The relationship of maternal age and some other associated factor to down syndrome (trisomy 21)

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ABSTRACT: Down syndrome is the most common genetic disorder in the world caused by abnormalities in the chromosome. Genetic disorders can be caused by trisomy 21, translocation, and mosaic. Trisomy 21 is characterized by an excess number of the 21st chromosome due to the nondisjunction where 21st chromosome fails to separate from the homologous chromosome; the incidence reaches 95% of the total Down Syndrome incidences in the world. Down syndrome is a multifactorial disease, including maternal and paternal age, environment, radiations and chemicals. The most common factor that increases the risk of Down syndrome is the age of mother.

In this study is based on the causes behind the genetic disease Down syndrome, Cases were collected from a special center for the rehabilitation of children with special needs in the city of Tobruk wherears were found about 200 cases of Down syndrome of rehabilitation of children with special needs in the city of Tobruk. In general, it was grouped according to the child's sex, maternal age, consanguinity and Family hisory exposure to chemical substance during pregnant.

Although advanced maternal age is an established risk factor for DS, the present study showed that young mothers between 30 to 34 are also susceptible.Further studies are required to confirm these findings.

Keywords: Down syndrome,trisomy21,maternal age at delivery, chromosome, Tobruk, libya.

1. INTRODUCTION:

There are Three different genetictype for Down syndrome (DS) are the first type is Free Trisomy 21, translocation trisomy 21 and mosaic trisomy 211. the Exactof this wrong mechanism for inheritance of DS is not completely known but there are some Earlier authors indicated Attributing this disorder to maternal age so the major risk factor according to most the maternal lso some authors4,5 noted that 80% of DS babies are born to young women of less than 30 years (1).

Down syndrome is a chromosomal condition that is associated with intellectual disability,a characteristic facial appearance, and weak muscle tone (hypotonia) in infancy. All affected individuals experience cognitive delays, but the intellectual disability is usually mild to moderate. People with Down syndrome often have a characteristic facial appearance that includes a flattened appearance to the face, outside corners of the eyes that point upward (upslanting palpebral fissures), small ears, a short neck, and a tongue that tends to stick out of the mouth. Affected individuals may have a variety of birth defects. Many people with Down syndrome have small hands and feet and a single crease across the palms of the hands. About half of all affected children are born with a heart defect. Digestive abnormalities, such as a blockage of the intestine, are less common (2).

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Down syndrome is one of the most leading causes of intellectual disability and millions of these patients face various health issues including learning and memory, congenital heart diseases(CHD), Alzheimer's diseases (AD), leukemia, cancers and Hirschprung disease(HD). The incidence of trisomy is influenced by maternal age and differs in population where between 1 in 319 and 1 in 1000 live births(3).

observed by most studies, That The most common factor causing Down Syndrome is the age of the mother.so The mother with advandace age The chance for brith a child with Down Syndrome increases with mother's age at the time of the pregnancy. Every parent has a risk of having a child with Down Syndrome, but several studies have shown that the risk is increased in mothers whose age is over 35 years old.5 Down Syndrome is a genetic disorder caused by chromosomal abnormalities. This genetic disorder can be caused by trisomy 21, translocation, and mosaic.6 Trisomy 21 is a congenital abnormality that is characterized by an excess number of the 21st chromosome. This occurs because of a nondisjunction where the 21st chromosome pair fails to separate at the time of the parents' gamete Trisomy 21 occur due to non-disjunction errors in 90-95% of maternal and 3-5% of paternal meiotic errors6. Non disjunction occur when chromosomes fail to segregate during meiosis (4).

Thematernal age effect in aneuploidy remains one of the most important questions in medical genetics, it is hoped that such a study can be realised in the not too distant future (6).

Older mothers are more likely to have a baby affected by Down syndrome than younger mothers. In other words, the prevalence of Down syndrome increases as the mother's age increases. Prevalence is an estimate of how often a condition occurs among a certain group of people. To estimate the prevalence of Down syndrome, the number of pregnancies affected by Down syndrome is compared to the total number (7).

Women who are 35 to 39 years old are approximately 4.5 times more likely to have a child with Down syndrome compared with women in the 25 to 29 age group. This risk increases to 15.7 for mothers age 40 years or older(8).

Down syndrome at increasing maternal ages as identified by chorionic villus biopsy (first trimester) or amniocentesis (mid-trimester) leading to miscarriage and at birth isdepicted. Note that the incidence of Down syndrome-related miscarriage increases with age(9).

