Prevalence of Autism in Special Education Schools of Lahore

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This study determined the prevalence of Autism in special education schools of Lahore. Through initial screening by using DSM-IV-TR diagnostic criteria for Autism (American Psychiatric Association, 2000), 142 out of 1633 children were identified as the probable cases of Autism. Of these screened cases, the average rating of two independent raters on Child Autism Rating Scale (Schopler, Reichler, & Renner, 2002) showed that a total of 103 (6.31%) children satisfied the criteria of Autism. Poor social relationship was found to be the most prominent feature among all associated features of the disorder. On the basis of the findings, the need of separate schools offering specialized instructional and educational programs for children with Autism was suggested for the effective management of the disorder.

Keywords: Autism, mental retardation, pervasive developmental disorders, special education schools, epidemiology

Pervasive Developmental Disorders (PDDs), more commonly known as Autism Spectrum Disorders (ASDs), are a group of severe and pervasive impairments characterized by delays in the development of socialization and communication skills. These impairments reflect substantial deviations from what would be expected given the mental age or developmental level of the individual (American Psychiatric Association [APA], 2000). PDDs consist of Autism, Asperger Disorder, and it also includes two rare but very severe types, Rett's Disorder and Childhood Disintegrative Disorder. Autism involves a

serious abnormality in the developmental process itself and that is why it is different from the mental disorders that originate in childhood or adulthood. Common symptoms of Autism as described by Kanner (1943) and later diagnostic criteria (APA, 2000) are impairment in social interaction, impairment in communication, and restricted, repetitive and stereotypical patterns of behavior, interests, and activities. Studies conducted with different racial groups have also reported more or less uniform profile (Charman, Cohen, & Swettenham, 2003; Constantino et al., 2004; Gray & Tonge, 2001; Knickmeyer, Cohen, Raggatt, & Taylor, 2005). All forms of ASDs exhibit varying degrees of impairment in social interactions, communication skills, and restricted, repetitive, and stereotyped patterns of behavior. As compared to Autism, Asperger Disorder is not characterized by clinically significant delays of language development.

Autism is relatively rare although the exact estimates of its occurrence vary across studies. Fombonne (2003) provided a review of epidemiological studies of PDDs through systematic search from the major scientific literature databases (MEDLINE, PsycInfo) and from prior reviews. The prevalence estimates for Autism based on 32 surveys published between 1966 and 2001 ranged from 0.7/10,000 to 72.6/10,000. There is sufficient evidence to conclude that rates of ASD are rising substantially over time. Increased rates have been reported from Britain (Chakrabarti & Fombonne, 2005), Scotland (Harrison, Hare, Campbell, Adamson, & Neillage, 2006) and USA (Bertrand et al., 2005; Croen, Grether, Hoogstrate, & Selvin, 2002). Age-period-birth-cohort analysis from the Minnesota Department of Children showed that the prevalence ASD among children aged 6 to 11 years increased from 3 per 10,000 in 1991-1992 to 52 per 10,000 in 2001-2002 (Gurney et al., 2003). Other studies have also suggested that compared to other disabilities, net growth in the number of persons with Autism is on average about 3% greater each year.

In a comprehensive study, Gillberg and Wing (1999) examined all English language papers on the prevalence of Autism, published between 1966 and 1997 and found a rise in prevalence rates with the early studies yielding prevalence rates of under 0.5 in 1000 children and the later ones showing a mean rate of about 1 in 1000. Moreover, a highly significant estimated increase was found with calendar year in the non-US studies (3.8% per year). It remains unclear whether the higher reported rates reflect differences in methodology or an increased frequency of the condition. Several factors like changes in diagnostic criteria, heightened awareness for Autism, and the

widening of the concept of Autism to include the wider spectrum are among the most commonly cited arguments for the worldwide rise in the prevalence of Autism (Gernsbacher, Dawson, & Goldsmith, 2005). However, a genuine increase in prevalence rates may also be possible which demands increased community awareness about the problem as well as appropriate educational and rehabilitation facilities for such children. Fombonne (2003) concluded that available epidemiological surveys do not provide an adequate test of the hypothesis of a changing incidence of PDDs. Studies have revealed variable rates of the disorder in boys and girls ranging from 3-4:1 (Wing & Gould, 1979) to 7:1 (Harrison et al., 2006). However, contrary to previous results, families' income, life style, and educational levels do not appear to affect the chance of Autism occurrence (Falcasiano, Hewson, Machet, Cooper, & Marshall, 2004).

