MOSUL JOURNAL OF NURSING
Online ISSN: 2663-0311 - Print ISSN: 2311-8784
Website: https://mjn.mosuljournals.com

RESEARCH ARTICLE

Associated Factors for Type 1 Diabetes Mellitus among Children in Raparin Administration in the Kurdistan Region/Iraq.

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ABSTRACT

Background: Type 1 diabetes, also known as DM1, is a chronic disease caused by the destruction of beta cells in the pancreas that produce insulin by the immune system. Insulin deficiency is the direct consequence of the destruction of beta cells.

Aim: The main objective of this study is to identify the sociodemographic characteristics of the study samples. The main purpose of this research is to explore the associated factors between children's diabetes mellitus type 1 during the previous year.

Methods: A cross-sectional study had been carried out in the Raparin Administration unit for chronic diseases care in Rayna city and Qaladza city and the Raparin administration. non-probability / purposive sample sampling technique used for selection of 70 children who will have chronic type1 diabetes Miletus. The data was collected through structured interviews with mothers and method contact phone numbers. using a special designed questionnaire, During the period of 25 April 2022 up to 30 August 2022. A Statistical Package for Social Sciences (SPSS v.25) was used for statistical analysis.

Results: 70 samples of patients had chronic type1 diabetes Miletus. Patient relationships between Associated Factors with DM1 From this study, family history of type 1 diabetes type1 and maternal risk factors (gestational diabetes, infectious diseases during the first trimester of pregnancy, and maternal habits of much drinking tea, coffee during pregnancy. Those risk factors are significant with DM1 because p-values < 0.05. and neonatal risk factors, history of jaundice and neonatal infectious diseases important with DM1 because p-values < 0.05. and nutritional factors cow's milk used before 1 year has a low rate of exclusive breastfeeding, vitamin D- with DM1 because p-values < 0.05.

Conclusions: In conclusion, in Raparin children with T1DM From this study it can be concluded had wide range of maternal, and neonatal, nutritional Factors. Risk factors that may have contributed to the development of T1DM. Keyword :

Received: 19 January 2023, Revised: 21 March 2023, Accepted: 27 March 2023, Available online: 28 July 2023

INTRODUCTION

Type 1 diabetes, often known as T1DM, is an autoimmune disease that affects millions of people around the world. The prevalence of type 1 diabetes in children is increasing at a rate that could not be described only by genetics and is increasing throughout the world (Katsarou et al., 2017).

Type 1 diabetes mellitus, often known as DM1, is a chronic autoimmune disease that causes the body's immune system to target and destroy insulin-producing β- cells; it is characterised by a gross deficiency of insulin (insulinemic) and a dependence on exogenous insulin to protect ketoacidosis. This condition, which primarily affects children and is known as type 1 diabetes (juvenile-onset diabetes), can be identified at virtually any age; however, the peak presenting years are between the ages of 5 and 7 as well as around puberty - typically identified in young adults, as well as related to significant psychological, familial, and social problems (Wu, Ding, Gao, Tanaka & Zhang, 2013).

It is believed that environmental factors like particular dietary components, including viruses, start the autoimmune process, which in turn leads to the elimination of pancreatic B-cells and the development of type 1 diabetes. Genetic disposition is an additional prerequisite that must be met before the autoimmune process can proceed (Majeed & Hassan, 2011). People destined to acquire type 1 diabetes are thought to have a full complement of β-cells at birth. However, a trigger insult, often environmental, starts a process in which antigen-presenting cells are recruited. Antigen-presenting cells collect the self-antigens created by damaged β-cells and transport them to pancreatic lymph nodes, where they are then given to autoreactive T cells (Atkinson, von Herrath, Powers & Clare-Salzler, 2015). Type 1 diabetes can be identified at virtually any stage; however, peak appearance years are between the ages of 5 and 7 and approximately puberty. There is an apparent difference based on the seasons, with more cases being identified in the winter. Type 1 diabetes is more prevalent in men and boys, in contrast to most autoimmune diseases. Hyperglycemia, hyperglucagonemia, and glycosuria are the results of inadequate endogenous insulin. If the condition is not treated, it will eventually progress to ketosis, acidosis, dehydration, and death. Even with vigorous therapy, diabetic ketoacidosis (DKA), which has a mortality risk of approximately 0.5%, affects approximately one third of people with recently identified type 1 diabetes (Gregory, Moore & Simmons, 2013; Ismail, Mohammed, El-Moneim, & Mohammed, 2020).

