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# Social Backgrounds for Mothers Having Infants and Children with Developmental Dysplasia of Hip

Hisham A. Al-Kattan

M. Sc.

Dhafer B. Al-Youzbaki

PhD.

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## Abstract:

**Background:** Developmental dysplasia of the hip (DDH) embraces conditions of varying severity. Early identification of affected infants is important for optimal outcome. The incidence of DDH is variable and depends on many factors. Approximately one in 1 000 children is born with a dislocated hip, and 10 in 1 000 may have hip subluxation. Factors contributing to DDH include breech presentation, female sex, positive family history, firstborn status, and oligohydramnios. Intrauterine position, sex, race, and positive family history are the most important risk factors. These factors have been meticulously globally studied by many researchers, this study aimed at exploring the effect of social backgrounds for mothers having babies with DDH.

**Aim:** To examine the impact of different socio-economic and medical characteristics for women and the subsequent occurrence of developmental dysplasia of hip among their children.

**Study design:** Case-control study, where 43 women with DDH babies, were allocated as cases. Another 91 women who have not had babies with DDH were considered as controls.

**Study period:** 1<sup>st</sup>. February 2007 to 1<sup>st</sup>. December 2007.

**Data collection tools:** Including, assessment of socio-economic features such as personal characteristics, life events and social context. In addition, previous history of oral contraceptive usage and the presence of one or more of chronic non-communicable diseases were also gained.

**Results:** Regarding *Personal Characteristics*; positive family history was found to be significantly associated with the development of DDH ( $P=0.001$ ), while sedentary life styles were found to be significantly negatively associated with the occurrence of DDH ( $P=0.022$ ). According to *Life Events*; stress, in this work appeared to be significantly associated with the development of DDH ( $P=0.017$ ), while social discontinuities and geographical mobility, both showed negative significant association with DDH. Regarding *Social Context*, both social disintegration and urbanization appeared to be significantly ( $P=0.032$ ,  $P=0.023$  respectively), negatively associated with the occurrence of DDH. According to *Other Variables*, the previous history for use of oral contraceptives showed significant ( $P=0.018$ ) negative association with DDH, while obesity in women appeared to be positively associated with the occurrence of DDH among their children.

**Conclusion:** Women with positive family history stress and obesity appeared to be at significant risk to have children with DDH. While, women with sedentary life, social discontinuities, geographical mobility, social disintegration, urbanization and previous usage of oral contraceptives appeared significantly protected from having children with DDH.

**Key words:** Social, Backgrounds, Mother, Developmental Dysplasia of Hip...

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## Introduction:

Developmental dysplasia of the hip is a musculoskeletal condition in children in which the bones of the hip joint, which is a ball-and-socket joint, do not form or grow together properly. This deviation from the normal growth pattern in the hip generally occurs while the child is still a developing fetus, but can occur, more rarely, in early childhood as well. DDH represents a spectrum of anatomic abnormalities in which the femoral head and the acetabulum are in improper alignment and/or grow abnormally. The precise definition of DDH is controversial. The spectrum includes hips that are dysplastic, subluxated, dislocatable, and dislocated. Clinical instability of the hip is the traditional hallmark of the disorder. In an unstable hip, the femoral head and acetabulum may not have a normal, tight, concentric anatomic relationship, which can lead to

abnormal growth of the hip joint and may result in permanent disability. DDH can lead to premature degenerative joint disease, impaired walking, and chronic pain<sup>[1,2]</sup>.

Estimates of the incidence of DDH in infants vary between 1.5 and 20 per 1000 births<sup>[3]</sup>. The incidence of DDH in infants is influenced by a number of factors, including diagnostic criteria, gender, genetic and racial factors, and age of the population in question<sup>[4]</sup>. The reported incidence has increased significantly since the advent of clinical and sonographic screening, which suggests possible over diagnosis. In addition to a higher prevalence of DDH in females, reported risk factors for the development of DDH include a family history of DDH, breech intrauterine positioning, and additional in utero postural deformities<sup>[5-7]</sup>

Understanding the developmental nature of DDH and the subsequent spectrum of hip abnormalities requires knowledge of the growth

and development of the hip joint. Embryologically, the femoral head and acetabulum develop from the same block of primitive mesenchymal cells. A cleft develops to separate them at 7 to 8 weeks' gestation. By 11 weeks' gestation, development of the hip joint is complete. At birth, the femoral head and the acetabulum are primarily cartilaginous. The acetabulum continues to develop postnatally. The growth of the fibro-cartilaginous rim (the labrum) that surrounds the bony acetabulum deepens the socket. Development of the femoral head and acetabulum are intimately related, and normal adult hip joints depend on further growth of these structures. Hip dysplasia may occur in utero, perinatally, or during infancy and early childhood<sup>9</sup>.

Several factors are thought to contribute to the development of DDH. One common finding in infants with DDH is that the ligaments that surround the joint show excessive laxity, which means they are looser than normal. Because the capsule does not hold the bones in close contact, as mentioned above, they do not grow completely or properly, leading to joint instability.