Although Kanner (1943) originally believed that the intelligence of autistic children was normal, later research has shown that three-quarters may have IQ scores in the "retarded" range. However, Autism is not a form of Mental Retardation (MR), in fact some of children with Autism are quite intelligent. Despite their comorbidity, many characteristics differentiate both. For example, most children with MR show relatively even skill development, whereas, children with Autism generally show uneven skill development with deficits in certain areas, especially the ability to communicate and relate to others (WebMed, n.d.). On the contrary, many children with MR relate well to people and enjoy social relationships which is quite rare for those with Autism. Other studies have also shown that as compared to MR, the pivotal defect of Autism is a deficit in social interactive skills (Bernabei, Fenton, Fabrizi, Camaiomi, & Perucchini, 2003). However, individuals with Autism may have unusually developed skills in other areas (WebMed, n.d.) and better adaptive functioning as compared to those with MR (Jacobson & Ackerman, 1990).

Considering the comorbidity between Autism and MR (APA, 2000), this also becomes pertinent that both are clearly distinguished. There is some evidence that there are 7.8% to 39.2% chances of PDDs in a child with Intellectual Disability (ID; Malfa, Lassi, Bertelli, Salvini, & Placidi, 2004). Although a diagnosis of Autism frequently connotes some cognitive impairment, autistic children with an IQ of at least 70 show a significantly better outcome than those with an IQ below this (Howlin, Goode, Hutton, & Rutter, 2004).

The ASDs can often be reliably detected by the age of 3 years, and in some cases as early as 18 months (Filipek et al., 1999). One

important step towards better prognosis is to diagnose it before 6 years of age so that child could benefit from early interventions (Smith, 1999). Research has shown that between 10% to 20% of children with childhood Autism begin to improve between the ages of about 4 to 6 years, and eventually are able to attend an ordinary school and work (Duff & Fuller, 2000). Some of them may achieve nearly normal level of functioning especially if they develop communicative language before age 5. Working on specific and diverse goals as social skills, average vocabulary and grammar, and independent living can help them use their potentials fully.

Developed countries with ample human and economic resources tend to diagnose Autism and intervene at an earlier age, however, in Pakistan Autism is not identified as a distinct disorder from ID. Due to which children with Autism are admitted in the special education schools mostly catering children with MR. As all autistic children are not mentally retarded and some of them are even endowed with extraordinary interests or capabilities, specialized treatment programs have been suggested and found more beneficial for them. Many of such programs employ behavioral techniques to shape behavior systematically. In a groundbreaking study, Lovaas (1987) presented the results of a behavior modification treatment for 2 groups of autistic children. The results showed that 9 of 19 (47%) children receiving intensive behavioral treatment (referred to as Lovaas Model of Applied Behavior Analysis, ABA) achieved normal functioning. On the contrary, only 2% of the control group children achieved normal educational and intellectual functioning.

Some other innovative techniques consist of audio-visual activities and use of coloured material considering the specialized sensory preferences of children with autism having interpersonal skill deficits. Schopler and Olley (1982) observed that people with Autism do not learn in traditional ways but are capable of learning with the help of customized interventions. Schopler's insight led to the development of TEACCH program (Treatment and Education of Autistic and Related Communication-Handicapped Children). The main goal of TEACCH for autistic children is to help them improve communication skills and autonomy to the maximum of the child potential. Educational strategies in TEACCH are structured individually on the basis of a detailed assessment of the child's learning abilities, and focus on the identification of potential for acquisitions rather than deficits. The use and effectiveness of innovative programs for Autism suggest that these children are admitted in specialized schools so that these techniques could be

employed for their better functioning. The first step in this direction is the right diagnosis of the disorder.

Studies investigating prevalence of Autism in Pakistan are meager. Whatever research has been contemplated showed less than 3% of new referrals at psychiatric case register (Rehman, et al., 2006; Syed, Hussain, & Yousafzai, 2007). However, we do not know how many of these or other children with PDD are admitted in special education schools where no attempt is made to diagnose them. The current investigation aimed to assess the prevalence of Autism in all special education schools of Lahore. This information would provide a basis for suggesting specialized treatment programs and institutes for these children to the concerned stakeholders such as families, teachers, therapists, and NGOs.

