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## The association between breastfeeding and tonsillectomy in children

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## Анализ взаимосвязи между грудным вскармливанием и тонзиллэктомией у детей

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## 母乳喂养与儿童扁桃体切除术的关系

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**Background:** One of the most common surgical operations carried out on children especially those under the age of fifteen is tonsillectomy. There are two main indications for tonsillectomy either recurrent tonsillar infections or obstructive sleep disorder. Breastfeeding is one of the factors that play a major impact on decreasing recurrent respiratory infections and improving immunity, this effect may prolong during childhood.

**Objective:** To study the rate of tonsillectomy during childhood concerning the duration of breastfeeding during their infancy.

**Methods:** In this study, 150 cases underwent tonsillectomy as a case group in Alfayhaa Teaching Hospital in the period from January 2017 to July 2018 to children aged 1–12 years. Parents of those patients asked about the sex of the child, the feeding habit during infancy, type of delivery, order of the child in the family, the cause of tonsillectomy, and paternal smoking. 300 controls had been taken including those children attending the hospital for other reasons. Analysis of data was done using odds ratio, chi-square test, and probability value.

**Results:** The main reasons for tonsillectomy were recurrent respiratory infections (66%), followed by obstructive respiratory symptoms (30%) and the least one was a recurrent ear infection (4%). The difference was not significant between sex, mode of delivery, order of the child in the family, and paternal smoking with breastfed. Other groups as compared with those who complete more than 6 months, never and 0-3 months showed weak relation. Conclusions: We found that breastfed infants for more than 6 months are less likely to have tonsillectomy during their childhood.

**Keywords:** Breastfeeding, Tonsillectomy, Childhood

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The authors are responsible for the originality of the data presented and the possibility of publishing illustrative material – tables, drawings, photographs of patients.

**Актуальность:** Одной из наиболее распространенных хирургических операций, проводимых детям, особенно в возрасте до пятнадцати лет, является тонзиллэктомия. Существует два основных показания к тонзиллэктомии: рецидивирующие тонзиллярные инфекции или обструктивное апноэ сна. Грудное вскармливание является одним из факторов, который играет важную роль в снижении частоты рецидивирующих респираторных инфекций и повышении иммунитета, и этот эффект может пролонгироваться в детском возрасте.

**Цель:** Изучить частоту тонзиллэктомии в детском возрасте с учетом продолжительности грудного вскармливания в младенчестве.

**Методы:** Экспериментальная группа данного исследования включала 150 пациентов в возрасте 1-12 лет, перенесших тонзиллэктомию в учебном госпитале Альфайхаа в период с января 2017 года по июль 2018 года. Родителей этих пациентов спрашивали о поле ребенка, характере кормления в младенчестве, типе родов, числе детей в семье, причине тонзиллэктомии и статусе курения отца. В качестве контроля были включены 300 детей, посещавших госпиталь по другим причинам. Анализ данных проводился с использованием отношения шансов, критерия хи-квадрат и значения вероятности.

**Результаты:** Основными причинами тонзиллэктомии были рецидивирующие респираторные инфекции (66%), на втором месте - обструктивные респираторные синдромы (30%), и самой редкой причиной была рецидивирующая ушная инфекция (4%). Различия в зависимости от пола, способа родов, очередности ребенка в семье и статуса курения отца при грудном вскармливании были незначительными. Другие группы по сравнению с теми, кто находился на грудном вскармливании более 6 месяцев, никогда и 0-3 месяца, показали слабую связь. Выводы: Мы обнаружили, что младенцы, находящиеся на грудном вскармливании более 6 месяцев, реже подвергаются тонзиллэктомии в детстве.