There is a mounting indication that specific genetic and epigenetic changes, dietary factors, and a sedentary lifestyle are among the underlying mechanisms in the etiology of diabetes factors (Kautzky-Willer, Harreiter, & Pacini, 2016). Maternal age > 35 years at delivery, the existence of gestational diabetes, preeclampsia, and taking medications throughout pregnancy were substantially related to the prevalence of DM1. Furthermore, children with low birth weight (less than 2500 grammes) and those with newborn illnesses (respiratory distress, Jaundice, & infection) had an elevated risk of DM1. Drinking cow's milk throughout the first year of life was a significant predictor of acquiring T1DM. However, vitamin D deficiencies, vitamin D supplementation, and extended duration of breastfeeding were all important protective variables (Koch, 2011).

METHOD

Quantitative design, across sectional design study. The setting of the study has been carried out in unit care chronic diseases in Rayna city and Qaladza city and of Raparin administration. Kurdistan Region of Iraq. The period of 25 April 2022 to 30 August 2022. To reach the objectives of the present study, a nonprobability, objective sample of (70) patients, who will chronic type1 diabetes millets. For data collection purposes, a questionnaire was designed and composed of (104) items, data were collected through the use of the interview technique, and contacted telephone number. the content Validity of the questionnaire was determined by a panel of (10) experts. A pilot study was carried out to check the reliability of the questionnaire which was determined by using the split-half approach, which was estimated as (r= 0.74). Statistical approaches which were used for data analysis include descriptive inferential statistical data analysis. The obtained data were analysis by using the SPSS application, version 25. The data P-value was set at ≤ 0.05.

Study tools and instruments:

Data collected using a constructed questionnaire included three parts;

Part I: patients socio-demographic characteristic;
Part II*:* Associate factors for type 1 Diabetes Mellitus;

Part III: Clinical futures presentation symptoms Type 1 Diabetes Mellitus; Variable diabetes mellitus: presention symptoms to create a variable

known as variable diabetes mellitus (severe , not severe).

The items were rated and scored according to the following patterns.

A 1- two-point type Likert Scale is used to classify items as Yes and NO.

2- The two-point type Likert scale is scored as (1) for Yes and (2) for NO.

The determination of these values was based on previously published research conducted by (Ismail AM, Mohammed AE-MA, El-2020).

Inclusion criteria:

Both genders, men and women, Children who have chronic disease have type I diabetes mellitus.

Exclusion criteria:

Children who have no type 1 diabetes mellitus type1 characteristic or but a short period of time and who cannot communicate and patients over 14 years old.

The sample of the study: A nonprobability sampling method / a purposive sample of patients who will meet the eligibility criteria of the study.

RESULTS

To analyse the specific objectives of the present study, 70 samples of males and females who. Patients with Type 1 diabetes mellitus in Raparin administration.

70 patients were used to evaluate the normal distribution of the distance variables studied in this research; all variables followed the normal distribution. Therefore, considering the number of 70 samples, Fisher exact tests (F-test) Chi-square tests were used to examine significant Fisher exact tests. Levels were significant with p-values > 0.05.

Table (1). A total of 70 patients were scheduled for the present study, sociodemographic data show This table shows that (24) patients in the study sample were 1 year of age of the child (4-6) years old, which represents high (34.3%) The mean age of the child are 7.79~ 8. that the majority of the study sample was women, representing a high percentage (61.43%). Child education the high percentage Primary school represent (70.00 %) Family Type Nuclear the high percentage represent (71.43%) numbers of family members (2,4,6) family Member the high percentage represent (80.00%). The number of rooms (2,4,6) represents a high percentage represent (94.29.%.) Father, occupation the non-government employee the high percentage represents (41.43%.) Mother Occupation house wife high percentage represents (64.29%.) . The high percentage of father-level education graduate institution the high percentage represent (24.29%.) The high percentage represents (24.29 %.). Monthly income barely sufficient the high percentage represent (55.71%.). The residential area sample lives in urban areas and the high percentage represent (64.29%.).

