Mental Retardation in Children, Causes &Prevention

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الخلاصة

أجريت هذه الدراسة لمعرفة الأسباب المؤكدة و المحتملة للتخلف العقلي و كيفية الوقاية من قسم منها.ثلاثمائة و ثلاث وثمانون طفل مصاب بالتخلف العقلي المتوسط و الشديد تمت دراسته في مستشفى كربلاء للأطفال خلال سنتين للفترة من كانون الثاني 2003 إلى كانون الثاني 2005. كانت نسبة الذكور إلى الإناث 1:1.51، وكان السبب معروفا في 151 طفلاً (34.4%) و غير معروف في 232 طفلاً (60.6%).

الأسباب المحتمل إمكانية الوقاية منها شملت اعتلال الدماغ نتيجة ارتفاع المادة الصفراء في الدم، اعتلال الدماغ نتيجة نقص الأوكسجين، سوء التغذية الشديد، الخداجة، تسمم الدم الجرثومي، نقص إفراز الغدة الدرقية، التهاب الدماغ، التهاب السحايا، نقص في الأنبوب العصبي، كالكتو سيميا، متلازمة ارتجاج الطفل و التسمم بالرصاص، و التي كونت (68.8%) من الأسباب المحتملة للتخلف العقلي. كانت هنالك نسبة عالية من القرابة بين الأبوين. (37.8%) منهم أولاد عم, (24.8%) أقارب من الدرجة الثالثة و الرابعة و (37.4%) ليسوا أقارب.ثلاثمائة و ثماني و أربعون طفل (90.86%) شُخصوا قبل عيد ميلادهم الأول.

استنتج من البحث بأنه يمكننا المساعدة في تقليل حالات التخلف العقلي بممارسة طرق الوقاية الأولية و الثانوية من خلال تحسين الواقع الصحي و التغذوي للمجتمع و التشخيص المبكر و معالجة الأمراض القابلة للعلاج من خلال تشريع قانون غربلة حديثي الولادة لتشخيص بعض الأمراض مثل نقص هرمون الغدة الدرقية, كالكتو سيميا وفقر الدم المنجلي

Abstract

This study was conducted to know the definite & probable causes of mental retardation (M.R.) in children & how can we prevent some of the cases.

Three hundred eighty three children with moderate to severe (M.R.) were studied in Kerbala Pediatric Hospital over two years from January 2003 to January 2005.

The male to female ratio was 1.51:1. The etiology was known in151 patients (39.4%) & was unknown in 232 patients (60.6%).

The probable preventable causes include kernicterus, hypoxic ischaemic encephalopathy, severe malnutrition, prematurity neonatal sepsis, hypothyroidism, encephalitis, meningitis, neural tube defect, galactossaemia, shaken baby syndrome & lead poisoning, constituting (68.8%) of the known probable causes.

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There was a high rate of consanguinity of parents, (37.8%) were first cousin, (24.8%) were relatives while (37.4%) were not related.

Three hundred forty eight patients (90.88%) were diagnosed before their first birthday.

It was concluded from the study that we can help to reduce cases of (M.R.) by practicing primary & secondary prevention through health promotion, specific protection; early diagnosis & treatment of treatable disorders by neonatal screening program.

Introduction:

Mental retardation (M.R.) is a disability that occurs before age 18. It is characterized by significant limitations in intellectual functioning & adaptive behavior as expressed in conceptual, social & practical skills.(1)

The prevalence of (M.R.) at any one time is estimated to be about 1 percent of the population. The incidence of (M.R.) is difficult to calculate because (M.R.) sometimes goes unrecognized until middle childhood when it is mild; the highest incidence is in school-age children, with the peak at ages 10-14.(2)

The etiological factors in (M.R.) may be primarily genetic, developmental, acquired, or a combination. Genetic causes include chromosomal & inherited conditions, developmental factors include prenatal exposure to infections & toxins, & acquired syndromes include perinatal trauma (such as prematurity) & sociocultural factors. The more severe the (M.R.) the more likely it is that cause is evident.

Knowledge of causes of (M.R.) can help to reduce cases by at least 25% by practicing primary prevention.(3)

This study was conducted to see the probable causes of (M.R.) in Kerbala & how to implement national preventive strategies to reduce their incidence.

Patients and Methods

The study was conducted in kerbala governorate over two years, from January 2003 to January 2005. The target of the study were 383 mentally retarded children attended the private clinic, outpatients clinic & those admitted to Kerbala Pediatric Hospital,
(a child is considered mentally retarded when motor skills, language skills & self-help skills don't seem to be developing in a child or are developing at a far slower rate than the child's peers).

