

Knowledge of primary paediatric care providers regarding attention deficit hyperactivity disorder and learning disorder: a study from Pakistan

Jawaid A, Zafar A M, Naveed A, Sheikh S, Waheed S, Zafar M A, Syed E U, Fatmi Z

ABSTRACT

Introduction: Attention deficit hyperactivity disorder (ADHD) and learning disorder (LD) remain prevalent globally and are also speculated to have a high occurrence in Pakistan. An early diagnosis and intervention in these disabilities is imperative for achieving good clinical and functional outcomes. This can be ensured by an effective screening at the level of primary paediatric care in the developing countries. We aimed to explore the ability of general practitioners (GPs) and paediatricians in Pakistan to screen for ADHD and LD based on their awareness regarding the risk factors and symptomatology of ADHD and LD.

Methods: A total of 96 paediatricians and 98 GPs practising in Karachi, Pakistan were included in the study. Data was collected employing a self-administered questionnaire.

Results: Only 13.7 percent of the GPs and 21.6 percent of the paediatricians were shown to have knowledge sufficient to effectively screen for / diagnose ADHD. Alarming, not a single GP was adequately familiar with the established risk factors and clinical symptoms of LD. The level of knowledge was not influenced by age, gender, and clinical practice attributes of the physicians. Doctors who regularly read medical journals and attend medical education seminars showed slightly better trends.

Conclusion: We hypothesise that this demonstrated lack of knowledge at the level of primary care in Pakistan prevents an early screening of ADHD and LD. A multipronged strategy targeted at the provision of objective screening tools for primary paediatric care

providers, regular continuing medical education seminars and an emphasis on paediatric mental health in undergraduate and postgraduate curricula may ensure an early detection of ADHD and LD in Pakistan.

Keywords: attention deficit hyperactivity disorder, learning disorder, primary paediatric care provider, structured screening tools

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INTRODUCTION

Childhood and adolescent psychiatric disorders remain prevalent around the globe, with median prevalence estimates of around 12%.⁽¹⁾ Attention deficit hyperactivity disorder (ADHD) and learning disorder (LD) comprise two important childhood psychiatric disabilities, and are well characterised on the Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV and International Classification of Disease (ICD)-10 criteria of psychiatric disorders.^(2,3) Prevalence estimates ranging 5%–15% for ADHD and 10%–17% for LD among the paediatric populace have been put forth before.^(4,5) The prevalence of ADHD in India, a densely-populated neighbouring country of Pakistan, was approximated to be around 5%.⁽⁶⁾ There is a dearth of indexed literature on the prevalence of ADHD and LD in Pakistan. A thorough review of literature revealed a single study done in 1992 in Lahore, the second largest city of Pakistan. The study identified a psychopathology in almost one out of every ten children of school-going age, based on Rutter's Children Behavioral Questionnaire.⁽⁷⁾ These figures, however, might not be truly depictive of the actual scenario fraction of the disabled children. It has been proposed that this may be partially attributed to a general lack of clinical suspicion among primary paediatric care providers.⁽⁸⁾

Early identification and intervention is of utmost importance in both ADHD and LD. It has been established that childhood ADHD is strongly associated with adolescent

Aga Khan University
Medical College,
Aga Khan University,
Karachi 74800,
Pakistan

Jawaid A
MBBS Student

Zafar AM
MBBS Student

Naveed A
MBBS Student

Sheikh S
MBBS Student

Waheed S
MBBS Student

Zafar MA
MBBS Student

Department of
Psychiatry

Syed EU, MD
Assistant Professor

Public Health
Practice Division,
Department of
Community Health
Sciences

Fatmi Z, MBBS, FCPS
Assistant Professor

Correspondence to:
Mr Ali Jawaid
Tel: (92) 300 420 7284
Fax: (92) 214 934 294
Email: alijawaid84@
gmail.com

and adult substance abuse disorder and criminal tendencies in the adulthood. It has also been demonstrated that an early intervention weakens this threatening association.⁽⁹⁾ Certain subtypes of ADHD, if left unaddressed, may also lead to irreversible neuropsychological impairment (e.g. cognitive deficits) in the adults.⁽¹⁰⁾ Similarly, if learning disabilities are not picked at an earlier stage and case-appropriate management strategies are not adopted, there is a potential for worsening of the child's academic and social functioning.⁽¹¹⁾ The literature encouragingly indicates that early diagnosis and intervention can retard the clinical progression and may also improve the social and functional outcomes in a number of childhood mental disabilities, including ADHD, LD and mental retardation.⁽¹²⁻¹⁵⁾ A number of diverse strategies have been adopted for the management of ADHD and LD. A review of multiple investigations recommends the use of psycho-stimulant medications and behavioural therapy for children suffering from ADHD, based on better clinical and social outcomes and minimal iatrogenic adversity.⁽¹⁶⁾ For LD, a combined approach comprising parental involvement, knowledgeable school administration and long-term assistance provided by the paediatrician/child psychiatrist, has been shown to improve academic and social performance of the disabled child.⁽¹⁷⁾

