

Technologically processed and natural foods in pregnant women nutrition

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The objective of our study was to find out the tendencies of nutrition among pregnant women and to reveal which products, technologically processed or natural foods, were consumed more. 205 women took part in the first Lithuanian newborn cohort, PLANK-K. 62 questionnaires with 198 questions about products consumed during pregnancy were answered. In the main groups of products the majority of women consumed plant origin food. Most of the women ate bread products, grain and its products, cocoa and its products, dairy products, meat and its products. A lot of women consumed nuts and their products, various drinks, some of them ate eggs and their products. The least consumed during pregnancy were various origin fats and honey. In smaller subgroups the majority of women consumed vegetables, the minority of them ate rare meat (venison, lamb) and mixed origin fat. Speaking about technologically processed food, two groups were fit for comparison: processed meat products and canned corn. Processed meat products had big preponderance against consumption of other meat products and more than half of women chose canned corn. It is clear that in this case technologically processed food was chosen more often than non-processed food. The format of this questionnaire allows to accurately evaluate food products that mothers consume during pregnancy, but makes it harder to evaluate technologically processed and non-processed food consumption.

Key words: pregnant women nutrition, PLANK-K, first Lithuanian birth cohort, technologically processed food, natural foods, technologically non-processed food, canned corn, technologically processed meat products

INTRODUCTION

We wanted to accurately document pregnant women nutrition in Lithuania and their priorities to technologically processed and non-processed food

products. We decided to make a cohort PLANK-K and use its results to evaluate the situation of pregnant women nutrition in Lithuania.

OBJECTIVES

Our main objectives were the following: 1) to find out the tendencies of nutrition among mothers in the first Lithuanian newborns cohort, PLANK-K;

2) to compare the consumption of technologically processed and natural foods; 3) to find the differences and similarities among Lithuanian women and separate groups of products.

METHODS

A special questionnaire of 198 questions about products consumed by pregnant women was used in our study. Out of 205 mothers who took part in the first Lithuanian birth cohort PLANK-K, this questionnaire was given to 90. In total, 68 questionnaires were answered, 62 of them met the requirements and were used in statistical calculations with Microsoft Excel and SPSS programs. The requirements for the questionnaires were as follows: 1) the questionnaire had to be fully answered; 2) answers had to be clear and easily understandable.

RESULTS

Products given in the questionnaire were grouped into 12 main food groups: bread products, grain and its products, nuts, drinks (alcoholic and non-alcoholic), cocoa products, dairy products, meat and its products, fish and sea food, eggs and their products, plant origin products (divided in fruits, vegetables and berries), honey and various fats (later divided in saturated fats, non-saturated fats and mixed-origin fats). Food groups consumed during pregnancy are shown in Fig. 1.

Out of 62 mothers that participated in our questionnaire during pregnancy, all of them (100.0%) consumed plant origin foods. The majority (98.0%) consumed bread, grain, cocoa, meat and its products and dairy products. Lots of women (92.0%)

during pregnancy ate nuts and their products and drank various drinks (this group involved drinking soft drinks and alcoholic drinks or either of them). 91.9% of women consumed eggs and their products. Least consumed were various-origin fats and honey (74.2%).

Main food groups were divided in smaller groups. Bread was divided into white and dark bread. Grain was divided into 1) wheat and its products (which included flour, pasta and bran), and 2) other grain (this group involved oatmeal, buckwheat, pearl barley, corn and lentils). Nuts were not divided into smaller groups, but it is worth mentioning that this group included not only nuts themselves but also halva and coconut shavings. Various drinks were divided into alcoholic and non-alcoholic (juice, tea, Coca-Cola) (5). Cocoa and its products such as nuts were not divided into smaller groups, but it is worth knowing that this group included not only cocoa powder itself and cocoa drink, but also dark and milk chocolate. Dairy products were discussed all together and were not divided further into sour cream, heavy cream, cow milk, whey, buttermilk, kefir, evaporated milk, ice cream, curd, milk powder or goat milk (5). Meat products were divided into poultry, lamb, pork, venison, beef and meat products. Fish and sea food were divided into different subgroups. The egg group consists of such products as egg powder and usual eggs, but these products were not separated into different groups. Plant food was separated into fruit (which were also divided into citrus and non-citrus fruit) (6), berries and vegetables (also divided into 1) root plants, 2) cabbage-like and 3) other vegetables) (7), and preserved plant products were also distinguished. Honey was not