A formulated data sheets were filled for all patients including all informations about the child & his family like name, sex, age, residence (urban or rural), sequence of the baby in the family, age of the patient

when first recognized as mentally retarded, age of mother & father at time of birth of the patient & their social & economic states.

Prenatal history, including illnesses, x-ray exposure, drug history, smoking, malnutrition & attempted abortions.

Natal history including prematurity & low birth weight, birth injuries& asphyxia

Postnatal history including cyanosis, jaundice, convulsions, illnesses, congenital malformations or recognized syndromes.

Then a full physical examination including neurological & anthropometric assessment followed by full available investigations according to the probable expected cause of (M.R.)

Results:

A total of 383 patients were studied

Sex: two hundred thirty one patients (60.5 %) were males, while the females were 152 patients (39.5 %) which make a male: female ratio of 1.51: 1

Parental relationship: consanguinity of the parents comprise a significant proportion as 145 (37.8 %) of them were first cousin , 95 (24.8 %) of the parents were 3rd & 4th degree relatives while 143 (37.4 %) of the parents were not related as shown in table (1)

Causes: the etiology was known in 151 patients (39.4%) and was unknown in 232 patients (60.6%)

The definite and probable causes are shown in table (2)

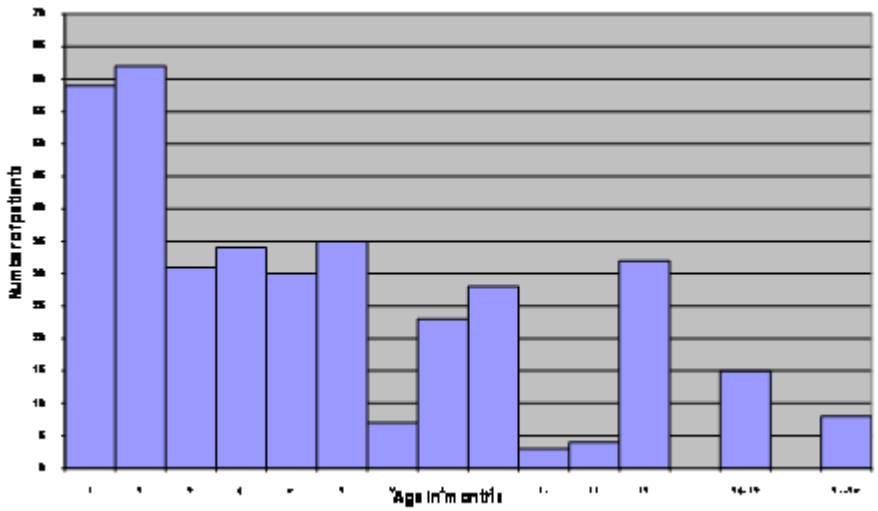
Time of recognition: most of the cases were first recognized by doctors, parents or care-givers in the first year of life as shown in figure (1)

Table (1) Parental relationship

Parents	Number	Percent
First cousin	145	37.8
Relatives	95	24.8
Not related	143	37.4
Total	383	100

Table (2) Definite & probable causes of (M.R.)

Causes	Number of patients	Percent
Down syndrome	28	7.31
Kernicterus	26	6.78
Hypoxic-ischaemic encephalopathy	22	5.74
Severe malnutrition	13	3.39
Prematurity	12	3.13
Neonatal sepsis	9	2.34
Microcephaly	7	1.82
Hypothyroidism	5	1.30
Encephalitis	5	1.30
Meningitis	5	1.30
Hydrocephalus	4	1.04
Neural tube defect	4	1.04
Galactossaemia	2	0.52
Intracranial hemorrhage	2	0.52
Shaken baby syndrome	1	0.26
Maple syrup urine disease	1	0.26
Lead poisoning	1	0.26
Gaucher disease	1	0.26
Cornelia de Lange syndrome	1	0.26
Hurler syndrome	1	0.26
Infantile spasm	1	0.26
Total	151	39.40



Discussion:

In this study, male: female ratio was 1.51:1 which showed some male preponderance, this finding is similar to some extent to other studies.(4)(5)(6)(7)

The study patients in this series had moderate to severe (M.R.), the unknown causes were 60.6% of the patients while in other studies the unknown causes were one third in severe (M.R.), one half in mild (M.R.) & three quarters in patients with borderline intellectual functioning,(4)(8) in overall, up to two thirds of all mentally retarded persons, the probable cause could be identified, yet the known causes in this study were only 39.4% which could be due to lack of advanced sophisticated investigations like enzyme or amino acid assay, neuro-imaging, viral & chromosomal studies…etc.

