quality and involved 205 children aged 3–7 years along with their parents. Data from the FFQ allowed the calculation of the Polish-adapted Mediterranean diet score in a modified version – MVP-aMED. Bone quality was assessed using quantitative ultrasound (QUS) with the Sunlight Omnisense 9000 device (BeamMed, Israel). Dietary patterns were identified using the k-means method, based on early feeding, types of complementary foods, and mealtime behaviors.

In Stage I, it was shown that longer breastfeeding duration was negatively associated with the subscales enjoyment of food (EF) and desire to drink (DD) and positively associated with satiety responsiveness (SR) and slowness in eating (SE). Additionally, more frequent provision of homemade complementary foods compared to commercial ones was associated with higher SR levels. Distracted mealtime environment pattern was negatively associated with EF and positively with DD and SE subscales. Factors such as higher EF and SR scores increased the odds of following a prohealth dietary pattern, whereas a commercial complementary foods pattern, distracted mealtime environment pattern, higher food fussiness (FF) scores, and screen time reduced these odds. Distracted mealtime environment pattern during the first three months of complementary feeding and separated mealtime environment pattern in the last three months, as well as higher FF scores, increased the odds of a non-eaters dietary pattern, while commercial complementary foods pattern, lack of current breastfeeding, and screen time increased the odds of belonging to a processed dietary pattern.

In Stage II, among girls, differences were observed between the MVP-aMED score and BMI z-score in relation to QUS z-score. Girls whose diet was more aligned with the Mediterranean

diet had higher QUS z-scores, indicating better bone quality. Conversely, girls who were overweight or obese had lower QUS z-scores compared to those with normal body weight. In the multivariate model, only the Mediterranean diet remained significant.

Based on these results, it was concluded that selected feeding practices (e.g., longer breastfeeding, offering homemade foods during complementary feeding, more frequent family meals, elements of the Mediterranean diet) and limiting children's screen time may be particularly important for creating desirable eating behaviors, prohealth dietary patterns, and better bone quality. Therefore, attention should be paid to these aspects in parental nutrition education for young children.

The results of this study may be applied in nutritional education and counseling for both parents and children. Furthermore, they may suggest directions for future long-term studies assessing the impact of the analyzed factors on children's development and health.