The aim of this study is to determine the relationship of maternal age with theincidence of Down Syndrome in tobrok city if there is other reasons that may be common with an older age, and of the causes that we can avoid as much as possible, such as having the mothers at a later age

MATERIAL AND METHOD:

This study is based on the causes behind the genetic disease Down syndrome, which states most studies indicate that the age of the mother with some other factors may be the reason behind this syndrome. Cases were collected from a special center for the rehabilitation of children with special needs in the city of Tobruk. Accordingly, some are identified Cases and causes behind the disease with the family history and age of the mother and some cases in which the mother is exposed to dangerous substances that may cause genetic distortion of chromosome 21, through the parents' questions.

Patients:

total of 200 cases of Down syndrome of rehabilitation of children with special needs in the city of Tobruk. In general, it was grouped according to the child's sex, maternal age, and the incidence of Down Syndrome in children.

Statistical analysis

Prepared statistics and graphs using excel sheet Microsoft Office 2019 is a version of Microsoft Office.

Results And Discussion:

Mean maternal age of children with down syndrom is around 16 to 56 years in our study . However This study does not include all of Libya . The present study is aimed at studying the relationship of maternal age to Down syndrome. Understanding the risk factors can help us devise strategies that can minimize the incidence of DS.

consanguinity known risk factor for Down syndrome is increasing maternal age. As seen in (table2), women who are 34 to 39 years old more likely to have a child with Down syndrome compared with women less han 34. This risk increases for mothers age 40 years or older. Distribution of maternal age of DS in mothers of different age groupsfound that majority (29%) of DS cases were born to mothers 30-34 years. about 25.5% of DS births are born to mothers of 40-44 years (Graph 1).

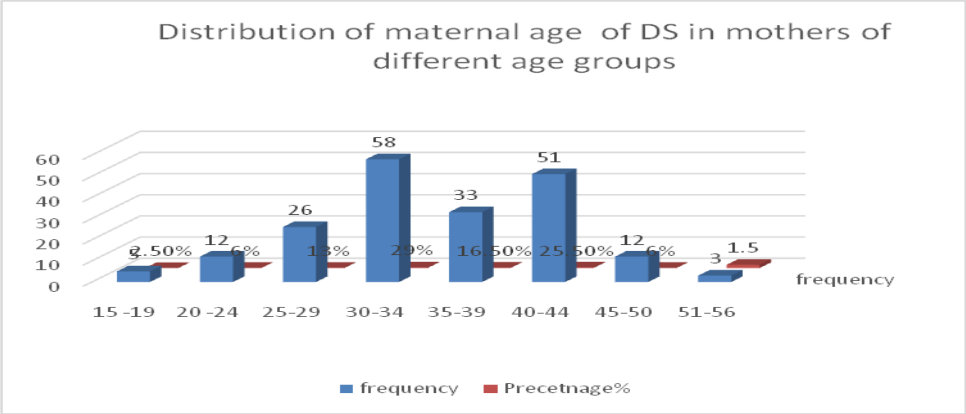
Frequency of DS in mothers of different age groups and sex found that majority (49%) of DS cases were born to mothers >35 years. about 50.5% of DS births are born to mothers of < 35 years ager and sex were abou 57% boy and 43% was girl as (Graph 2).

Prevalence of Down Syndrome by Mother's Age with consanguinity and Family history , Mother's Age with consanguinity 45% bu Family history , Mother's Age was 6.5%.

Frequency of DS in mothers of different age groups and Prevalence of Down Syndrome by Mother's Age Group Exposure other factors 2.5% and consanguinity was 60%and Family hisory was 38% as the (graph 3).Frequency of DS in mothers of different age groups and Prevalence of Down Syndrome by Mother's Age Group Exposure other factors 2.5% and consanguinity was 60%and Family hisory was 38% as the (graph 3).

Table1. Distribution of maternal age of DS in mothers of different age groups

maternal age	frequency	Precetnage%
15 -19	5	2.5%
20 -24	12	6%
25-29	26	13%
30-34	58	29%
35-39	33	16.5%
40-44	51	25.5%
45-50	12	6%
51-56	3	1.5