This study thus was conducted with the following objectives:

1. To find out the prevalence of Autism in special education schools of Lahore.

2. To assess the primary characteristics of Autism in Pakistan.

3. To find out any gender differences in children with Autism.

Method

Sample

The sample of this study consisted of prospective children with autism from nearly all special education institutes of Lahore. A list of 36 special education schools in Lahore was obtained from various sources. During the first visit to these schools, it was revealed that 5 out of these 36 schools were not currently functional; hence, they were excluded from the list. During the initial screening, two schools did not appear to have any child showing essential characteristics associated with Autism. The final list consisted of 29 schools. A total of 142 children (80 boys and 62 girls) out of 1633 (779 boys and 751 girls) satisfied the initial screening criteria for Autism. The age range of the sample was 4-18 years ($M = 10.50$, $SD = 3.57$).

Instruments

The following measures were employed to assess the prevalence of Autism:

DSM-IV-TR Criteria for Autism.   The DSM-IV-TR Autism Spectrum Disorder criteria (299.00; APA, 2000) were used as the initial screening tool. These criteria have three essential characteristics for the diagnosis of Autism: 1). Qualitative impairment in social interaction; 2). qualitative impairment in communication; and 3). restricted, repetitive, or stereotyped patterns of behavior, interests, and activities. These three criteria have further divisions and for the diagnosis of Autism, one must possess a total of six (or more) characteristics from criterion 1, 2, and 3, with at least two from criterion 1 and one each from 2 and 3. For the inclusion in this study, however, it was not essential that the child exhibits all the required symptoms mentioned in the diagnostic criteria. A child manifesting only 2 symptoms from the three categories was included in the current sample. The purpose of this flexibility was not to miss any probable case of Autism from screening.

Child Autism Rating Scale (CARS).   Those children satisfying initial screening criteria were assessed using Child Autism Rating Scale (CARS; Schopler, Reichier, & Renner, 2002) as the main diagnostic tool. The CARS is a 15-item behavioral rating scale developed to identify children with Autism and to distinguish them from developmentally handicapped children without the Autism syndrome. Every item of the CARS as a sub-scale measures different types of behaviors. Fourteen scales are about specific behaviors, whereas the last scale (general impressions) is intended to be an overall rating of Autism based on the observer's subjective impression of the degree to which the child is autistic as defined by the other ratings. The 15 items are: Relating to people, imitation, emotional response, body use, object use, adaptation to change, visual response, listening response, taste, smell and touch responses and use, fear or nervousness, verbal communication, nonverbal communication, activity level, level and consistency of intellectual response, and general impressions.

Each behavior is operationalized and explicitly defined in the manual and is rated on 4-point rating options. However, the midpoint scales between any 2 numbers can also be assigned; for example, rating of 1.5, 2.5, and 3.5 is also possible. In that way, the original 4-point scale becomes a 7-point scale. There is not any statement or guideline in the manual for assignment of midpoint ratings and it depends on the judgment of the observer. Hence, it is possible to score a child on every behavior on altogether 7-point scale. A scale of 1 is assigned for showing behavior within *normal* limits for that age, a score of 2 indicates *mildly abnormal* (autistic) behavior, a score of 3

shows that the behavior of a child is *moderately abnormal*, while a score of 4 denotes *severely abnormal* behavior for a child of that age.

For determining the degree of abnormality, clear instructions are provided in the manual to score all behaviors. The CARS scores may range from a low of 15, obtained when child's behavior is rated as falling within normal limits, to a high of 60 showing severely abnormal behavior. A diagnostic categorization system, which aids in the interpretation of the total CARS score, has been established by the authors of CARS, which indicates that children scoring below 30 are categorized as nonautistic, while those with scores of 30 and above are categorized as autistic. Scores falling in the autistic range (30-60) can be divided into two further categories i.e., scores ranging from 30 to 36 indicate mild to moderate Autism, while scores ranging from 37 to 60 indicate severe Autism.

The scale provides a valid and reliable measure of autistic characteristics as the internal consistency of CARS is .94, inter-rater reliability is .71, test-retest reliability is .88, and criterion-related validity is .80. To assess the utility of the Childhood Autism Rating Scale – Tokyo Version (CARS-TV), its total score was compared among 430 children with DSM-IV criteria, and researchers concluded that CARS is a useful instrument for differentiating between PDDs and MR (Tachimori, Osada, & Kurita, 2003). As the ratings on CARS are entirely based on observation, which are very well defined by the authors of the scale, any cultural differences were not very likely to confound the ratings of the present work.