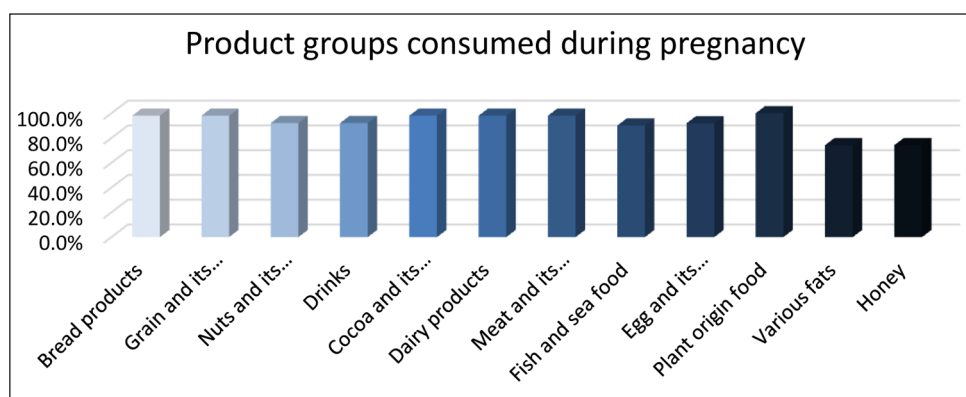


Fig. 1. Product groups consumed during pregnancy

divided into smaller groups, while fats were distinguished according to their origin into saturated, non-saturated and mixed (4). The consumption of products of all subgroups is presented in Fig. 2.

After evaluating answers to the questionnaire and performing calculations, it appeared that white bread products were consumed by 98.4% of women while dark bread by 93.5%, but this difference is