**Ключевые слова:** Грудное вскармливание, тонзиллэктомия, детский возраст

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**背景:** 扁桃体切除术是对儿童尤其是15岁以下儿童进行的最常见的外科手术之一。扁桃体切除术有两个主要适应症:反复扁桃体炎或阻塞性睡眠障碍。母乳喂养是对减少反复呼吸道感染和提高免疫力起主要影响的因素之一,这种影响可能会在儿童期延长。目的:研究儿童期扁桃体切除术率与婴儿期母乳喂养时间的关系。

**方法:** 在这项研究中,2017年1月至2018年7月,在阿尔法哈教学医院对150名1–12岁儿童进行了扁桃体切除术,作为一个病例组。这些患者的父母询问了孩子的性别、婴儿期的喂养习惯、分娩类型、孩子在家庭中的顺序、扁桃体切除术的原因以及父亲吸烟。已经采取了300项控制措施,其中包括因其他原因在医院就诊的儿童。使用比值比、卡方检验和概率值对数据进行分析。

**结果:** 扁桃体切除术的主要原因是反复呼吸道感染(66%),其次是阻塞性呼吸道症状(30%),至少一个原因是反复耳部感染(4%)。性别、分娩方式、孩子在家庭中的顺序以及母乳喂养的父亲吸烟之间的差异不显著。与完成时间超过6个月、从未和0–3个月的人相比,其他组表现出较弱的关系。

**结论:** 我们发现,母乳喂养超过6个月的婴儿在其童年时期进行扁桃体切除术的可能性较小。

**关键词:** 母乳喂养、扁桃体切除术、儿童

**利益冲突:** 提交人没有需要声明的利益冲突。

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作者对所提供数据的独创性以及发布说明性材料(表格、图纸、患者照片)的可能性负责。

## Introduction

One of the most common surgical operations carried out on children especially those under the age of fifteen is tonsillectomy [1–3]. Decide to do a tonsillectomy, there are two main reasons which are either recurrent tonsillar infections or obstructive sleep disorder [4–6].

The tonsillar disease has multifactorial pathogenesis and interactions among the anatomy, immunology, and microbiology of these structures may be important [7].

Breastfeeding is one of the factors that play a major impact on decreasing recurrent respiratory infections and improving immunity, this effect may prolong during childhood [8, 9]. Human breast milk is the natural and optimum food for newborn infants [10, 11]. It is constantly available at a suitable temperature and requires no preparation time [12, 13]. Besides it provides complete nutrition and many bioactive health substances (protein, fat, minerals, vitamins, enzymes, growth factors, and hormones), it is free of contaminating bacteria and thereby decreasing the incidences of gastrointestinal disturbances. It is associated with improved infant health and

**Table 1: demographic data distribution of patients**  
**Таблица 1: распределение демографических данных пациентов**

| Parameters<br>Показатели  | Cases (%)<br>Пациенты (%) | Controls (%)<br>Контроль (%) | Total<br>Всего | OR<br>ОШ | $\chi^2$ |
|---|---------------------------|------------------------------|----------------|----------|----------|
| Sex (male/female)<br>Пол (мужской/женский)                                      | 97(64.7)/ 53(35.3)        | 170(46.7)/130 (43.3)         | 267/ 183       | 0.71     | 2.652    |
| Type of delivery (Caesarean/ Vaginal)<br>Тип родов (кесарево/вагинальные)       | 24 (16)/126 (84)          | 24 (8)/276 (92)              | 48/ 402        | 0.45     | 6.716    |
| Order of the child (1st/ 2nd & more )<br>Очередность ребенка (1-й/ 2-й и более) | 61 (40.7)/89 (50.4)       | 95 (31.6)/205 (68.3)         | 156/294        | 1.47     | 3.576    |
| Paternal smoking (yes/ no)<br>Курение отца (да/нет)                             | 68 (45.3)/82 (54.6)       | 168 (56)/132 (44)            | 236/ 214       | 0.65     | 3.011    |
| Total<br>Всего  | 150                       | 300                          | 450            |          |          |

immune development [14–17]. Antimicrobial immunoglobulins of the mother transmit via her breast milk and provide passive immunity to the breastfed child while his immune system is growing [18, 19].

## Patients and methods

This work is a prospective case-control study of 150 patients aged below 13 years (the case group) who were admitted for tonsillectomy at Alfayhaa Teaching Hospital from January 2017 to July 2018. Questionnaires were obtained from the parents of those children about the sex of the child, the feeding habit during infancy, type of delivery, order of the child in the family, the cause of tonsillectomy, and paternal smoking. The duration of breastfeeding was divided into four groups (never, 0-3, 3-6, and more than 6 months).