Procedure

The data were collected from 29 special education schools of Lahore. A comprehensive list about special education schools of Lahore was not available, however, Department of Psychology, GC University, Lahore has liaison with a few special education schools for research and academic purpose. From these schools, a comprehensive list of such schools working in Lahore was generated. Prior to data collection, initial visits were conducted to all schools and written permission was sought from the administration. No difficulty was encountered in this task. The administration of the concerned schools was informed about the purpose of the study and was assured that the information obtained will be kept confidential and would be used for research purposes only and the identity of children will not be disclosed.

For the initial screening, DSM-IV-TR criteria were read to all concerned teachers working in these schools. Majority of these teachers were Master's degree holders in Education or Psychology, hence, it was not difficult for them to understand these criteria in English language. Although these teachers in many cases were Master's level teachers in Psychology, only a few had some information about the Autism diagnostic criteria. The second author discussed the criteria with them and asked them to identify any child in their institute exhibiting these symptoms and behaviors. After a discussion on these criteria, teachers were able to identify children exhibiting such or similar characteristics.

The next step was observation of probable cases of Autism (identified through initial screening) using the main diagnostic tool, CARS. Observation is a valuable clinical assessment tool, however, it also suffers from personal biases, misunderstanding, and misinterpretation. Therefore, it is suggested that the rating of observational scales by two raters can help avoid many biases and increases reliability of observation (Eastlack, Arvidson, Mackler, Danoff, & McGarvey, 2001; Ebersole, Marissa, & Armstrong, 2006). Considering this, two raters rated children on 15 behavioral categories of CARS. Before starting observation, both raters studied CARS manual carefully, after which the first author discussed all categories of CARS in detail with them. Both raters and the first author first rated two nonautistic children and spent a few sessions to reach to a general consensus in rating of CARS.

After getting this training, both observers spent some time with children in each school for establishing rapport with them. For a few days, both raters worked voluntarily in each school with the teachers so that the children get familiar with them and are used to of their presence. Scoring on behavioral categories of CARS is a long process which takes 1 to 1.5 hour on average. As major problem of autistic children is lack of attention, in some cases (about 20%) the observational process took more than 2 hours. If the child was not interested in play or class activities, observation was halted at that time and was completed at another sitting. Observation was completed in two sessions for 39 children. Data collection for the study was accomplished in approximately 210 visits spread over 6 month period.

Results

Data analysis was conducted using the SPSS 10 for Windows. A total of 142 out of 1633 children were screened through DSM-IV-TR

(by using predefined relaxed criteria), and 103 of them satisfied the main criteria as measured by CARS. This showed a prevalence rate of 6.31% for Autism in special education schools. Out of these 103 children, 34 were in mild level of MR. Unfortunately, the current study did not assess the intellectual functioning of these children and the quoted figures are based on the information obtained from the schools.

To assess the reliability of the observation, kappa correlation was computed and results showed significant agreement between ratings of both observers. The obtained kappa showed moderate association ($r_k = .67$) at $p < .01$ between the two ratings. Table 1 show that most of the agreement occurred on the rating of nonautistic or severe Autism.

Table 1

Degree of Agreement (Kappa Correlation) Between Two Raters on CARS (N=142)

Observations of Rater II	Observations of Rater I			
	Nonautistic	Mild Autism	Severe Autism	Total
Nonautistic	29	06	-	35
Mild Autism	07	14	07	28
Severe Autism	-	08	71	79
Total	36	28	78	142

Over all Inter rater reliability: $r_k = .67, p < .01$.

Inter-rater reliabilities were also computed on all 15 characteristics of CARS by Spearman rank order correlation. All scales showed at least moderate level of correlation with highest level of association on the category of "Imitation" ($r_s = .83$), whereas the lowest was on the category of "Fear or nervousness" ($r_s = .59$). Seven of the categories showed the reliability index above .75.

To find out the characteristic symptoms of Autism in this sample, a series of t-tests were computed on ratings of all scales of CARS. The average score of both raters on each scale was compared with the median value of the scales, i.e., 2 (see Table 2).

