Research Article

Specific Language Impairment in Multiple Births

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Abstract
Purpose: to establish base line data about the size and distribution of Specific language Disorders among twins children in order to put a plan of early detection, proper assessment, intervention and prevention of these problems if possible. **Methods:** One hundred and eighty of children were included in this study. One hundred and twenty (٦٠ pairs) of them were twins (٦٦ males and ٥٤ females) and ٦٠ of the children were singletons (٣٣ males and ٢٧ females). The mean age for the twin children was ٣.٩±١.٨ (Y and M) and the mean age for singletons children was ٤±١.٣ (Y and M). The children in the two groups were statistically matched in their age and sex distribution .All children participated in the current study were subjected to patient's interview, general examination, vocal tract examination, neurological examination ,ENT examination ,evaluation of the various aptitudes by formal testing, psychiatric evaluation ,audiological examination and language evaluation using the Arabic Preschool Language Scale-٤ "APLS-٤", articulation test and stuttering severity index. **Results:** The results from this study revealed that the poor neonatal outcome, LBW and prematurity were important factors for worsening the language abilities of twins children. **Conclusion:** There is evident that the low birth weight, poor neonatal outcomes and premature (risk factors) are more important than the twins delivery in determent the developmental outcomes and language of the twins children.
Key Words: Multiple births; Specific language impairment; Twins.

Introduction
Multiple births are much more common today than they were in the past due to the use of infertility drugs and ICSI. Multiple births are associated with significant medical risks and complications for the mother and children. (ASRM, ٢٠١٢). Twinning is known to be a risk factor for language delay (Rutter et al., ٢٠٠٣).

It is now generally accepted that SLI is a strongly genetic disorder. The best evidence comes from studies of twins. Two twins growing up together are exposed to the same home environment, yet may differ radically in their language skills. Such different outcomes are, however, seen almost exclusively in fraternal (non-identical) twins, who are genetically different. Identical twins share the same genes and tend to be much more similar in language ability. There can be some variation in the severity and persistence of SLI in identical twins, indicating that environmental factors affect the course of disorder, but it is unusual to find a child with SLI who has an identical twin with normal language. SLI is not usually caused by a mutation in a single gene. Current evidence suggests that there are many different genes that can influence language learning and SLI results when a child inherits a particularly detrimental combination of risk factors, each of which may have only a small effect (Bishop, ٢٠٠٩).

Genetic influences on the development of SLI:
There are many studies suggested the strong genetic factors that influence the development of specific language impairment:

Stromswold (١٩٩٨) reviewed ١٤ studies that investigated the incidence of a positive family history of language impairment (usually a first-degree relative with language impairment or a history of language impairment) in children with

developmental language impairment. In these studies, the median incidence of a positive family history of specific language impairment was ٣٩٪ (range ٢٤–٧٧٪).

Bishop et al., (١٩٩٥) reported a concordance rate for SLI of ٧٢٪ for monozygotic twins compared with ٤٩٪ for dizygotic twins based on an observed ٢٠-point nonverbal verbal discrepancy in IQ. When more liberal criteria for language impairment were used, the concordance rate increased to ٩٠٪ in monozygotic twins and ٦٢٪ in dizygotic twins.

In one family, a dominant mutation in the FOXP٢ gene was found to be associated with severe speech and language disorders (Lai et al., ٢٠٠١).

Furthermore, the SLI Consortium found a linkage between language impairment and two separate loci on chromosomes ١٦ and ١٩. The locus on chromosome ١٦ was associated with poor performance on a nonword repetition test, whereas the locus on chromosome ١٩ was linked to poor performance on an expressive language test (Webster and Shevell., ٢٠٠٤).

Bartlett et al., (٢٠٠٢) reported that a locus on chromosome ١٣ was linked to a discrepancy between nonverbal IQ and reading ability (a possible late consequence of specific language impairment).

Patients and Methods

Sample size:

The study group (G١) includes ٦٠ twins children the result from the study group were compared to another group *(control group)*, which included ٦٠ singletons children. The children of the study and control group were collected randomally from selected from school children, from ENT and pediatrics clinic El Minia University. Both of the study and control group were statistically matched with regards age and sex distribution.