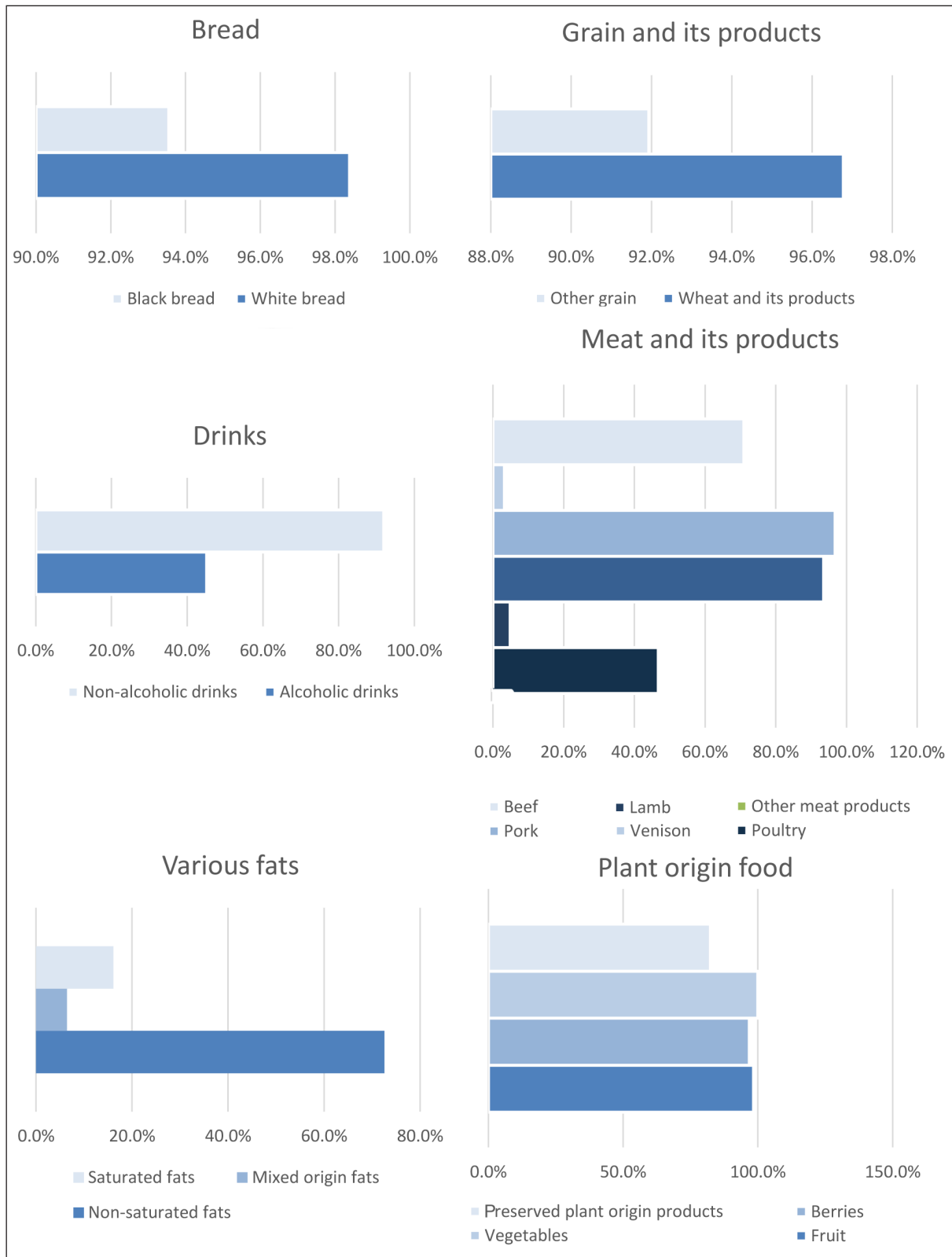


Fig. 2. Consumption of food products in subgroups

not statistically significant ($p = 0.842$). Wheat and its products were eaten by 96.8% of women, other grain by 91.9% ($p = 0.842$), which shows low presumption against null hypothesis. On the other hand, statistical significance is seen in drinks subgroups: alcoholic drinks were consumed by 45.5% of women while soft and other drinks by 91.9% ($p = 0.002$) (8). In the meat group consumption of poultry was 46.8%, lamb 4.8%, pork 96.8%, venison 3.2%, beef 71.0%, other meat products 93.5%, which is statistically significant ($p < 0.001$). Statistical significance is also seen in consumption of sea food, that was eaten by 35.5% of women and fish by 88.7% of women ($p < 0.001$). Fruit was enjoyed by 98.4% of mothers, berries by 96.8% of mothers, vegetables by 100.0% of mothers and preserved products by 85.5%. Unfortunately, this difference did not prove to be of statistical significance ($p = 0.838$). In one of the least consumed groups, fats, a statistically significant difference is seen, as non-saturated fats were consumed by 72.6% of women, saturated fats by 16.1% and mixed-origin fats by 6.5% of women ($p = 0.001$). As mentioned, the smallest subgroups were in fruit and vegetables. Fruit was divided into citrus, consumed by 91.9% of mothers, and other fruit, eaten by 98.4%, and this difference is statistically insignificant ($p = 0.778$). Vegetables were divided into cabbage-like – 79.0%, root plants – 100.0%, other vegetables – 91.9%, and this difference is also statistically insignificant ($p = 0.463$). In the “other vegetables” group there were cucumber, eggplant, zucchini, broccoli, red pepper (9). Additionally, a preserved products subgroup was distinguished. In it there were 85.5% of women, that consumed canned products, such as canned corn, peas, black and green olives. Distribution in the smallest subgroups is visualised in Fig. 3.

After the evaluation of the general distribution between groups and subgroups of food in the diet of the participants, we get to the second half of the study, in which we discuss technologically processed and natural products. Here we met various difficulties. Although the data of the cohort satisfies the first of our objectives, the abundance of in advance prepared questions make it more difficult to interpret the second part because variation in the processing method for certain products raises additional questions and preempts accurate data evaluation. In order to prevent questionable interpretations in the second part, we are more focused on the reasons that caused the problems, how they could be solved and what we can finally find out from the data collected.