Table 2

Single-sample t-test Showing Significance of Difference on All 15 Subscales of CARS (N = 103)

Characteristics	M	SD	t
Relating to people	2.98	0.61	16.32*
Imitation	2.88	0.80	11.18*
Emotional response	2.99	0.71	14.06*
Body use	2.74	0.62	12.13*
Object use	2.84	0.75	11.40*
Adaptation to change	2.69	0.76	9.24*
Visual response	2.98	0.59	16.87*
Listening response	2.70	0.70	10.16*
Taste, smell and touch response and use	2.86	0.71	12.33*
Fear or nervousness	2.74	1.27	5.88*
Verbal communication	2.85	0.58	14.96*
Nonverbal communication	2.53	0.78	6.84*
Activity Level	2.67	0.69	9.99*
Level and consistency of intellectual response	2.32	0.47	6.76*
General impressions	2.96	0.52	18.71*
Total score	41.39	6.51	17.80 *

df = 112. *p < .001.

The results in Table 2 show that this sample has significantly higher scores on all symptoms of Autism as measured by CARS. Total scale score also showed significant problems of the subjects on CARS. Scale mean values displayed in Table 2 shows that "relating to people", "emotional responses", and "visual responses" were the problems or deficit areas that were equally more common in autistic children. These were followed by "general impression", "imitation", "taste, smell and touch response and use" and "verbal communication". The least commonly observed problem area was "level and consistency of intellectual response".

To assess gender differences in diagnosis of Autism, a chi-square analysis with cross-tabulation on presence or absence of Autism in boys and girls was computed. Although more boys got the diagnosis of Autism (60 out of 779 vs. 43 out of 751), the difference did not reach statistical difference, $\chi^2 = 2.08$ (1), $p = .15$. A series of Kruskal Wallis test were calculated to assess significance of difference in scores of boys and girls on 15 subscales of CARS. The reason of using a non-parametric equivalent to t-tests was that the data of CARS was on ordinal scales. The results did not show significant gender difference in any symptom associated with Autism.

Discussion

This study aimed to find out the prevalence of Autism in special education schools of Lahore, so that the need of establishing separate schools for autistic children could be assessed. The prevalence of Autism in special education schools of Lahore was found to be 6.31%. This rate is greater than has previously been found in new referrals. Rehman and colleagues (2006) collected data from the case register on patients aged 16 years or under presenting in one calendar year (January to December 2003). Among 821 new cases, Autism accounted for less than 3%. Another study reported similar results. Syed, et al., (2007) found 2.4% rate for Autism and other PDD among a total of 290 new referrals to the Department of Psychiatry at Agha Khan University Hospital, Karachi, in a clinic for children under the age of 15 years.

To the best of our knowledge, this is the first study in Pakistan about prevalence of Autism in special education schools of Pakistan, hence, is considerably important. However, the following limitations should be kept in mind in interpreting the findings of this study: Firstly, the study only assessed the prevalence of Autism in special education schools of Lahore, and could not cover the other areas of Pakistan, which makes the generalizations of the results limited. Secondly, there was no way to include untreated cases of Autism, which in absence of visible intellectual or verbal deficits (in case of Asperger's Disorder) may not be easily detected and thus may be studying in normal schools. Thirdly, children's intellectual level was not assessed, hence, no assumptions can be made regarding the comorbidity. Fourthly, parents' evaluations were not taken. By scoring the child on 14th item of CARS, the observer estimates about general level of intellectual functioning, however, this is just a crude idea based on limited knowledge and observation of the child.

Despite these drawbacks, the findings of this pioneer study are valid for many reasons: a). The study attempted to cover all special education schools of Lahore. b). The assessment of Autism was based on the observations of two raters; c). Kappa correlations calculated on the ratings of both raters ranged from moderate to high. d). For the diagnosis of Autism both DSM-IV-TR criteria and CARS, the most widely used rating scale for behaviors associated with Autism, were used.

The highest agreement of both raters was on the category of severe Autism ($n = 71$) followed by absence of autistic features ($n = 29$). Some disagreement occurred on the category of mild Autism which may be due to the difficulty of assessing minor symptoms associated with this problem. During data collection, it was observed that many teachers (about 70%) had just minimal knowledge about Autism. Some of them just knew that it is a childhood disorder. Also no data about the number of children with Autism was available in the school, and even files of children missed some essential information, like child's developmental history, comprehensive disease record, family psychiatric, and medical history, etc. Only 4 out of 29 (14%) schools had categorized children with developmental disorders separately from those with MR.

