ORIGINAL ARTICLE

Association Between Exclusive Breastfeeding and Type 1 Diabetes Mellitus

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ABSTRACT

Objective: to determine the association of formula milk and exclusive breastfeeding (EBF) with type 1 diabetes (TID) in children.
Methods: This epidemiology cross-sectional study was conducted in Saidu Teaching Hospital from January-2022 to January-2023. We included 75 patients with diagnosis of TID who presented in diabetes clinic of the hospital. For control group we included 75 children who did not had T1D. Data regarding type of feeding was collected from parent of each child.
Results: Mean age was 7.89±2.1 years in patients with T1D and 8.1±1.9 years in control group (p-value 0.52). There were 40 (53.3%) male patients in T1D and 39 (52%) male patients in control group (p-value 0.87). There was very low percentage of exclusive breastfeeding (EBF) in T1D patients; 9 (12%) only in comparison to 43 (57.3%) in controls (p-value <0.001). There was high prevalence of formula feeding in T1D patients; 31 (41.3%) in comparison to 12 (16%) in controls (p-value <0.001).
Conclusion: In present study, the frequency of EBF was significantly lower in T1D patients in comparison to controls. So EBF seems to be a protective factor against occurrence of type 1 diabetes.
Keywords: Exclusive breastfeeding, Type 1 diabetes, formula feeding.

INTRODUCTION

The global and regional incidence of type 1 diabetes has witnessed a notable rise, with around 86,000 children being diagnosed with this condition annually. Childhood obesity is currently ranked as the third most prevalent noncommunicable disease (NCD) among children, with a global annual incidence that has exhibited a consistent upward trend of approximately 2%-5%.[1] The development of Type 1 Diabetes (T1D) is influenced by genetic vulnerability, but, the notable rise in frequency over the last five decades indicates that non-genetic factors, such as environmental or nutritional factors, likely play a significant role.[2] According to the International Diabetes Federation (IDF), in the year 2015, Pakistan witnessed over 7 million recorded instances of diabetes, with around 2% of those individuals being afflicted with Type 1 Diabetes (T1D).[3] The reported incidence of Type 1 Diabetes (T1D) in Pakistan is 1.02 per 100,000 individuals annually.[4]

A multitude of environmental exposures are believed to significantly contribute to the onset of Type 1 Diabetes (T1D). According to Soltesz's study, several external factors have been identified as contributors to the development of Type 1 Diabetes (T1D). These factors include diet, birth weight, viral infections, accelerated childhood growth, maternal age, stress factors, and socioeconomic conditions. In relation to nutritional considerations, prior research has indicated that the early introduction of infant formulae or cow's milk, as well as a limited period of breastfeeding, have been linked to an increased susceptibility to Type 1 Diabetes (T1D).[5, 6] Several studies have indicated that the consumption of certain cow milk proteins through food may elevate the likelihood of b-cell autoimmunity and T1D. Conversely, breastfeeding has been hypothesised to exert a beneficial impact by enhancing the child's immune system.[7, 8]

The aim of present study was to determine the association of formula milk and exclusive breastfeeding (EBF) with TID in children.

METHODS

This epidemiology cross-sectional study was conducted in Saidu Teaching Hospital from January-2022 to January-2023. We included 75 patients with diagnosis of TID who presented in diabetes clinic of the hospital. For control group we included 75 children who did not had T1D and presented to the hospital for other causes. Children having congenital metabolic disorders, or with autoimmune disease were excluded from analysis.

A questionnaire was developed for data collection, the first half of questionnaire included information regarding age, gender and age at diagnosis of T1D, while the second half contained information regarding type of milk feed after birth e.g. breast milk, formula milk or both.

RESULTS

Mean age was 7.89±2.1 years in patients with T1D and 8.1±1.9 years in control group (p-value 0.52). There were 40 (53.3%) male patients in T1D and 39 (52%) male patients in control group (p-value 0.87). Majority of the patients were from rural area; 45 (60%) in T1D and 47 (62.7%) in control group (p-value 0.11) [Table 1].

There was very low percentage of exclusive breastfeeding (EBF) in T1D patients; 9 (12%) only in comparison to 43 (57.3%) in controls (p-value <0.001). There was high prevalence of formula feeding in T1D patients; 31 (41.3%) in comparison to 12 (16%) in controls (p-value <0.001) [Table 2].

Table 1: Baseline Characteristics.

	T1D (N=75)	Controls (N=75)	P-value
Mean Age (Mean±S.D.)	7.89±2.1	8.1±1.9	0.52
Sex			
Female	35 (46.7%)	36 (48%)	0.87
Male	40 (53.3%)	39 (52%)	
Residence			
Rural	45 (60%)	47 (62.7%)	0.11
Urban	30 (40%)	28 (37.3%)	

Table 2: Association between T1D and Type of Feeding.