Table (2). Correlation between maternal factors and DM1. Table, as seen in the table below, the correlation of some maternal variables with T1DM1 is significant, for example, the correlation between gestational diabetes and T1DM1 is significant at 0.05 level because its p value (0.043) is lower than < 0.05, therefore it could be concluded that the null hypothesis is rejected. In general correlations of age of mothers, hypothyroid and convulsions and preeclampsia and age of mother with T1DM1 are not significant, because all their p-values (0.669) p-value (0.654) p-values (0.214) are greater than > 0.05, correlation between Asthma and T1DM1 is significant at 0.05 level because its p value (0.018) is less than < 0.05, correlation between hyperthyroid and T1DM1 is significant at 0.05 level because its p value (0.049) is less than < 0.05, but in addition to gestational diabetes, the correlations of Asthma, hyper-thyroid and with T1DM1 are significant at is less than < 0.05, level.

Table (3). Correlation between Neonatal Factors and T1DM1. Table as can be seen in the table below, the correlation between their newborn variables is significant with T1DM1 is significant because its p-value is smaller than < (0.05). for example, the correlation between birth weight (2.5kg -4kg) normal birth weight, its p-value (0.013) is smaller than < (0.05). and the Neonate that has jaundice is significant, its p-value (0.013) is smaller than < (0.05). In general, of them have no significant correlation with T1DM1, because p-value greater than > 0.05. Mode of delivery Normal vaginal delivery, p-value (0.744), emergency c/s -Caesarean section) delivery p-value,(0.745) cosmetic c/s delivery p-value (0.746), Gestational age preterm p-value (0.542), full term age p-value (0.544), post -term age over 42 week p-value(0.546), greater than > 0.05.birth weight less than 2 kg -1.5kg low birth weight p-value(0.542), birth weight mor than (4.5kg-5kg-5.5kg) , high birth weight p-value (0.546), greater than > 0.05. phototherapy used p-value (0.199), greater than > 0.05. R.D. p-value of S respiratory distress syndrome (0.538) and p-value of Vitiligo (0321). Therefore, it could be concluded that the null hypothesis is rejected as being not significant because the p-value level is greater than the > 0.05 level.

Table (4). Correlation between nutritional factors and DM1. Table, as can be seen in the table below, the correlation between nutritional factors

with T1DM1. of them have Variables significant because its p-value its smaller than < (0.05). For example, the child using cow's milk less than 1 year of p-value (0.042), vitamin D deficiency p-value (0.0335), significant because its p-value its smaller than < (0.05). but have Variable no significant because p-value greater than > 0.05 level. for example, p-value of vitamin D supplementation (0.508), variables are not significant because the p-value greater than > 0.05 level. Two variables formula feeding and mixed feeding without significant formula feeding p-value (0.424), mixed feeding p-value (0.113),) because the p-value is greater than > 0.05 level. But the significant p-value of breast feeding (0.012) is smaller than < (0.05).

Table (1): Distribution of the study sample for both parents and children according to their sociodemographic attributes.

Age of Child	Frequency	Percentage	mean
4-6 years of age	24	34.3	7.79 ~ 8
7-9 years of age	23	32.9	
10-12 years of age	23	32.9	
Total	70	100.0	

Variables	Categories	Frequency	Percentage
Gender	Female	43	61.43
	Male	27	38.57
Child Education	Kindergarten	11	15.71
	Primary school	49	70.00
	No kindergarten	10	14.29
Family Type	Nuclear	50	71.43
	Extended	20	28.57
Family member	Numbers of family members 2,4,6	56	80.00
	Numbers of family members 7,8,10	14	20.00
No. of Rooms	Number of rooms 2,4,6	66	94.29
	Number of rooms 7,8,10	4	5.71
Father Occupation	Government Employees	15	21.43
	Non-government employee	29	41.43
	Self-employment	26	37.14
Mother occupation	housewife	45	64.29
	Government Employees	19	27.14
	Non-Government Employee	3	4.29
	Self-work	3	4.29
Father Education	Unable to read and write	7	10.00
	Able to read and write	12	17.14
	primary school	9	12.86

	certificate		
	Secondary school certificate	16	22.86
	Graduate Institution	17	24.29
	Graduate university	9	12.86
Mother Education	Unable to read and write	7	10.00
	Able to read and write	17	24.29
	Primary school certificate	7	10.00
	Secondary school certificate	12	17.14
	Graduate Institution	16	22.86
	Graduate university	11	15.71
Monthly Income	Sufficient	6	8.57
	Barely sufficient	39	55.71
	Insufficient	25	35.71
Residential area	Urban	45	64.29
	Rural	25	35.71

Table (2): Correlation between maternal factors and DM1.