One must remember that such foods as bread products are all thermally processed. The group of grain products includes natural grain, flour and pasta, where both physical grinding and mixing with other products in order to achieve the final form of the merchandise are used, so it is difficult to compare the two groups. In the group of drinks it is easy to say that all of the alcoholic drinks were prepared during certain technological processes as well as “other drinks” group members, such as tea or Coca-Cola. On the other hand, it is hard to evaluate the preparation of juice because it is not verified what kind of origin the juice is of – natural, freshly juiced or from the shopping mall’s mass production cartons (10). There also could have been juice drinks or cocktails, where natural juice is frequently replaced with a certain concentrate (11). Cocoa and its products production also raise many questions. Cocoa drink can be prepared using only hot water or adding milk. Moreover, the purity of cocoa powder and its quality are also unknowns. Speaking about

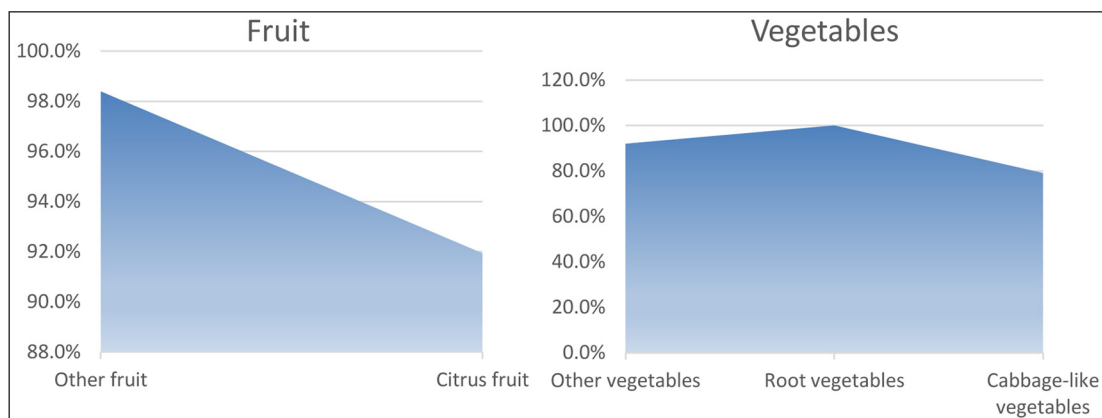


Fig. 3. Distribution of consumers in the smallest subgroups

chocolate, a similar problem exists – it is hard to tell the percentage and quality of cocoa that was used for chocolate different mothers ate. For example, different milk chocolate producers use different amount of cacao (10–55%). In the European Union it is regulated that not less than 25% of cocoa is required in milk chocolate, with an exception of several countries (1–3). Dairy products, although most are differentiated by different fat percentage, might have been the so-called “from the countryside” or “farmers”, or bought in the supermarkets, in turn bought from a creamery and pasteurised or otherwise prepared milk (9). Meat gives fewer difficulties. In usual conditions, it is always consumed only after thermal preparation. We also defined a meat products group, which consisted of various sausages, meat and bones broth (12). These two processing options can be compared as thermal-only home processing and additional technological processing. Nuts are not easily evaluated, since we do not know what halva was made of, while coconut shreds are only processed mechanically. The matter of fish and sea food processing is special since much of these can be eaten either raw and only salted, or marinated, or thermally processed. Due to the type of questionnaire used in the cohort and because of the variety of processing possibilities, this group remains hardly informative and it cannot be interpreted without knowledge of the exact means of preparation. The same problem is with eggs. Although they are usually used boiled or fried, it is widely known that some people drink them raw and this possibility distorts the questionnaire’s results because of in advance prepared questions, that do not cover this kind of granularity. We have nothing to compare the honey group to, and it can only be used in general (epidemiologic) calculations. In the meantime fats are not only saturated but also non-saturated and of mixed origin, and raise the question of processing because oil has many extraction sorts and margarine has many recipes. This question is worth analysing separately, taking into consideration the production method and only concentrating on this one group, in order to get accurate results. In the last plant origin food group, we distinguished a separate preserved food group. Because of a clear production method, this subgroup is easy to interpret. Still we come across the problem of comparing products in this group

to their raw form. This subgroup includes canned corn, peas, green and black olives. Only one raw product was included in this questionnaire – corn (in the group of “other grain”). Moreover, green and black olives are not consumed raw in our region. Because of the mentioned conditions, we can exclude all but two technically processed food groups: other meat products and preserved products.

