

## Effect of Breastfeeding on Hearing Outcome in Childhood

### Abstract

**Purpose:** To evaluate whether duration of breastfeeding is associated with the symptoms of hearing disorders

**Material and Methods:** A total of 100 children aged below 12 years were recruited into two groups: 41 children diagnosed with profound sensorineural hearing loss, and 59 subjects of normal hearing as control group. The structured interview and the retrospective questionnaire (including, duration, family history, alternative sources of feeding, maternal condition during pregnancy, and relative marriage consideration) were used during the study of both groups to any association between breast feeding and hearing loss.

**Results:** The mean duration of breastfeeding in the diseased group was 13.5 months, while the mean duration of breastfeeding of control group was 12.7 months approximately. For comparison, there was no significant difference between the two groups.

**Conclusions:** The results of this study suggest that the breastfeeding duration has no relation with hearing disorders.

**Keywords:** breastfeeding, hearing, sensorineural hearing loss,

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### Introduction

Hearing disorders are one of the commonly diagnosed disorders in childhood (1). Children with hearing disorders also have problems with language development, and the age appropriate social development that this disability brings (2). It has been suggested that early life factors, including breastfeeding, are the foundation for childhood health (3). A common belief in many Saudi societies is that hearing disorders can develop as a negative side effect of breast feeding, despite the fact that no clinical studies have indicated that breastfeeding is a risk factor for the hearing disorders.

This study seeks to ascertain whether breastfeeding is related to the development of hearing disorders, based on breastfeeding duration, family history, alternative sources of feeding, maternal condition during pregnancy, and consanguineous or relative marriage considerations.

### Material and Methods:

A population of 100 children aged below 12 years (49 boys and 51 girls) was sampled. The initial selection of children was based on using King Abdulaziz University Hospital (KAUH), Riyadh, Saudi Arabia, patients who had been diagnosed with hearing loss. After consent from parents, a questionnaire was completed Table 1.

### Subjects:

**Group I** consisted of the population with hearing disorders (N=41, 18 (43.9%) boys and 23 (56.1%) girls). This group had a mean age of years 4 years, 9 months and 18 days, and had been diagnosed of having hearing disorders in their childhood or infancy. All children of this group had either received cochlear implants, or were being evaluated for cochlear implants. Hearing loss caused by acquired middle or inner ear injuries due to a specific and known cause, e.g. a trauma or an infection, were excluded.

**Group II** consisted of the normal hearing control children (N=59, 31 (52.5%) boys and 28 (47.5%) girls, mean age 5 year 9 months and 7 days) were selected as normal controls, who in the parent's opinion have no significant hearing disorders, nor congenital diseases.

### Procedure

The structured interview and the retrospective questionnaire were used during the study to indicate if breastfeeding was a risk factor for hearing disorders. Duration of parameters, such as age of hearing disorder development and breastfeeding duration, were expressed as mean, median and standard deviation (SD). Results were expressed using percentage positive for discrete variables (family history, other sources of feeding

Age: _____ Contact no: _____		
Gender <input type="checkbox"/> Male <input type="checkbox"/> Female		
Health Status <input type="checkbox"/> Healthy <input type="checkbox"/> With hearing disorder		
Please tick the appropriate box	Yes	No
Was the child breast fed?		
Specify the duration of breastfeeding if yes. _____		
Has the child had a foster mother?		
Has the child had fortified milk?		
Do you have other children with such disorder?		
Do you have a positive family history with hearing disorders?		
Is your marriage considered to be a relative marriage?		
Did the mother have any complication during pregnancy?		
Has the mother been diagnosed with hearing disorder?		
Has the father been diagnosed with hearing disorder?		
Did you have a premarital genetic screening?		

**Table I. The questionnaire**

(fortified milk or foster maternity), maternal condition during pregnancy, delivery complications, previous experiences with other children, relative marriage consideration, and genetic premarital screening). Groups were compared using the Chi-square test or Fisher precision test for discrete variables. P value was considered statistically significant at the level of 0.05. The data was analyzed using SPSS program.

### Results

The retrospective data from both groups was evaluated. The mean age of hearing disorder discovery was approximately 11 months and 5 days. In group I, 38 children (92.7%) with hearing disorders had been breastfed. Also, 29 children (70.7%) had fortified milk as an extra nutrition source and none had foster nursing. This hearing disorder group also had 15 children (36.6%) with sibling with similar diagnosis, and 10 children (24.4%) had a positive family history for hearing disorders. As personal opinions of the parents, parents of 18 children (43.9%) of group I disagreed

about the relation between breastfeeding and the development of hearing disorders.

Pregnancy complications occurred in only 4 (9.8%) children with hearing disorders, but no hearing disorders were diagnosed in these children's parents. No significant differences were observed in the breastfeeding condition, breastfeeding duration, foster nursing, pregnancy complication, maternal or paternal hearing disorders, and neither was there a significant difference between the two groups' premarital genetic screening (Table. II).