Variables	Categories	T1DM1			Df	Chi-square	P - value
		Severe	Not severe	Total			
Age of the mother	Age of the mother under 18 years	6 8.57	1 1.43	7 10.00	3	1.5572	0.6691
	Age of the mother 20 -30 years	13 18.57	5 7.14	18 25.71	2	1.4572	0.6591
	Age of the mother 30 -40 years	20 28.57	10 14.29	30 42.86	1	1.3572	0.6390
	Age of the mother 40-45 years	12 17.14	3 4.29	15 21.43	3	1.3672	0.6268
	Total	51 72.86	19 27.14	70 100.00			
Preeclampsia	Yes,	35 50.00	10 14.29	45 64.29	1	1.5427	0.2142
	NO	16 22.86	9 12.86	25 35.71			

	Total	51 72.86	19 27.14	70 100.00			
Gestational Diabetes	Yes,	31 44.29	16 22.86	47 67.14	1	4.4435	0.0435
	NO	20 28.57	3 4.29	23 32.86			
	Total	51 72.86	19 27.14	70 100.00			
Asthma	Yes,	14 20.00	11 15.71	25 35.71	1	5.5881	0.0181
	NO	37 52.86	8 11.43	45 64.29			
	Total	51 72.86	19 27.14	70 100.00			
Hypo-thyroid	Yes,	16 22.86	8 11.43	24 34.29	1	0.7077	0.4002
	NO	35 50.00	11 15.71	46 65.71			
	Total	51 72.86	19 27.14	70 100.00			
Hyper thyroid	Yes,	9 12.86	0 0.00	9 12.86	1	3.8476	0.0498
	NO	42 60.00	19 27.14	61 87.14			
	Total	51 72.86	19 27.14	70 100.00			
Convulsion	yes,	6 8.57	3 4.29	9 12.86	1	0.2001	0.6546
	NO	45 64.29	16 22.86	61 87.14			

Fisher exact tests (F test) Chi-square tests were used to examine significant Fisher exact tests were used; the levels were significant with p-values > 0.05.

Table (3): Correlation between Neonatal Factors and T1DM1.

Variables	Categories	T1DM1			Df	Chi-square	P-value
		Severe	Not severe	Total			
Mode of delivery	Normal vaginal delivery	32 45.71	11 15.71	43 61.43	2	0.5907	0.7443
	Emergency c/s(Caesarean section) delivery	18 25.71	7 10.00	25 35.71	3	0.5916	0.7453
	Cosmetic c/s delivery	1 1.43	1 1.43	2 2.86	4	0.5926	0.7463
	Total	51 72.86	19 27.14	70 100.00			
Gestational age	Age 32-34-35-36 weeks (preterm)	14 20.00	5 7.14	19 27.14	2	1.2236	0.5424

 DOI: 10.33899/mjn.2023.180603

	Age 37-38-39-40-42 week (full term)	34 48.57	14 20.00	48 68.57	3	0.1916	0.5443
	Age over 42 weeks (postterm)	3 4.29	0 0.00	3 4.29			
	Total	51 72.86	19 27.14	70 100.00	4	1.2237	0.5465
Birth weight	2.5kg -4kg normal birth weight	31 44.29	6 8.57	37 52.86	2	8.6119	0.0135
	Less than 2kg -1.5kg low birth weight	14 20.00	5 7.14	19 27.14	3	8.6219	0.4932
	More than 4.5kg-5kg-5.5kg -. high birth weight	6 8.57	8 11.43	14 20.00			
	Total	51 72.86	19 27.14	70 100.00	4	8.6319	0.4942
Neonatal diseases-having jaundice	yes,	39 55.71	13 18.57	52 74.29	2	8.6129	0.0136
	NO	12 17.14	6 8.57	18 25.71			
	Total	51 72.86	19 27.14	70 100.00			
Phototherapy used	yes,	19 27.14	4 5.71	23 32.86	1	1.6472	0.1993
	NO	32 45.71	15 21.43	47 67.14			
	Total	51 72.86	19 27.14	70 100.00			
R.D.S respiratory distress syndrome	yes,	31 44.29	10 14.29	41 58.57	1	0.3792	0.5380
	NO	20 28.57	9 12.86	29 41.43			
	Total	51 72.86	19 27.14	70 100.00			

Fisher exact tests (F test) Chi-square tests were used to examine significant Fisher exact tests were used; the levels were significant with p-values > 0.05.