The distribution of technically processed other meat products is shown in Fig. 4.

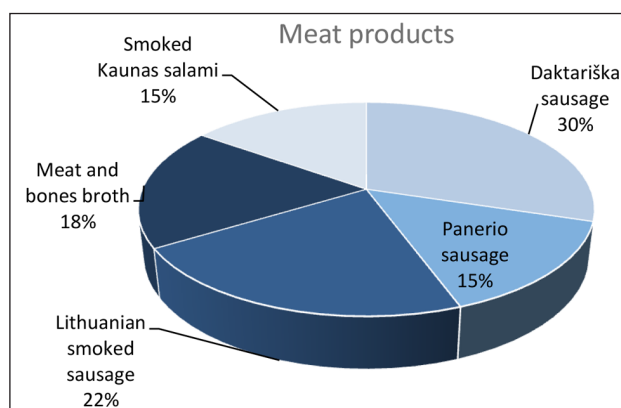


Fig. 4. Technologically processed meat products

In this group, Daktariška sausage was consumed by 85.5% of women, Panerio sausage by 41.9%, Lithuanian smoked sausage by 62.9%, meat and bones broth by 53.2%, smoked Kaunas salami by 43.5%. These results are statistically significant ($p = 0.008$).

Distribution in the group of preserved goods is shown in Fig. 5.

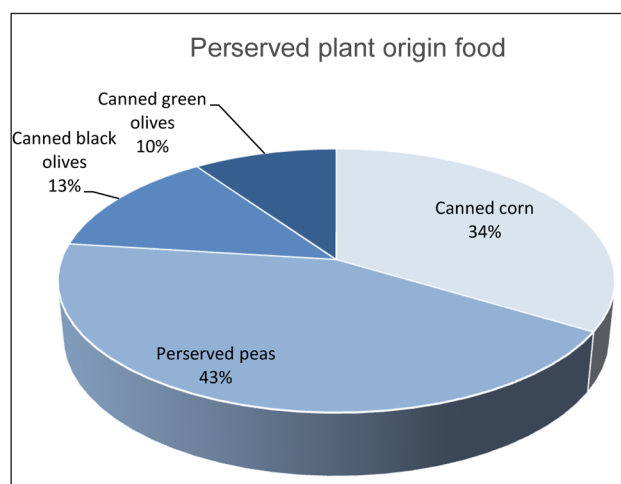


Fig. 5. Consumption in the group of preserved goods

We can see that 60.3% of mothers consumed canned corn, 76.5% ate peas, 23.5% consumed black olives, 16.2% ate green olives. In comparison to raw corn, that was eaten by 25.8% of women, technically processed food was consumed more (more than half of the women more frequently chose canned corn over raw) (Fig. 6).

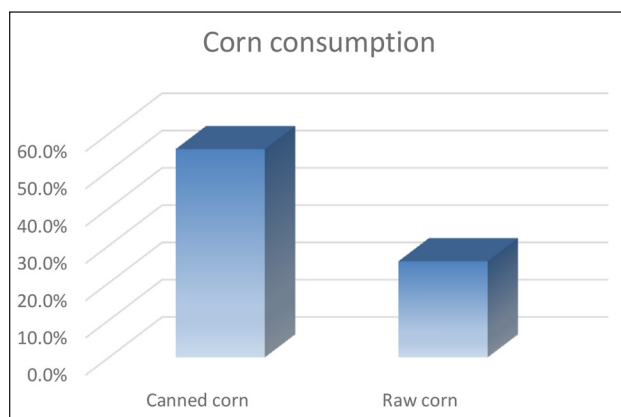


Fig. 6. Canned and raw corn consumption

Nevertheless, we have to remember that for such products as corn preference of raw over technologically processed is determined by taste characteristics and adaptability in everyday cooking.