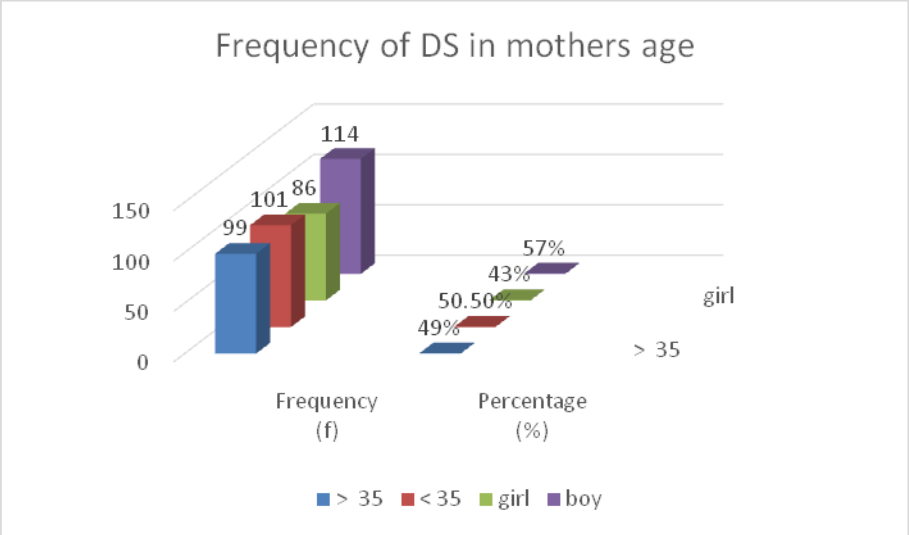


Graphical 1. Distribution of maternal age of DS in mothers of different age groups

found that majority (29%) of DS cases were born to mothers 30-34 years. about 51% of DS births are born to mothers of 40-44 years.

Table2.Frequency of DS in mothers of different age groupsaccording to the child's sex, maternalage, and DownSyndrome incidence.

Respondent Characteristics		Frequency (f)		Percentage (%)
> 35	99		49%	
< 35	101		50.5%	
girl	86		43%	
boy	114		57%	

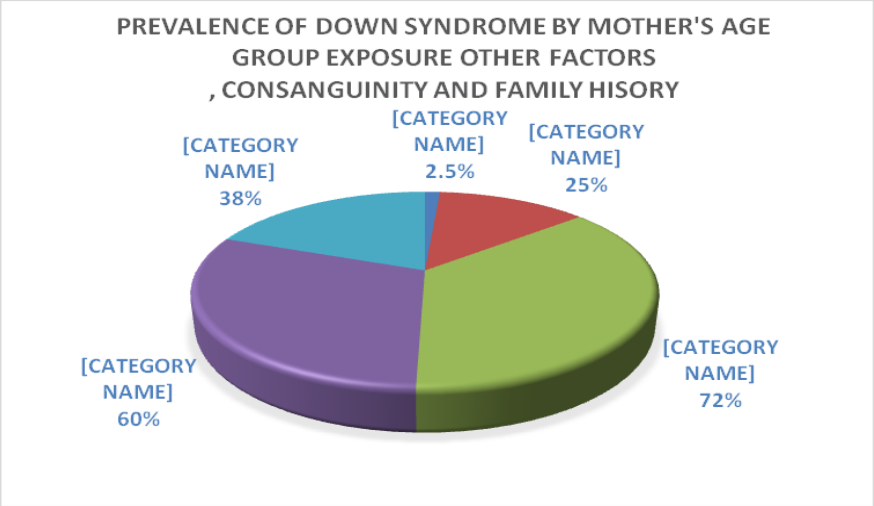


Graphical 2. Frequency of DS in mothers of different age groups and sex

found that majority (49%)of DS cases were born to mothers >35 years. about 50.5% of DSbirths are born to mothers of < 35 years ager and sex were abou 57% boy and 43% was girl.

Table3. Prevalence of Down Syndrome by Mother's Age GroupExposure other factors**consanguinity and** Family hisory

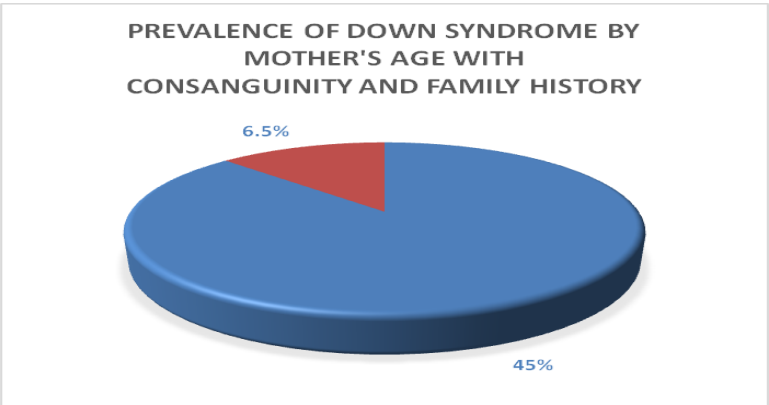
Respondent Characteristics	Frequency (f)	Percentage (%)
Exposure other factor	**5**	**2.50%**
Unknow	**50**	**25%**
No	**145**	**72.50%**
consanguinity	**120**	**60%**
Family hisory	**76**	**38%**



Graphical 3. Frequency of DS in mothers of different age groups and Prevalence of Down Syndrome by Mother's Age Group Exposure other factors 2.5% and consanguinity was 60%and Family hisory was 38%**consanguinity and** Family hisory

Table 4.Prevalence of Down Syndrome by Mother's Age with

Respondent Characteristics	Frequency (f)	Percentage (%)
Consanguinity asscitated with mother age	**90**	**45%**
aFamily history **with mother age**	**13**	**6.5%**



Graphical 3. Prevalence of Down Syndrome by Mother's Age withconsanguinity and Family history , Mother's Age withconsanguinity 45% bu Family history , Mother's Age was 6.5%

Girirajan, S. (2009) et al. (2009) their studies was In the study by that the basis of the maternal age effect in aneuploidy(10) this study agree with our result advanced maternal age risk factor for DS.