Table (4): Correlation between Nutritional Factors and T1DM1.

Variables		Categories	T1DM1			Df	Chi-square	P-Value
			Severe	Not severe	Total			
The child using cow's milk		yes,	25 35.71	11 15.71	36 51.43	1	0.4365	0.0429
		NO	26 37.14	8 11.43	34 48.57			
		Total	51 72.86	19 27.14	70 100.00			
Vitamin D deficiency		yes,	31 44.29	16 22.86	47 67.14	1	3.4435	0.0335
		NO	20 28.57	3 4.29	23 32.86			
		Total	51 72.86	19 27.14	70 100.00			
Vitamin D supplementation		yes,	12 17.14	9 12.86	21 30.00	1	3.7461	0.5088
		NO	39 55.71	10 14.29	49 70.00			
		Total	51 72.86	19 27.14	70 100.00			
Type of Feeding		Yes- Breast feeding	42 60.00	13 18.57	55 78.57	2	1.7125	0.0125
		Yes-formula milk	1 1.43	1 1.43	2 2.86	1	4.8405	0.4247
		Yes, mixed feeding	8 11.43	5 7.14	13 18.57	1	2.5076	0.1134
		Total	51 72.86	19 27.14	70 100.00			

Fisher exact tests (F test) Chi-square tests were used to examine significant Fisher exact tests were used; the levels were significant with p-values > 0.05.

DISCUSSION

Correlation between Maternal Factors and T1DM1. In our study revealed that there were no significant relationships between the age of the mother and T1DM1 at p-value > 0.05. This result is in contrast to the findings of an assessment that involved 30 research and 14,752 cases of type 1 diabetes, which showed that children born to mothers over the age of 35 had, on average, a 10% higher risk of developing type 1 diabetes compared to children born to mothers between the ages of 25 & 30. No important. While contrasted to the reference category of moms aged 25-30, a distinct variation was seen in the characteristics of mothers aged 30-35. showed that the increased risk of DM1 increased with increasing maternal age (Algert, McElduff, Morris & Roberts, 2009). Furthermore, it was revealed in our study that there was a significant relationship between Gestational Diabetes, at p-value < 0.05. with p value <0.05. with DM1. This finding is similar in a case-control study in Basrah (Stene et al., 2004) ,(Majeed & Hassan, 2011) who reported that there was a significant correlation and gestational diabetes, with DM1. at p-value < 0.05. gestational, is associated with an increased risk of a number of pregnancy related complications. In contrast, study in Norway by Stene LC et al. (Stene, Magnus, Lie, Svik & Joner, 2003)But maternal preeclampsia No significant p-value > 0.05. This finding contradicts (Majeed & Hassan, 2011) and (Waernbaum, Dahlquist, & Lind, 2019) . it was revealed that there was a significant relationship between asthma, hyper thyroid, infectious diseases during the first trimester of pregnancy, Mastitis, Eczema, Arthritis with DM1 at a p-value < 0.05. with this finding contradicts with our findings,(Ismail et al., 2020). it was revealed from our study that there was a significant relationship between respiratory tract infection first trimester, Tonsillitis, Stomatitis, at p-value < 0.05. with T1DM. This observation is comparable to that of another research. Early pregnancy maternal respiratory infections increase the incidence of