It has been hypothesized that DDH is more common among girls because the female hormones circulating in the womb of a female fetus may contribute to increased joint laxity. Another contributing factor may be the position of the child while in the uterus, or the combination of pressures to which a fetus may be subjected, while developing in the womb. For example, one explanation for why first-born children are more commonly affected is because the mother's uterus has not been stretched out yet by the process of labor, creating greater pressures in the womb that may place the hip in a more unstable position. Though other, similar theories relate to the other risk factors as well, the exact causes and pathophysiology of DDH remain largely unproven, and ongoing research at several medical centers is devoted to identifying these causes and improving the treatment and prevention of the condition<sup>10</sup>.

Accordingly, the present study, tried to explore social backgrounds for mothers having one or more child with DDH, in order to highlights any significant association between these important factors in mothers life, and the development of DDH in their children.

#### **Subject & methods:**

In order to achieve the aim of the present study, a case-control study design was adopted, where, 43 women were enrolled in this study as cases according to the following inclusion criteria:

- The participant, must be a woman (in child bearing age, 15-40).
- The participant must have had at least one child with proved DDH.

Another 91 women were chosen as controls with the following inclusion criteria:

- The participant, must be a woman (in child bearing age, 15-40).
- The participant must have had no any one of her children with DDH.

The study was carried out in orthopedic wards of Al-Zahrawi teaching hospital, Mousl Governorate, Iraq.

Un-paired sampling technique was used in this study, matching was done for age ( $\pm 5$  years). Every participant woman in this study was interviewed by one researcher and the following questions were answered. The presence of one or more of the chronic non-communicable diseases (CNCDS), previous history for usage of oral contraceptives, body mass index were calculated for all mothers, socio-economic factors were obtained according to the following<sup>[11]</sup>:

#### **I – Personal characteristics:**

##### **A- Social identity:**

Age, sex and heredity (family history DDH), Marital status, occupation, and race.

##### **B- Personal habits:**

Sedentary life style.  
Smoking.  
Alcohol consumption.  
Fatty, calorie and salt rich diets (unhealthy diets)

##### **C- Psychological make-up:**

Personality type A  
Personality type B

#### **II – Life Events:**

##### **A- Stress**

##### **B- Social Discontinuities:** Such as;

Death of spouse  
Abnormal marital status (single, divorce, widow)  
Retirement  
Change in the job  
Change of residence  
The birth of new baby

##### **C- Geographical mobility:**

- Rural to urban, urban to rural of any type.

##### **D- Catastrophic events.**

#### **III – Social Context:**

##### **A- Economic factors:**

- Unemployment.
- Sudden upgrade in employment
- Sudden job descend.
- Sudden loss of huge money.
- Sudden gain of huge deal of money.

##### **B- Social disintegration**

- Living alone, or with family

**C- Urbanization:**

- Urban or rural
- Crowding index

X<sup>2</sup>-test was used to look for the presence or absence of an association, Odds ratio (OR) with it 95% confidence interval (95% C.I.) were also computed. P-value less than or equal to 0.05 was considered significant.

**Results:**

The mean ages of the study population was 26.24 years for cases and 26.94 years for controls. Table (1) represents personal characteristics of the study sample and their mode of association with DDH. Positive family history is more prevalent among cases than controls in a significant way (P=0.001) and the presence of such history

appeared to be associated with DDH development among children (OR=3.71, 95% C.I.=1.69-8.14). Sedentary life styles appeared to be significantly (P=0.022) a protecting factor for women against the development of DDH among their children. While both unhealthy dietary behaviors together & personality type A showed no association with DDH development

Previous and concurrent history of stress for mothers carries a significant risk for the development of DDH among their children (OR= 2.61, P-value= 0.017, and 95%C.I.=1.18-3.47). The same thing was applied for social discontinuities, geographical mobility, but in a reciprocal way, where both factors appeared to be significantly, negatively associated with the development of DDH.

**Table(1): Association of personal characteristics for mothers with subsequent development of DDH among their children.**

Characteristics	Cases (n=43)		Controls (n= 91)		O R	P-value*	95 % C.I.
	No.	%	No.	%			
Positive family history	19	44.2	16	17.6	3.71	0.001	1.69-8.14
Sedentary life	38	88.4	89	79.8	0.17	0.022	0.04-1.77
Unhealthy dietary	16	37.2	50	54.9	0.49	0.055	0.24-1.02
Personality type A	34	79.1	58	63.7	2.15	0.074	0.93-4.98

\* Chi square test for contingency table was used.

**Table (2): Association of life events for mothers with subsequent development of DDH among their children**

Life events	Cases (n=43)		Controls (n=91)		OR	P-value*	95% C.I.
	No.	%	No.	%			
Stress	32	74.4	48	52.8	2.61	0.017	1.18-3.47
Social discontinuities	4	9.3	25	27.5	0.27	0.017	0.09-0.79
Geographical mobility	3	7	32	35.2	0.14	0.001	0.05-0.43

\* Chi square test for contingency table was used

Factors related to social context of the study subjects showed that both, social disintegration and urbanization, were significantly (P=0.032, P=0.023

respectively) negatively associated with development of DDH.