The present investigation is a useful contribution in identifying children with Autism from the population of children with mentally retardation and has important implications for parents, teachers, government, and NGOs. Although the current prevalence rates generated through this study are just 6.31%, the findings suggest that either separate specialized school with trained teachers are established according to the prevalence of Autism, or trained teachers are recruited in special education schools, so that children with Autism can be identified and appropriate programs targeting their specialized needs are initiated. These programs are particularly warranted for those children who have either mild or no intellectual deficit.

In the present study, the overall score of the sample on "level and consistency of intellectual functioning" item was 2.32, which shows mildly abnormal intellectual functioning. In fact, on average this was the least scoring item on CARS, which indicates that this group was rated higher on all typical characteristics of Autism, but scored less on item indicating intellectual deficit. Although people with Autism show problems in initiating and maintaining social interactions (Bernabei et al., 2003), they may have unusually developed skills in other areas, such as drawing, creating music, solving math problems, or memorizing facts. Because of this, they may score in the average

or above-average range on nonverbal intelligence tests (WebMed, n.d.). Studies have also reported better developed daily living skills in Autism than children with MR matched by age and intellectual level (Jacobson & Ackerman, 1990). Such differences in both disorders suggest a great need to identify Autism from MR so that children with Autism could be dealt with differently considering their unique strengths and potentials. This also demands the need to include PDD in diagnostic categories when assessing children with mental deficiency in special education schools.

Several studies have indicated that children with Autism require special attention due to their differences from children with MR on several dimensions. There is evidence that adopting appropriate educational interventions can optimize quality of life for children with Autism (Richardson, 2000). Fombonne (1999) reviewed 23 epidemiological surveys of Autism published in the English language between 1966 and 1998 and outlined the needs in special services for children with Autism. Earlier investigations revealed that the use of multimedia technology is intensely enjoyed by children with Autism. Therapists and parents have expressed their satisfaction on videos used to relax, treat, and help children with Autism improve their eye contact (Stokes, 2002). If separate schools are established for such children, such useful learning strategies can be employed effectively for their better functioning.

The current data showed greater number of boys (58%) than girls (42%) diagnosed with Autism. However, this difference did not reach statistical significance. The small reported gender difference in this research is not consistent with the previous research which shows a higher rate of Autism in boys than girls, generally, boys are about three times more likely to have Autism (Gray & Tonge, 2001; Lord, Schopler, & Revicki, 1982; Posserud, Lundervold, & Gillberg, 2006; Wing & Gould, 1979). Some studies have reported even higher differences. For example, a research was conducted on a total population of 1,34,661 under 15 year old residents in Lothian in Southeast Scotland to determine the prevalence of ASD and found the ratio of boys to girls was 7:1 (Harrison et al., 2006). This inconsistency may be interpreted in a number of ways: Firstly, the male and female ratio of Autism may be equal in Pakistan due to some unknown factors. Secondly, parents in Pakistan may be more sensitive to detect any behavioral problem in their daughters due to cultural and social factors, hence, have brought them to these schools for rehabilitation. The later factor suggests that if untreated cases of Autism are also included in the current data, results may have been

different. Also male and female children were not significantly different on any symptom associated with Autism. The results indicated that both male and female children showed deficits in communication, social interaction, and behavior.

Findings of this research showed that this sample of autistic children showed significantly higher symptoms on all three major associated features of Autism, i.e., impairment in social interactions, impairment in communication, and restricted behavior, interests, and activities (APA, 2000), which shows the involvement of biological factors in pathogenesis of this disorder. This study showed that poor social relationship was the most prominent feature of children with autism. The current sample showed significantly higher scores on all related features, like relating to people, imitation, and emotional responses. Results of a 12 year follow-up study showed that social impairment generally associated with Autism is present in 50% of the sample (Shah, 1985). Several other studies have shown severe impairment in social interaction (Lord & Volkmar, 2002; Wing & Gould, 1979) and emotional responsiveness (Dawson, Webb, Carver, Panagiotides, & McPartland, 2004) as the hallmark of Autism and have pointed out that the children with Autism exhibit less joint attention and social interaction behaviors (McEvoy, Rogers, & Pennington, 1993).