type 1 diabetes (Bélteky, Wahlberg, & Ludvigsson, 2020)in Sweden with (Piper et al., 2004). Particularly respiratory tract disorders at a window near the beginning of the first trimester. This corresponds to the embryological development of the pancreas, where endocrine functions begin between weeks 10 and 13 after conception(Piper et al., 2004). Throughout foetal life, B-cell autoimmunity, as well as the development of clinical DM1 could well be related Also bronchiolitis and influenza-flu cold do not have significant relationships with T1DM1 at p-value > 0.05. this finding contradicts with findings (Piper et al., 2004). In our study revealed that there were no significant relationships between G.I. T. tract infection during pregnancy, for example, chronic diarrhoea, vomiting, nausea, gastro-oesophageal, with T1DM1 at p-value > 0.05. This finding contradicts the Norwegian cohort investigation of mothers and children (Henriksen, Torsheim, & Thuen, 2015). Also, there were no significant relationships between urinary -uterine tract infection, toxoplasmosis during pregnancy, with T1DM1 at p-value > 0.05. this finding contradicts with the investigation of Norwegian cohorts of mothers and children (Henriksen et al., 2015). In our study revealed that there were no significant relationships between the history of medication in mothers during pregnancy, for example, using antibiotics (vancomycin, erythromycin…), Antihypertensive therapy, insulin therapy, anticonvulsion with DM1 at p-value > 0.05. This finding contradicts the finding of maternal drug intake during pregnancy, which is significantly in agreement with our findings, Majeed and colleagues (Majeed & Hassan, 2011) carried out a case-control study to identify potential maternal, neonatal, and early child risk characteristics for DM1 in Basrah children. In our study revealed that there were no significant relationships between history of Mother Habits-Mother smoking during pregnancy with T1DM1 at p-value > 0.05. This Finding is similar with findings from the study Majeed et al. (Majeed & Hassan, 2011)who smoke during pregnancy effects on foetal development (Avşar, McLeod, Jackson, & childbirth, 2021).But it was revealed from our study that there was a significant relationship between Mother Too Much drinking coffee tea at p-value < 0.05. with DM1. With this finding it is similar in Italy (Visalli et al., 2003) and the study Majeed et al. (Majeed & Hassan, 2011).

Correlation between Neonatal Factors and T1DM1 .In our study revealed that there were no significant relationships between mode of delivery Normal vaginal delivery, emergency c/s - Caesarean section) delivery ,cosmetic c/s delivery with T1DM1 at p-value > 0.05. This finding contradicts the findings of the C-section. Children with a C-section birth were approximately 2.5 times more likely to develop DM1 than children born vaginally (Lee, Lu, Chen, Su & Li, 2015).and with this finding is similar Norway by (Stene et al., 2003) . also, it was revealed from our study that there was no significant relationship between gestational age, preterm, full terms, post -term age with T1DM1 at p-value > 0.05. This finding contradicts with findings on gestational age and T1DM the investigation discovered a strong inverse connection among gestational age and also the risk of T1DM. The relative incidence for children born beyond 42 weeks was 0.73 as contrasted to new-borns born before 39 weeks (Cardwell, Carson, & Patterson, 2005). Additionally, in a 2015 cohorts and case-control research, the gestational age of preterm babies was determined (33 to 36 weeks). Preterm infants continue to apply to all babies born before a completed gestational age of 37 weeks. Because prematurity now encompasses a wider age, weight, and physiological maturity, physical characteristics increase development with DM1. also, it was revealed from our study that there was no significant relationship between birth weight. low baby weights, great birth weight with T1DM1 at p-value > 0.05. There is a contradiction between this finding and other findings on T1D and birth weights(Khashan et al., 2015) also investigated the relationship between birth weight and type 1 diabetes. A birth weight less than 1,500 grammes was associated with a decreased risk of type 1 diabetes, according to a meta-analysis published in 2009 related to birth weight and type 1 diabetes in childhood (Harder et al., 2009). The researchers found a correlation between having a high birth weight (more than 4,000 grammes) and having an increased chance of developing type 1 diabetes. But it was revealed from our study that there was a significant relationship between normal birth weight (2.5kg - 4kg) its' p-value < 0.05. with the finding of DM1 contradicts (Khashan et al., 2015). it was revealed from our study that there was a significant relationship between neonates having Jaundice and their p-value < 0.05. with T1DM finding is similar to Majeed and colleagues (Majeed & Hassan, 2011) carried out a case-control to investigate possible maternal, neonatal, including early child risk variables for type 1 diabetes in Basrah's children. T1D is associated with the risk factor jaundice. The most striking rise was shown in Jaundice as a risk variable for type 1 diabetes. In our study revealed that there were no significant relationships between the phototherapy used, respiratory distress syndrome, with T1DM1 at p-value > 0.05. This finding contradicts with Majeed et al. (Majeed & Hassan, 2011) and finding contradicts (Dahlquist, Patterson, & Soltesz, 1999)in Europe,. But it was revealed from our study that there was a significant relationship between neonatal infection that has, for example, Vitiligo, Conjunctivitis, Umbilical sepsis, oral thrush, with T1DM its p-value < 0.05. This finding similarly with Majeed and colleagues (Majeed & Hassan, 2011)and finding similarly (Dahlquist et al., 1999) in Europe and by (McKinney et al., 1999) in the UK. Neonatal infections during the first years of an individual's life are thought to play a significant role in the activation of the immune response that results in the death of B cells and

also the development of type 1 diabetes (Svensson, Carstensen, Mortensen, & Borch-Johnsen, 2005).