The study group (G١)

This group included ١٢٠ children (٦٠ pairs of twins). They were ٦٦(٥٥٪) males and ٥٤ (٤٥٪) females with a mean age for the twin children was ٣.٩±١.٨ (Y and M) and The children in the two groups were matched in their age, sex,the criterion of LBW was weight at birth less than ٢٥٠٠.

The control group (G٢)

This group included ٦٠ of the children were singletons**.** They were ٣٣(٥٥٪) males and ٢٧(٤٥٪) females, with a mean age of ٤±١.٣and a range of ١.٩-٧.٥ (Y and M).

All children were participated in the current study after taking a written consent from their parents and following explanation of the objectives and detailed methodology of the study. All children were assessed according to the assessment protocol in the Phoniatric Unit, Minia University Hospital. This protocol is classified into:

١- Preliminary Diagnostic Procedures:

١- Parent's interview and history including complaint, personal data, personal history, searching for etiological factors during pregnancy, natal, neonatal, and postnatal periods, developmental milestones and illness of early childhood.

٢- Examination including neurological and ENT includes ear, nose, indirect laryngeal examination and throat examination.

٣- Subjective language assessment.

٤- Subjective auditory perceptual assessment "APA" of both auto-matic speech and spontaneous speech and voice during child-parent/physician interactional conversation.

٢- Clinical Diagnostic Aids:

I- Audiological evaluation will include middle ear assessment through Tympanometry and Acoustic Reflex recording and hearing assessment according to the age of child.

Hearing assessment will be performed through one of the following methods:

- Free field Audiometry and Behavioral Observational Audiomety "BOA".
- Auditory Brainstem Response "ABR".
- Conditioned play audiometry (CPA).

In addition the cochlear microphonics and or otoacoutic emissions will be recorded to diagnose cases with auditory neuropathy spectrum.

II- Psychometric evaluation by Intelligence Quotient "IQ" using Stanford Binet Intelligence test arabic version (Hanoura, ٢٠٠٢).

III- Mansoura Arabic Articulatory Test "MAAT" (Abou-Elsaed et al., ٢٠٠٩)

IV- Language test by Arabic Preschool Language Scale-٤ "APLS-٤" (Elsady et al., ٢٠١١).

VI- In case of stuttering Arabic versions of stuttering severity index "A-SSI" was used (Rifaie, ١٩٩٩).

VII- laryngeal examination by laryngo-scopy.

٣- Additional Instrumental Measures:

- Computerised tomography scans "CT" if needed.
- Magnetic resonance imaging "MRI" if needed.
- EEG if needed.

Results

The children in this study included in two groups:

The study group (G١): Twins children (n= ٦٠ pair).

The control group (G٢): Singletons children (n= ٦٠ child).

Table (١): distribution of children regarding prenatal history

DATA		Mothers		P
		Twins' mother N=٦٠	Controls N=٦٠	
Prenatal complication	**-ve prenatal history**	٤٠(٦٦.٧٪)	٥٧(٩٥٪)	٠.٠٠٧*
	+ve prenatal history	٢٠(٣٣.٣٪)	٣(٥٪)	
	ICSI	٢(٣.٣٪)	٠	
	Preclampsia	٦(١٠٪)	١(١.٧٪)	
	Bleeding	٦(١٠٪)	١(١.٧٪)	
	Anti RH	٢(٣.٣٪))	٠	
	Anemia	٤(٦.٦٪)	١(١.٧٪)	
Consanguinity	**positive**	١٤(٢٣.٣%)	١٣(٢١.٧٪)	٠.٨
	Negative	٤٦(٧٦.٧٪)	٤٧(٧٨.٣٪)	
Family history	**Positive**	١٢(٢٠٪)	٤(٦.٧٪)	٠.٠٢*
	Negative	٤٨(٨٠٪)	٥٦(٩٣.٣٪)	

A highly statistical significant differences were obtained between the study and the control group as regarding positive prenatal history **(p<٠.٠١).**