The p value for relative marriage was extremely statistically significant (p value= .0001) which supports the fact that there is a relation between relative marriage and the development of hearing disorders. The p value concerning fortified milk was 0.091, which was not quite statistically significant. The mean duration of breastfeeding in group I was 13.476 months, that is, 1 year 1 month and 14 days, while the mean duration of breastfeeding of control group was 12.678 months; 1 year and 8 days approximately. For comparison, There

(Examined Groups)	With hearing disorder		Control Group		P Value
	N = 41		N + 59		
	N	%	N	%	
Age of disorder development			Not Applicable		
1-<6 month	8	19.5			
6-<12 month	13	31.7			
12-24 month	16	39.0			
> 24 month	4	9.8			
Was the child breastfed					0.607(ns)
Yes	38	92.7	55	93.2	
No	3	7.3	4	6.8	
Fortified milk					0.091(ns)
Yes	29	70.7	50	84.7	
No	12	29.3	9	15.3	
Foster nursing					0.166 (ns)
Yes	2	4.9	0	0	
No	39	95.1	59	100	
Similar disorder in sibling			Not Applicable		----
Yes	15	36.6			
No	26	63.4			
imilar disorder in family members			Not Applicable		---
Yes	10	24.4			
No	31	75.6			
Do you believe there is a relation					0.571 (ns)
Yes with a good effect	7	17.1	6	10.2	
Yes with a bad effect	8	19.5	9	15.3	
No	18	43.9	27	45.8	
I do not know9.8	8	19.5	17	28.7	
Relative marriage					<0.001 (s)
Yes	34	82.9	16	27.1	
No	7	17.1	43	72.9	
Pregnancy complication					0.428 (ns)
Yes	4	9.8	4	6.8	
No	34	90.2	55	93.2	
Mother with hearing disorders					0.59(ns)
Yes	0	0	1	1.7	
No	41	100	58	98.3	
Father with hearing disorders					1.00 (ns)
Yes	0	0	0	0	
No--	41	100	59	100	
Had Premarital screening					0.544(ns)
Yes	39	95.1	57	96.6	
No	2	4.9	2	3.4	

Table II. The Status of Study Group; ns: not significant S: significant difference

Duration of Breastfeeding (months)	Not applicable		1-<3		3-<6		6-<12		12-24		>24		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Group I (n=41) (hearing disorders)	3	7.3	6	14.6	2	4.9	12	29.3	14	34.1	4	9.8	41	100
Group II (n=59) (control)	5	8.5	4	6.8	8	13.6	12	20.3	28	47.5	2	3.4	59	100
P value	0.87 (ns)		0.34 (ns)		0.28(ns)		0.43 (ns)		0.26 (ns)		0.37 (ns)		---	

**Table III. Duration of breastfeeding (BF) of examined group with hearing disorders and control group**

was no significant difference between the two groups (Table III).

### Discussion

The results of the children with hearing disorders in the present study did not differ significantly from those of the control children in breastfeeding condition, breastfeeding duration, foster nursing, pregnancy complication, maternal or paternal hearing disorders. From this study it has been seen that hearing disorders are associated with genetic aspects rather than breastfeeding itself. Hearing loss in our patients seems to be following the usual pattern. Profound congenital hearing loss is estimated to occur in about 1 in 1000 births; approximately 50% of cases are thought to be due to environmental factors and the remainder to genetic causes (4,5). Examples of the former include acoustic trauma, ototoxic, drug exposure (i.e., aminoglycosides), and bacterial or viral infections such as rubella or cytomegalovirus (CMV). Approximately 70% of congenital cases associated with genetic factors are classified as nonsyndromic (the deafness is not associated with other clinical findings that define a recognized syndrome). In the remaining 30%, one of more than 400 forms of syndromic deafness can be diagnosed because of associated clinical findings(5).

Regarding breastfeeding, statistically, the control group was breastfed as long as the hearing disorder group ( $p=0.209$ ), with a mean Group I 13.5 months and a mean Group II of 12.7 months. The WHO and World Group on Breastfeeding of the American Academy of Pediatrics conclude exclusive breastfeeding is the best nutrition and sufficient to support growth and development for approximately the first 6 months after birth. It is recommended that breastfeeding continue for at least 12 months (6,7,8). There is a lack of previous studies exploring the relationship between breastfeeding and hearing disorders, and ours seems to be the first to address this.

### Conclusions

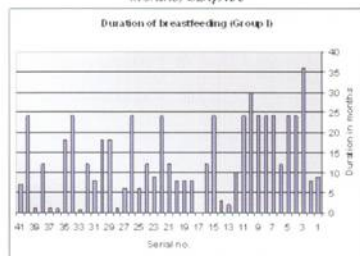
The results of this study suggest that the breastfeeding duration has no direct relationship with severe to profound hearing disorders. Relative marriage is, however, a risk factor of hearing disorders development. However, further studies are needed to understand this problem better.

### Acknowledgement

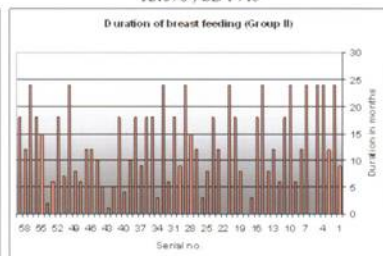
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*Figure 1. The assessment of the duration of breastfeeding in examined groups*

a- Group I with HD: median : 12, mean: 13.476 months, SD:9.55



b- Group II (control) : median : 12, mean: 12.678, SD : 7.6



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