Correlation between Nutritional Factors and T1DM1. In our study, it was revealed that there were significant relationships between the child using cow's milk under 1 year of age with DM1. at p-value < 0.05. This finding contradicts the result reported study Risk Variables for Type 1 Diabetes Mellitus in Kids Attending Aswan University Hospital by (Ismail et al., 2020). This finding that similar rates (Goldfarb, 2008),(Chia et al., 2017). Cow milk protein is a critical environmental trigger that could describe the significant increase in type 1 diabetes, as well as the disparities in incidence. Increased cow's milk consumption may enhance the progression to type 1 diabetes in kids via islet autoimmunity, an impact that may be mediated by specific fatty acids found in cow's milk. proteins during early childhood, at a time when the maturation of the gut immune system is not yet complete, is in some way deleterious and predisposes to the development of β-cell autoimmunity (Vaarala, 2002). Investigations investigating the relationship between cow milk consumption later in childhood and the development of islet autoimmunity, which is a precursor to type 1 diabetes (Lamb et al., 2015). also, it was revealed from our study that there were significant relationships between vitamin D deficiency and DM1. at p-value < 0.05. This observation provides evidence that contradicts. It was hypothesised that vitamin D would be able to prevent, in some way, the autoimmune reaction directed against the β cells of the pancreas. Moreover, low vitamin D levels in childhood may affect immune system functioning, which might have long-term impacts on immunological responses later in life (Hyppönen, Läärä, Reunanen, Järvelin, & Virtanen, 2001). also, it was revealed from our study that there were no significant relationships between vitamin D supplementation with DM1. at p-value > 0.05. This finding rates similarly in the study Risk Factors for Type 1 Diabetes Mellitus in Children Entering Aswan University Hospital by (Ismail et al., 2020). also, it was revealed from our study that there were significant relationships between breast feeding, duration of breast feeding Less than <6 months high, significant with DM1. at p-value < 0.05. and this finding rates similarly (Holmberg, Wahlberg, Vaarala, Ludvigsson & nutrition, 2007) in Sweden. In this investigation, the feeding style in early childhood (breast, or mixed feeding) and its duration were examined. The results revealed that breast feeding for less than six months is a crucial component between children who develop diabetes. Results comparable to these were reported by (Visalli et al., 2003). in Italy, who came to the conclusion that breast feeding lowers the incidence of beta cell autoimmunity even years after the mother had stopped breast feeding her child (Holmberg et al., 2007) in Sweden. No significant formulas feeding with T1DM. at p-value > 0.05. Early enterovirus infections, which are associated with formula feeding, have been suggested to be a strong possibility for triggering B-cell autoimmune (Catassi et al., 1995).

CONCLUSIONS:

In conclusion, in Raparin children with T1DM, it can be concluded that they had a wide range of maternal and neonatal nutritional factors. Risk factors that may have contributed to the development of T1DM.

Recommendations The study recommended that children with DM1 had a wide range of genetic, maternal, newborn, and nutritional risk factors that may have contributed to the development of DM1. Therefore, interventions are recommended to minimise exposure to these risk factors in genetically susceptible patients. However, in further studies with rigorous design, large sample size and multiregional cooperation are required.

Ethical Approval Statement

This research study, titled " **Associated Factors for Type 1 Diabetes Mellitus among Children in Raparin Administration in the Kurdistan Region/Iraq.**" conducted by [**Shahla Abdulla Ahmed, Heersh Hama Raof Saed**], has received ethical approval from the [ethical committee of the College of Nursing] at [University of Raparin].

FUNDING

This research did not receive any grant from funding agencies in the public, commercial, or non-profit sectors.

AUTHOR'S CONTRIBUTIONS

All authors contributed equally to the conception and design of the study, data collection, and analysis, and drafted the initial manuscript. All authors critically reviewed and edited the manuscript. All authors approved the final version of the manuscript for submission.

DISCLOSURE STATEMENT:

The authors report no conflict of interest.

ACKNOWLEDGEMENTS

We thank all study participants who agreed and participated in this study, all paediatricians, nurses, and administrative staff for their help during this study.

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