(٢) Perinatal history

Table (٢): distribution of children regarding Perinatal history

DATA		twins N=٦٠ pair	Controls N=٦٠	P
Cyanosis	**Negative**	١٠٥(٨٧.٥٪)	٥٥(٩١.٧٪)	٠.٥
	Positive	١٥(١٢.٥٪)	٥(٨.٣٪)	
Jaundice	**Negative**	٩٠(٧٥٪)	٥٦(٩٣.٣٪)	٠.٠١
	Positive	٣٠(٢٥٪)	٤(٦.٧٪)	
Neonatal Intensive Care Unit (NICU)	**Negative**	٩٥(٧٩.٢٪)	٥٧(٩٥٪)	٠.٠١*
	Positive	٢٥(٢٠.٨٪)	٣(٥٪)	
Weight at birth	**Normal**	٥٨(٤٨.٣٪)	٥٢(٨٦.٧٪)	٠.٠٠١*
	Low birth weight	٤٥(٣٧.٤٪)	٨(١٣.٣٪)	
	VLBW	١٣(١٠.٨٪)	٠	
	EVLBW	٤(٣.٣٪)	٠	
Mode of Delivery	**SVD**	٦٠(٥٠٪)	٤١(٦٨.٣٪)	٠.٠٠١*
	CS	٦٠(٥٠٪)	١٩(٣١.٧٪)	
TERM	**Full term**	١٠٤(٨٦.٧٪)	٥٨(٩٦.٧٪)	٠.٠١*
	Pre term	١٦(١٣.٣٪)	١(١.٧٪)	
	Post date		١(١.٧٪)	
Neonatal mortality		٦(٥٪)	٠	٠.٠٣*

VLBW=very low birth weight. EVLBW=extremely very low birth weight.
SVD=spontaneous vaginal delivery. CS=caesarian section.
NICU=Neonatal Intensive Care Unit.

A statistical significant difference was obtained between the study and the control group as regarding the prenatal pro

- There was a highly significant difference between the two groups as regard prenatal history.
- There was a highly significant difference between the two groups as regard birth weight, mode of delivery and admission in NICU.
- There was a statistically significant difference between the two groups as regard history of jaundice, neonatal mortality and gestational age.
- There was non significant difference between the two groups as regard history of cyanosis.
- There was a statistically significant difference between the two groups as regard early childhood illness.

Table (٣): comparison between twins and controls regarding IQ, Mental and social age

DATA		twins N=٦٠ pair	Controls N=٦٠	P
IQ	**Range**	٦٤-١٠١.٥	٥٣-١١٦	٠.٠٠٢*
	Mean±SD	٨٨.٢±٨.٩	٩٣.٨±٩.٣	
Mental age (In years)	**Range**	١.١-٧.٢	١.٢-٧.٣	٠.٠٠٤*
	Mean±SD	٣.٥±١.٥	٤.٣±١.٣	
Social age (in years)	**Range**	١.٥-٥.٧	١.١-٧	٠.٠٢*
	Mean±SD	٣.٤±١.١	٤.٢±١.٣	

There was a highly significant difference between the two groups as regard the I.Q and mental age (P<٠.٠١).

The mean IQ for the children in the study group was ٨٨.٢±٨.٩ with a range of (٦٤-١٠١.٥) and the mean IQ for the children in the control group was ٩٣.٨±٩.٣ with a range of (٥٣-١١٦).

Table (٤): Comparison between twins and controls regarding language

DATA (MONTH)		Twins N=٦٠ pair	Controls N=٦٠	P
Receptive language	**Range** **Mean±SD**	١١.٥-٦١ ٣٧.٧±١٥.٢	٩-٦٦ ٤٦.٧±١٢.٢	٠.٠٠١*
Expressive language	**Range** **Mean±SD**	١٣-٧٠ ٤٠.٢±١٦.٥	١٦-٧١ ٥١.٦±١٤.٥	٠.٠٠١*
Total language	**Range** **Mean±SD**	٢٤.٥-١٣١ ٧٧.١±٣١.٥	٢٥-١٣٧ ٩٨.٣±٢٦.٥	٠.٠٠١*
Standard of R	**Range** **Mean±SD**	٥٠-١٢٥.٥ ٧٣.١±١٩.٢	٥٠-١٢٤ ٨١.٩±١٨.٨	٠.٠١*
Standard of E	**Range** **Mean±SD**	٤٦-١٤٥ ٧٣.٤±٢٤.٣	٣٢-١٥٠ ٨٨.٧±٢٥.٧	٠.٠٠٢*
Standard of T	**Range** **Mean±SD**	٥٠-١٣٩.٥ ٧١.٤±٢٢.٦	٣٠-١٤٩ ٨٦.٤±٢٣.٥	٠.٠٠١*
Large age of R	**Range** **Mean±SD**	٥-٧٧ ٣٩.٨±٢١.٧	١-٧٧ ٥٤.٢±١٧.٩	٠.٠٠١*
Large age of E	**Range** **Mean±SD**	١٠.٥-٧٨ ٤٠.٥±٢٠.٩	١٠-٧٨ ٥٤.٦±١٨.٣	٠.٠٠١*
Large age of T	**Range** **Mean±SD**	٧.٥-٧٨ ٤٠.١±٢١.١	٥-٧٨ ٥٣.٩±١٧.٨	٠.٠٠١*