	T1D (N=75)	Controls (N=75)	P-value
Exclusive Breastfeeding (EBF)			
Yes	9 (12%)	43 (57.3%)	<0.001
No	66 (88%)	32 (42.7%)	
Formula Feeding			
Yes	31 (41.3%)	12 (16%)	<0.001
No	44 (58.7%)	63 (84%)	

DISCUSSION

The implementation of optimal breastfeeding practises has been shown to have a positive impact on the survival, health, and overall development of children.[9] The advantages of breastfeeding encompass improved cognitive development, a strengthened immune system, decreased susceptibility to certain autoimmune and atopic disorders, lower likelihood of childhood obesity, and

diminished risk of leukaemia.[10, 11] According to a Lancet series on breastfeeding in 2016, it was projected that the implementation of optimal breastfeeding practises might potentially avoid 823,000 deaths annually among children under the age of five.[12] Nonetheless, as indicated by the Global Breastfeeding Scorecard's assessment of 194 nations, the prevailing worldwide proportion of exclusive breastfeeding remains inadequate, with only 40 percent of infants under six months of age being exclusively breastfed. Furthermore, a mere 23 countries have managed to achieve exclusive breastfeeding rates surpassing 60 percent. However, it is worth noting that overall rates of continued breastfeeding at one year are comparatively higher, reaching 74 percent.[13]

The percentage of children who were not given EBF was quite high in both the cases and the controls, despite the fact that the proportion of children who were not given EBF was significantly higher in the cases. These alarming figures are consistent with the findings of research conducted on a nationwide scale. According to the findings of one study, the percentage of children in Pakistan who are exclusively breastfed is disturbingly low. According to the Pakistan Demographic and Health Survey (PDHS), just 48 percent of newborns who are under six months old are fed only by their mothers' breast milk.[14]

It is not completely known why so many mothers in Pakistan have difficulty initiating and maintaining exclusive breastfeeding for the first six months of an infant's life, and instead opt to give their children formula instead. Despite this, a number of studies have suggested that a number of factors, including sociodemographic characteristics (such as the mother's level of education, number of children and household income), cultural attitudes, place of residence, health-related variables, biopsychosocial variables, and women's employment policies, all play a role in the decision to start or continue employing extended breastfeeding.

Yan et al. conducted a meta-analysis comprising 25 studies involving a total sample size of 226,508 individuals from 12 distinct countries. The findings of this study indicate a significant association between BF and a reduced incidence of factors that contribute to the onset of diabetes.[15] The association between FF and type 1 diabetes was established in a separate meta-analysis with a cohort of 155,392 children from Norway and Denmark.[16] The research findings indicate that non-breastfed infants had a twofold increased risk of developing type 1 diabetes compared to their breastfed counterparts. Nevertheless, a comprehensive meta-analysis incorporating 43 observational studies with a sample size of 9,874 individuals diagnosed with type 1 diabetes did not yield any substantiating data supporting the notion that breastfeeding (BF) confers a protective effect against the development of type 1 diabetes.[17] However, the study did not examine the impact of breastfeeding on type 1 diabetes (T1D) before the age of three months. The presence of conflicting results in these research may be attributed to several reasons, including as the utilisation of diverse experimental methodologies and the disparities in breastfeeding practises across different countries.[17]

Pakistan is among the countries with one of the largest birth cohorts worldwide, with more than five million children born every year.[14] There has been a slight decrease in mortality rates among infants and children during the preceding decade. At present, the infant mortality rate is at 62 deaths per 1000 live births, while the mortality rate for children below the age of five is recorded at 74 deaths per 1000 live births.[18] Undernutrition is a prominent contributing factor to child mortality, accounting for approximately 50% of all deaths in children under the age of five.[19] Exclusive breastfeeding (EBF) refers to the practise of solely breastfeeding an infant for the initial six months of their existence. This approach is widely recognised as a crucial and economically efficient method for addressing childhood malnutrition on a global scale. The aforementioned suggestion is sourced from the World Health Organisation (WHO). Furthermore, there exists the potential for a 10 percent reduction in the overall disease burden among children aged five and below.[20] Moreover, the World Health Organisation (WHO) advocates for the initiation of breastfeeding in newborns promptly, ideally within the initial hour following delivery, while discouraging the administration of prelacteal meals. There exists empirical evidence indicating that neonates who initiate breastfeeding more than one hour after delivery face an increased likelihood of mortality within the initial month of life, in comparison to those who commence breastfeeding within one hour of birth (pooled odds ratio of 2.02; 95% confidence interval of 1.40, 2.93).[21] Furthermore, a relationship has been shown between the delayed initiation of breastfeeding and the impression of inadequate milk production, resulting in the discontinuation of exclusive breastfeeding.[22] However, the implementation of the EBF practise in Pakistan has been suboptimal.

CONCLUSION

In present study, the frequency of EBF was significantly lower in T1D patients in comparison to controls. So EBF seems to be a protective factor against occurrence of type 1 diabetes.

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