Table (4) portrays the association of certain medical and obstetrical variables with DDH. Previous use of

oral contraceptives among mothers appeared to be significantly, but negatively associated with the development of DDH. While obesity of mothers

appeared to be significantly associated with the occurrence of DDH among their babies.

**Table (3): Association of social context for mothers with subsequent development of DDH among their children**

Social context	Cases (n=43)		Controls (n=91)		OR	P-value*	95% C.I.
	No.	%	No.	%			
Economic factor	2	4.7	7	7.6	0.59	0.511	0.12-2.85
Social disintegration	3	7	20	22	0.27	0.032	0.08-0.89
Urbanization	31	72.1	80	87.9	0.36	0.023	0.15-0.87

\* Chi square test for contingency table was sued

**Table (4): Association of other variables for mothers with subsequent development of DDH among their children**

Variables	Cases (n=43)		Controls (n=91)		OR	P-value*	95% C.I.
	No.	%	No.	%			
CNCDs	4	9.3	19	20.9	0.39	0.097	0.13-1.19
Contraceptive	11	25.6	43	47.3	0.38	0.018	0.17-0.84
BMI > 25	35	81.4	52	57.1	3.28	0.006	1.41-7.66

\* Chi square test for contingency table was sued

**Discussion:**

Not all patients with DDH have dislocations, and not all cases are congenital. Though the congenital form of the condition is by far the most common subset of DDH, it may also develop after birth and be associated with neurologic conditions (such as spinal cord defects), connective tissue disorders, or other syndromes of the musculoskeletal system (such as Larsen’s syndrome or arthrogryposis).

Accounting for 75% of all congenital defects, DDH, formerly termed CDH, is believed to be the most common defect in the newborn infant. DDH seems to be the most discussed subject in the pediatric orthopedic literature dealing with the musculoskeletal system<sup>12</sup>, and as ably stated by R. Salter<sup>13</sup>, congenital dislocation of the hip represents one of the most important and challenging congenital abnormalities of the musculoskeletal system.

Since, DDH, is very important subject in the health of all new born babies, and because its exact etiology is still not clear, thus investigation for risk factors of this crucial disease is very important.

This study, tried to explore risk factors from other perspective, i.e. regarding social backgrounds for mothers having one or more child that was affected by this disorder.

Several fair quality case-control and observational studies found breech positioning, family history of DDH, and female gender to be most consistently associated with the diagnosis of DDH. However, the majority of cases of DDH have no identifiable risk factors<sup>14</sup>. In this study, family history, also appeared to be significantly associated with the development of DDH. Actually, there are two heritable features that could predispose to hip instability, generalized joint laxity (as a dominant trait) and an acetabular dysplasia (as a polygonal trait) that is seen in the smaller group, mainly girls<sup>15</sup>. Therefore, newborn infants with positive family history for DDH, must be considered at risk, especially female ones.

The current study demonstrated protective effect of sedentary life styles for mothers against having a child with DDH. This negative association was significant the probable mechanism for this, may be that, fetuses of pregnant women with

sedentary life styles, are less prone to the mechanical stress that has a clear effect on the development of DDH. Moreover, unhealthy dietary behavior and personality type A among mothers appeared in this study not to be associated with the occurrence of DDH among their children.

Stress in general, among mothers, showed a significant association with the development of DDH. Nevertheless, other parameters of life events and social context such as social discontinuities, geographical mobility, social disintegration and urbanization, all appeared in this study to be negatively associated with the development of DDH. Exact mechanisms for the effect of stress and its related parameters are still largely unknown, but the most accepted theory of action for the stress is that of the new field of psycho-neuro-immunology, where stress acts through different mechanism on the body and expresses both positive, negative or dual effects on the health<sup>11</sup>.

In this study, the previous use of mothers for oral contraceptives, appeared significantly, as a protecting factor for mothers from having children with DDH. It has been hypothesized that DDH is more common among girls because the female hormones (namely "relaxin") circulating in the womb of a female fetus may contribute to increased joint laxity<sup>16</sup>. Bower et al.<sup>17</sup>, mentioned that the preponderance of female's involvement has been postulated to be due to a physiological hormonal joint laxity in the first few days of postnatal life. Moreover, Apley's<sup>18</sup> recorded that high levels of maternal estrogen, progesterone and relaxin in the last few weeks of pregnancy may aggravate ligamentous laxity in the infant. This could account for rarity of instability in premature babies, born before hormones reach their peak.

Lastly, obese mother, appeared to be at real risk for having infants with DDH. Actually, mechanical factor has been well established as a causative and associative factor for the development of DDH. Probably, obese mothers will have much more intra-abdominal pressure that will indirectly affect intrauterine pressure during pregnancy and thus contributing for the occurrence of DDH.

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