There was A statistical highly significant differences were obtained between the study and the control group as regard the receptive language row **score** expressive language row score, total language row score, standard score of expressive language, standard score of total language total language and expressive, receptive and total language ages.

Statistical significant differences were obtained between the study and the control group as regard the standard score of receptive language**.**

A high positive significant correlation was obtained between the row score of reception, expression and row score of total language (reception and expression) in correlation with gestational age and birth weight.

A high negative significant correlation was obtained between the language age in correlation with gestational age and birth weight.

There was a highly significant difference between the two groups as regard audiological evaluation**.**

There was no significant difference between the two groups as regard stuttering severity index and articulation test**.**

Table (٥): comparison between TWINS and controls regarding diagnosis

DATA	TWINS N=٥٧ pairs	Controls N=٦٠	P
Normal	٢٦(٢٢.٨٪)	٤٢(٧٠٪)	٠.٠٠٣*
SLI	٢٧(٢٣.٦٪)	٣(٥٪)	٠.٠٠١*
DLD			
MR	٤(٣.٥٪)	٢(٣.٣٪)	٠.٥
BELOW AVERAGE	٢٨(٢٤.٥٪)	٦(١٪)	٠.٠٠٤*
ADHD	٣(٢.٦٪)	٠	٠.١
Autism Spectrum Disorder	٤(٣.٥٪)	١(١.٧٪)	٠.٢
HI	٩(٧.٨٪)	٠	٠.٠٢*
BDMH	٣(٢.٦٪)	٠	٠.١
Speech Sound Disorders	٩(٧.٨٪)	٢(٣.٣٪)	٠.١
BILATECAL vocal NODULES	٤(٣.٥٪)	١(١.٧٪)	٠.٢
STUTTERING	٨(٧.٢٪)	٢(٣.٣٪)	٠.٢
OPEN NASALITY	٤(٣.٥٪)	١(١.٧٪)	٠.٢

SLI=Specific Language Impairment. DLD=Delayed Language Development.
MR= Mental Retardation. HI= Hearing Impairment.
ADHD=Attention Deficit Hyperactivity Disorder.
BDMH=Brain damage motorly Handicapped.

A statistical highly significant difference was obtained between the two groups as regard the children with DLD. ٢٦(٢٢.٨٪) children in the study group had normal language development and ٧٨(٦٨.٤٪) children with DLD. In the control group, there were ٤٢(٧٠٪) children had normal language development and ١٢(٢٠٪) children had DLD (p<٠.٠١).

The results obtained from audiological evaluation and language test revealed that statistical significant difference was obtained between the two groups as regard the children with DLD-HI. As, ٩(٧.٨٪) of the study group had DLD- SNHL. In the control group, there was no children had DLD-SNHL with highly significant differences.

Twenty-seven (٢٣.٦٪) children in the study group were diagnosed as DLD-specific language impairment (SLI) in comparison to ٣(٥٪) children in the control group with highly significant difference between the two groups (P. < ٠.٠١).

Twenty eight (٢٤.٥٪) children in the study group were diagnosed as DLD-below average mentality in comparison to ٦(١٪) children in the control with highly significant difference between the two groups (P. < ٠.٠١) .

Non-statistical significant difference was obtained between the two groups as regard the children with DLD-Autism, DLD-MR, DLD-BDMH, DLD-ADHD, speech and voice disorders (P. > ٠.٠٥) .