Some autistic children are comfortable in interacting with their parents, however, others show detachments to parents as well. Sixteen studies on attachment in children with Autism were reviewed, and 10 studies with data on observed attachment security ($N = 287$) were included in a quantitative meta-analysis and showed that children with Autism were significantly less securely attached to their parents than comparison children (Rutgers, Bakermans-Kranenburg, Ijzendoorn, & Berckelaer-Onnes, 2004).

Children with Autism have been hypothesized to have some deficit in frontal cortex mirror neurons, due to which they may be lacking in emotional responsiveness to other people. Williams, Whiten, Suddendorf, and Perrett (2001) indicated that the imitative disturbance in Autism is caused by a deficit in mirror neurons, which show activity in relation both to specific actions performed by self and matching actions performed by others, providing a potential bridge between minds. Moreover, there is some evidence that the children with Autism are virtually incapable of focusing on a joint endeavor with another person (Mundy, Sigman, & Kisari, 2003). Studies that have sought to elucidate the early features of Autism in young preschool children have shown that impairments in the

capacity for reciprocal social interaction involving preverbal, verbal and non-verbal communication, and play and symbolic behavior are the key features indicative of Autism in infants and preschool children (Gray & Tonge, 2001).

Social deficits and delays in spoken language are the most prominent DSM-IV characteristics exhibited by very young children with Autism (Lord & Volkmar, 2002). The results of this work showed deficits in verbal and nonverbal communication as well as in visual and listening responses. Bishop and Norbury (2002) maintained that 50% of those with Autism never acquire useful speech. Another study pointed out that although children with Autism do comprehend language, they may not use it to express themselves as other children do (Wing & Gould, 1979).

Deficits in visual responses also accompany communication problems in Autism. For example, research has proved that when presented with a complex stimulus input, autistic children typically respond to only one of the elements of the complex stimuli, and are not well able to give appropriate visual responses (Blake, Turner, Smoski, Pozdol, & Stone, 2003; Schreibman & Lovaas, 2005).

The third distinguishing feature of Autism is behavioral problems. The findings of the present work also showed significant problems in these children in adaptation to change, taste, smell, and touch responses, activity level, general impressions, and body and object use. Consistent with this profile, previous studies have also revealed behavioral deficits in Autism, such as, resistance to change in the environment (Rathwell, Hasketh, & Santosh, 2006) and repetitive behavior patterns (Knickmeyer et al., 2005; Lewis & Bodfish, 1998; Militerni, Bravaccio, Falco, Fico, & Palermo, 2002; Szatmari et al., 2006).

The findings of this investigation highlighted the need to differentiate children with Autism from children with MR for the better management of the disorder. The previous research indicates that the prognosis of early identified Autism is favourable due to the possibility of timely interventions and treatment (Charman et al., 2005). In Pakistan awareness about childhood disorders is very limited and mostly people are unaware of developmental disorders such as Autism. It is recommended that autistic children should be diagnosed and identified early so that special attention is given to them by using appropriate educational therapeutic strategies. Both private and public sector can take initiative in this direction. It is advised that the following programs may be initiated in these schools:

1. Implementation of computer learning is advisable as it is proved as an extremely effective method of teaching language. Picture symbols and literacy software package have been effectively used with children with Autism by teachers in order to develop their communication and language skills (Murray, 1997).

2. Language therapy has also been acknowledged as an effective strategy to develop language skills. Multimedia software which is a combination of text, animation, sound, and video could be beneficial for children with Autism, as multimedia technology can improve verbal language through various ways and should be used in class rooms to promote language development (Onions, 1992).

3. Using the principles and techniques of Applied Behavior Analysis (Lovaas, 1987), discrete skills can be taught to children, such as, eye contact, emotion recognition (of static images), turn taking, etc.

4. Relationship Development Intervention (RDI) program has also been proved successful for improving emotional intelligence in children with Autism (Gutstein, Burgess, & Montfort, 2007). The major advantage of RDI is that it focuses on teaching skills which the traditional learning approaches do not address, for example, it focuses on core problems faced by these children, such as, learning friendship, empathy, and a love of sharing their world with others.

5. Degree holders in Psychology and Education should also be trained to use the above mentioned programs effectively and appropriately in institutions catering children with Autism.

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