300 controls of the same age group had been randomly selected from those children who were attending the hospital for other reasons. Two controls were taken for each case, and their parents also asked the same questions mentioned above. Results were statistically analyzed using odds ratio (OR), chi-square ( $\chi^2$ ) test, and probability (P) value and summarized into tables.

## Results

Of 150 cases of tonsillectomy included in this study, the main reasons for tonsillectomy were recurrent respiratory infections (66%), followed by obstructive respiratory symptoms (30%) and the least one was a recurrent ear infection (4%).

Table 1 showed all variables which were comparable for both groups. The difference was not significant between those data where

the P-value was less than 0.05 for sex, mode of delivery, order of the child in the family (whether the child is the first or second and more in order), and lastly paternal smoking.

In table 2, for more than 6 months of breastfed children, the P-value is more than 0.05 and so there is a significant association. Other groups as compared with those who complete more than 6 months, never and 0–3 months show weak relation and any relation respectively as shown in the same table, where those never breastfed odds ratio = 2.6 and the P-value is less than 0.05, that's mean there is a relation but statistically not significant. Those who breastfed for 0 to 3 months show no relation with an odds ratio = 0.7 and a P-value is less than 0.05.

## Discussion

Human milk can affect the immune system of breastfed infants [20]. Its protective effect against respiratory infection may persist for several years [21, 22]. This might be accompanied by more tolerant tonsillar lymphoid tissue because the infant's immune system is programming [23].

In our study, there is a significant association between breastfeeding for 3 to 6 months and tonsillectomy more than those completed more than 6 months (as indicated by WHO [24]) and the P is more than 0.05. This is consistent with a finding of Alfredo Pisacane [25] who studied the relation between breastfeeding and tonsillectomy in children in Naples, Italy, in 1995. He found that children whose tonsils have been removed were less likely to have been breastfed. This is the only study we found about the same subject of our study. Many researchers studied the breastfeeding

**Table 2: Distribution of cases according to different periods of breastfeeding**  
**Таблица 2: Распределение случаев в зависимости от длительности периода грудного вскармливания**

| Duration of breastfeeding<br>Продолжительность грудного вскармливания | Cases (%)<br>Пациенты (%) | Controls (%)<br>Контроль (%) | Total<br>Всего | OR<br>ОШ | $\chi^{2*}$ |
|---|---------------------------|------------------------------|----------------|----------|-------------|
| Never<br>Никогда  | 10(55.5)                  | 8(44.4)                      | 18             | 2.6      | 2.44        |
| 0-3 months<br>0-3 месяца  | 17(26.5)                  | 47(73.4)                     | 64             | 0.7      | 0.56        |
| 3-6 months<br>3-6 месяцев   | 12(57.1)                  | 9(42.8)                      | 21             | 2.8      | 4.1         |
| more than 6 months<br>более 6 месяцев                                 | 111(31.9)                 | 236(68.01)                   | 347            |          |             |
| Total<br>Всего  | 150                       | 300                          | 450            |          |             |

Note \* odds ratio and  $\chi^2$  of each group were calculated for those more than 6 months

Примечание \* отношение шансов и  $\chi^2$  для каждой группы были рассчитаны по отношению к тем, кто находился на грудном вскармливании более 6 месяцев

duration and associated decrease in respiratory tract infection. One of those studies is that of W. Wardhana et al [26] which concluded that children under the age of five had a lower risk of tonsillitis if they were exclusively breastfed. Although we didn't ask whether the involved children were exclusively breastfed or not, the association is significant in both studies. Another one is that of Caroline J. Chantry [27] who found an increased risk of respiratory tract infections in children who were fully breastfed for 4 in comparison to those fed for 6 months. Another finding is those children who were never breastfed, there is an association with increased tonsillectomy rate but it is statistically not significant (P-value is less than 0.05) as seen in table 2. In contrast to the finding seen in those children who breastfed for 0 to 3 months where the percentage of tonsillectomy is lower than in those breastfed for more than 6 months, which may be due to sampling error of inadequate sample size.

Other parameters of cases (mode of delivery, order of the child in the family, and paternal smoking) had been taken in this study to see if there is any factor other than breastfeeding may have a role in increasing the tonsillectomy rate among cases in our sample, there was no significant association with tonsillectomy, these also constant with the finding of Alfredo Pisacane [25].

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