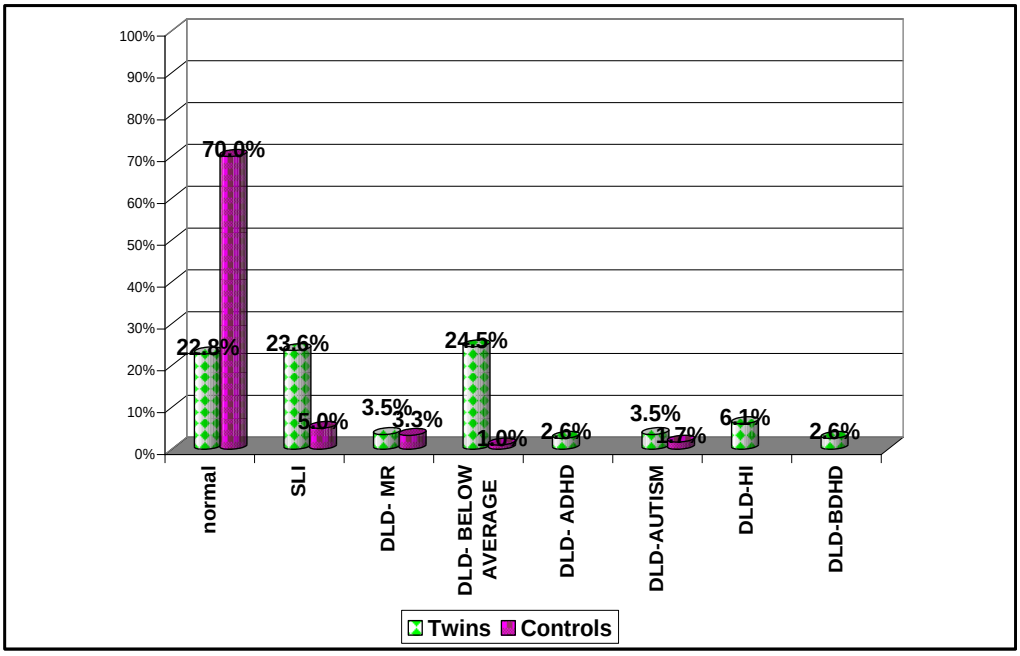

Figure (١): comparison between TWINS and controls regarding Language Disorders

Discussion

The aim of this work is to establish base line data about the size and distribution of Specific language disorders among twin's children in order to put a plan of early detection, proper assessment, intervention and prevention of these problems if possible. The two groups were matched in their demographic data (age and sex of children), in order to show the effect of the Twins delivery itself in the language abilities of their children.

The results obtained from The Arabic Preschool Language Scale-٤ "APLS-٤" test revealed a statistical highly significant difference were obtained between the twins and the singletons as regard the receptive language row **score** expressive language row score, total language row score, standard score of expressive language, standard score of total language total language and expressive, receptive and total language ages. This result can be explained by the high percentage of premature birth, SNHL and LBW of twins than singletons. Many studies are consistent with our result (Zaki et al., ٢٠٠٧) that reported that there is a high significant difference was obtained between the singletons and twins as regard the expressive language scores and total language scores

Twenty-seven (٢٣.٦٪) children in the twins group were diagnosed as DLD-specific language impairment (SLI) in comparison to ٣(٥٪) children in the singletons group with highly significant difference between the two groups. This result may be contributed to genetic cause and the evidence of that is positive family history of delayed language development .This result agreed with Bishop et al., (١٩٩٥) who reported a concordance rate for SLI of ٧٢٪ for monozygotic twins compared with ٤٩٪ for dizygotic twins.It is now generally accepted that SLI is a strongly genetic disorder. The best evidence comes from studies of twins. also in agreement with Zaki et al., (٢٠٠٧) who reported a significant difference between the two groups twin children and singletons children as regard the children with DLD-Specific Language Impairments (SLI) (٤٪ in twin children in comparison to ٢٪ in singletons children).

Conclusion

There is evident that the low birth weight, poor neonatal outcomes and premature

(risk factors) are more important than the twins delivery in determent the developmental outcomes and language of the twins children.

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