Graaf, G et al., (2017).their studies was Older mothers are more likely to have a baby affected by Down syndrome than younger mothers. In other words, the prevalence of Down syndrome increases as the mother's age increases (8). we agree with them but also younger women if there is Consanguinity becuace the Consanguinity is risk factor asscitated with mother age

Gaulden, M. E. (1992) this study was women who are 35 to 39 years old are approximately 4.5 times more likely to have a child with Down syndrome compared with women in the 25 to 29 age group (9). This risk increases to 15.7 for mothers age 40 years or older we agree with them but also mothers between 30 To 34 have more risk factor to have a child with Down syndrome.This risk increases to 15.7 for mothers age 40 years or older.

Devlin, L., & Morrison, P. J. (2004). their Incidence of Down syndrome at increasing maternal ages as identified by chorionic villus biopsy (first trimester) or amniocentesis (mid-trimester) leading to miscarriage and at birth isdepicted. Note that the incidence of Down syndrome-related miscarriage increases with age(6). we agree with them.

Although advanced maternal age is an established risk factor for DS, the present study showed that young mothers are also susceptible. Other important factors like MTHFR gene polymorphism and nutritional factors, paternal age, age of maternal grandmother when she conceived, etc. may also be responsible for found that 29.% of children were born to mother's 30-34 years. so advanced maternal age affected free trisomy. 25.5 % of the were born to mothers between 40 to 44 years compared to only 12.5% in mother's under 34 years. observed a low mean maternal age of 16 o 25 years for DS, which were 6% only

Conclusion

Advanced maternal age has long been established as a contributory factor for Down Syndrome (DS). However, not much data on the relation of maternal age with DS in the tobruk city population is available. Aims: The study aimed at finding the relation of maternal age with the of DS in a population fromtobruk city. Limiting the number of pregnancies for women older than more than 34 years is a relatively simple way to decrease the incidence of DS. Antenatal screening for DS, Although advanced maternal age is an established risk factor for DS, the present study showed that young mothers between 30 to 34 are also susceptible. Other important factors like MTHFR gene polymorphism and nutritional factors, paternal age, age of maternal grandmother when she conceived, Consanguinity is risk factor asscitated with mother age

etc. may also be responsible for (DS). who conceive at a young age can reduce the risk of having children with Down Syndrome. Further studies are required to confirm these findings.

Acknowledgement :We would like to thank everyone help in performing this work.

المستخلص: متلازمة داون هي الاضطراب الوراثي الأكثر شيوعًا في العالم بسبب تشوهات في الكروموسوم. يمكن أن تحدث الاضطرابات الوراثية بسبب التثلث الصبغي 21 والإزاحة والفسيفساء. يتميز التثلث الصبغي 21 بوجود عدد زائد من الكروموسوم الحادي والعشرين بسبب عدم الارتباط حيث يفشل الكروموسوم الحادي والعشرين في الانفصال عن الكروموسوم المتماثل ؛ تصل نسبة الإصابة بمتلازمة داون إلى 95٪ من إجمالي حالات الإصابة بمتلازمة داون في العالم. متلازمة داون هي مرض متعدد العوامل، بما في ذلك عمر الأم والأب والبيئة والإشعاعات والمواد الكيميائية. العامل الأكثر شيوعًا الذي يزيد من خطر الإصابة بمتلازمة داون هو عمر الأم.

في هذه الدراسة تقوم على الأسباب الكامنة وراء مرض متلازمة داون الوراثي، تم جمع الحالات من مركز خاص لتأهيل الأطفال ذوي الاحتياجات الخاصة في مدينة طبرق حيث تم العثور على حوالي 200 حالة لمتلازمة داون لتأهيل الأطفال ذوي الاحتياجات الخاصة. في مدينة طبرق. بشكل عام، تم تصنيفها حسب جنس الطفل، وعمر الأم، صلة القرابة وتاريخ العائلي وتعرض الأم لعامل كيمائي أثناء الحمل.

على الرغم من أن عمر الأم المتقدم هو عامل خطر ثابت لمتلازمة داون ، إلا أن الدراسة الحالية أظهرت أن الأمهات الشابات بين 30 و 34 هن أيضًا عرضة للإصابة. هناك حاجة لمزيد من الدراسات لتأكيد هذه النتائج.

كلمات البحث:متلازمة داون، التثلث الصبغي21، كروموسوم، طبرق، ليبيا.

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