Down syndrome was the most common genetic cause of (M.R.) in this study constituting (7.31%) & all other studies.(9)(10)(11)

Fragile x syndrome in the second most common single cause of (M.R.) in almost all studies,(12) while no single case was reported in our study, this is because persons with fragile x syndrome have relatively strong skills in communication & socialization & their intellectual function seem to decline in the pubertal period so they are easily missed during childhood & even they are not considered as mentally retarded by health worker, parents & community.

Kernicterus was the probable cause in 26 patients (6.78%), its incidence can be minimized by

- educating people to seek medical advice early, as soon as they noticed a tinge of jaundice in the neonatal skin. & to avoid the use of non-medical methods for the treatment of neonatal jaundice like fixation of gold rings or stone in the infant swaddle or use of herbal fluids like (kammon, glucose water or mudhghah) or applying garlic rings around neck of baby or applying Hinna (after mixing the powder with water) on the infant skin.(13)
- going back to the old trend of doings exchange transfusion at bilirubin level of 20 mg\dl & not 25 or 30 mg\dl which has been practiced for the last decade.(14)
- preventing Rh isoimmunization by administration of Anti D immunoglobulin after the first delivery or abortion (health centers & hospitals were in actual shortage of AntiDimmunoglobulin most of the time since the beginning of the sanction 1990).

Hypoxic-ischaemic encephalopathy (22 patients ((5.74%))), severe malnutrition (13 patients ((3.13%))) , neonatal sepsis (9 patients ((2.34%))), neural tube defect (4 patients ((1.04%))), encephalitis (5

patients ((1.31%))) & meningitis (5 patients ((1.31%))) were important probable causes of (M.R.).

These causes can be minimized by

- improving the nutritional status of the community as a whole, especially the girl child in order to reduce the risk factors for (M.R.) such as low birth weight & prematurity in the offspring of these children in the future.
- Improvement in pre, peri & post natal care.
- Administration of folic acid tablets, to reduce the occurrence of neural tube defects.
- Universal immunization of children with BCG, polio, DPT & M.M.R. to prevent many disorders having the propensity to damage the brain and there- by causing (M.R.).
- Spacing pregnancies to help the mother to nutritionally replenish herself before the next pregnancy.
- Detection & care for high-risk pregnancies & babies.through antenatal care
- Prompt treatment for severe diarrhea & brain infections to reduce the chance & extent of brain damage.
- Providing highly specialized & technology-intensive care in the neonatal intensive care unit to prevent brain damage in very sick newborn babies.

Five cretins were reported in this study, recognized at different age groups (2, 4, 6, 7, & 13 months), this delay in diagnosis resulted in variable degrees of brain damage.(15) , which could be prevented be early diagnosis & implementation of national neonatal screening tests at least for hypothyroidism, galactossaemia & sickle cell anemia to start with.

Three cases of intracranial hemorrhages, one spontaneous, the second after car accident &the third was shaken baby syndrome due to child abuse.

Safety seats & seat belt can prevent accidental brain injuries.

One case of lead poisoning in two month old infant due to daily application of kohl to his eyes, kohl contain high percent of lead which is absorbed from conjunctiva leading to lead encephalopathy, brain damage & (M.R.).

Mental retardation was the main feature in few recognized conditions in this study like Gaucher disease, Cornelia de Lange syndrome, Hurler syndrome & maple Syrup urine disease.

In this study, the first cousin marriage contribute to (37.8%) of the cases, (24.8%) of cases were relatives & only (37.4%) of them were not related.

In a study on infants from consanguineous marriages from south India,(16) anthropometrical measurement (weight, length, head circumference, triceps & sub scapular skin fold thickness) showed that consanguinity contribute to intrauterine growth retardation & increased incidence of recessively inherited conditions like galactossaemla, phenylketonurea, maple syrup urine disease, mucopolysaccharidosis …etc).

Reduction in number of consanguineous marriages reduce the incidence of (M.R.) due to recessively inherited conditions.

The degree of (M.R.) in this study were moderate to severe which were easily recognized by doctors or parents that is why most cases (90.86%) were diagnosed before first birthday.

Conclusion

A significant percent of cases of (M.R.) in children were due to probable preventable causes.

Recommendations

Knowledge of the causes of (M.R.) can help to reduce cases by practicing primary prevention (Preventing the occurrence of (M.R.)) which can be approached through health promotion & specific protection by the following interventions.

- Health education, especially for adolescent girls.
- Improvement of nutritional status in community.
- Improvement in pre, peri & postnatal care.
- Rubella immunization for women before pregnancy.
- Folic acid administration in early pregnancy.
- Detection & care for high risk pregnancies.
- Universal immunization for children .

Secondary prevention (halting disease progression) can be approached by legislation of laws that mandate that newborns are screened for hypothyroidism, galactossaemia & sickle cell disease through a national neonatal screening program.

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