DISCUSSION

For now the data collected in this study allow us to freely interpret only technologically processed meat and preserved plant origin products. Most of the technologically processed meat goods had an advantage over the other meat products (this difference could have been influenced by cost), while canned / preserved products were the least consumed group (except for the cabbage-like plants subgroup). Due to a broad questionnaire it is possible to precisely evaluate the variety of food products, consumed by mothers during pregnancy, but it makes it more difficult to evaluate the choice of technologically processed goods over raw, natural products. An even broader questionnaire would burden the women and potentially reduce the number of questionnaires fully answered even more, so it is worth using this questionnaire as a stepping stone for further studies, this time concentrating more not on the number of food sorts but on the quality of the products themselves. It is worth dividing the questions or studies

into different groups, that would allow to deepen the understanding of consumption within certain nutritional groups according to their technological processing or non-processing and technological processing ways themselves. The PLANK-K cohort questionnaire's 198 questions about consumed food products clearly answer the question about the nutrition of mothers during pregnancy, but the quality of the nutrition and the nature of food processing are hard to evaluate.

CONCLUSIONS

According to the first Lithuanian birth cohort PLANK-K we can draw the following conclusions:

1.1. In the bigger food groups pregnant women mostly ate plant origin food. The majority of women consumed bread products, grain and its products, cocoa and its products, dairy products, meat and its products. A lot of women during pregnancy ate nuts and their products, drank various drinks. Quite a lot of women consumed eggs and their products.

1.2. The least consumed were various-origin fats.

2.1. After dividing big food groups into smaller subgroups it became clear that all women ate vegetables.

2.2. The least consumed was the meat that is rare in Lithuania (venison, lamb) and various-origin fats.

3. The type of the questionnaire allows to accurately evaluate the frequency of various food product consumption during pregnancy but makes it more difficult to research technologically processed and non-processed foods.

4. In technologically processed food two groups were distinguished – processed meat products and canned corn. Both processed product groups were preferred more than their non-processed equivalents.

This study became a stepping stone for future research, showed expedient research directions and potential problems, that we hope to avoid in the future. It is planned to further continue the studies, specifically analyzing technically processed and non-processed groups of products.

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TECHNOLOGIŠKAI APDOROTI IR NATŪRALŪS MAISTO PRODUKTAI NĖŠČIŪJŲ MITYBOJE

Santrauka

Tyrimo metu siekta išsiaiškinti, kokios yra Lietuvos nėščiąjų moterų mitybos tendencijos, ir pamėginti išskirti, kokie dažniausiai vartojami produktai – technologiškai apdoroti ar natūralūs. Iš 205 moterų, dalyvavusių pirmojoje Lietuvos naujagimių kohortoje PLANK-K, gauta 62 anketos su užpildytais 198 klausimais apie nėštumo metu vartotus maisto produktus. Iš didžiosios maisto produktų grupės dažniausiai nėščios moterys vartojo augalinį maistą. Dauguma moterų įvardijo duonos gaminius, javus ir jų produktus, kakavą ir jos gaminius, pieną ir jo produktus, mėsą ir jos produktus. Dauguma nėštumo metu maitinosi riešutais ir jų produktais bei gėrė įvairių gėrimų, nemažai pamėgo kiaušinius, jų produktus. Rečiausiai nėštumo metu buvo vartojami įvairios kilmės riebalai ir medus. Iš siauresnių maisto kategorijų pogrupių visos moterys vartojo daržoves, o rečiausiai – mėsą (elnieną, avieną) bei mišrios kilmės riebalus. Iš technologiškai apdorotų produktų palyginti tiko dvi grupės – apdirbti mėsos produktai ir konservuoti kukurūzai. Apdirbti mėsos produktai turėjo ryškia persvarą, palyginti su kitų mėsos gaminių vartojimu, o daugiau nei pusė moterų rinkosi konservuotus kukurūzus. Šiuo atveju technologiškai apdoroti produktai pasirinkti dažniau nei neapdoroti. Anketos pobūdis leidžia tiksliai įvertinti nėštumo metu dažniausiai motinų vartotus produktus, tačiau apsunkina technologiškai apdorotų ir neapdorotų produktų nuodugnų ištyrimą.

Raktažodžiai: nėščiąjų mityba, PLANK-K, pirmoji Lietuvos naujagimių kohorta, technologiškai apdoroti maisto produktai, natūralūs maisto produktai, technologiškai neapdoroti maisto produktai, konservuoti kukurūzai, technologiškai apdoroti mėsos gaminiai