A social, functional and academic impairment in affected children and adolescents makes the mentioned disorders liable to be picked up at home, school and primary care centre (general practice and paediatric clinics) besides being identified by a paediatric psychiatrist. Parents, teachers and primary paediatric care providers have been identified as pivotal links in the identification and management of behaviour and learning problems.^(5,8,18) Wake et al from Australia expounded that parents' predictions and perceptions about the mental condition of their child are often vague and emotionally influenced.⁽¹⁹⁾ In fact, parents' ability to identify LDs has been questioned in a recent study in India.⁽¹⁸⁾ Another study concerning the knowledge of these diseases among Israeli high school teachers yielded an encouraging finding that around 70% of the high school teachers were able to pick learning disabilities and hyperactivity among children and adolescents.⁽²⁰⁾ Research has, however, shown that school teachers tend to overestimate ADHD.⁽²¹⁾ These reservations suggest that an isolated notion by parents or teachers alone may not be sufficient to identify a clinical case of ADHD / LD.

A scarcity of paediatric psychiatrists in Pakistan and the prevailing stigma attached to the utilisation of psychiatry specialist services emphasise the importance

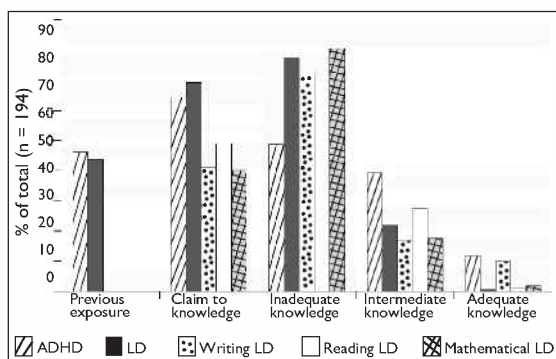
Table 1. Demographic details and clinical practice attributes of the study participants (n = 194).

	No. (%) of participants
Type of practice	
General practice	98 (50.5)
Paediatrics	96 (49.5)
Gender	
Male	104 (53.6)
Female	90 (46.4)
Qualification	
Graduation (MBBS)	122 (62.9)
Postgraduation	72 (37.1)
Area of practice	
Teaching hospital	74 (38.1)
Non-teaching hospital	19 (9.8)
Private clinic and hospital	48 (4.7)
Private clinic only	53 (27.3)

of identification of ADHD and LD at the level of primary care in Pakistan.^(22,23) Little literature exists regarding the ability of general practitioners (GPs) and paediatricians to effectively screen for / diagnose ADHD and LD in the developing countries. Lian et al from Singapore reported a substantial deficit in GPs' knowledge on childhood developmental and behavioural disorders including ADHD and LD in 2003.⁽²⁴⁾ However, to the best of our knowledge, an in-depth exploration into the awareness of the important risk factors of ADHD and LD, knowledge of their clinical presentation and a general familiarity with the diseases among primary paediatric healthcare providers (GPs and paediatricians in this case) in the East Mediterranean region has not been attempted before. We aimed to investigate not only these areas but also the influence of various factors on the knowledge regarding ADHD and LD among GPs and paediatricians.

METHODS

A cross-sectional descriptive study was conducted involving primary paediatric care providers, i.e. practising GPs and paediatricians of Karachi, Pakistan. Doctors with at least two years of clinical experience in either institutional or independent settings were included in the study. A self-administered, structured questionnaire was employed to assess the knowledge concerning ADHD and LD. The questionnaire was designed after a thorough review of textbooks and literature on the subject. DSM IV and ICD 10 criteria were used to derive the disease characteristics on which the knowledge of the participants was tested.^(2,3,21,25) The tool was reviewed and modified in consultation with an expert panel comprising two psychiatrists and two paediatricians. The questionnaire was further subjected to a pilot study on a small subset of the population (n = 20) to establish the conceptual



ADHD : attention deficit hyperactivity disorder
LD : learning disorder

Fig. 1 Bar chart shows previous exposure, claim to knowledge and actual level of knowledge regarding ADHD, LD and LD subtypes among the participants included in the study.

clarification and feasibility of administration. The questionnaire contained four sections. The first section dealt with demographical details of the participants: age, gender, qualification, area of practice and previous exposure to ADHD or LD. The second section pertained to ADHD and comprised questions regarding age of presentation and symptoms. The third section comprised similar questions about LD and its three subtypes: reading disorder, disorder of written expression and mathematical learning disorder. Response was categorised as “yes”, “no” and “don’t know”. The fourth section comprised opinions about management of the two diseases (Appendix 1).

Karachi, with an estimated population of 15 million, is the largest metropolitan city in Pakistan. It comprises 18 towns and one federally-administrated area (Defence Housing Authority [DHA]).⁽²⁶⁾ Four out of these 19 areas, i.e. Saddar Town, Malir Town, North Nazimabad Town, and DHA (Clifton), were selected for sampling through a random draw. Paediatricians in these areas were identified using the members’ list from the Pakistan Paediatric Association. As no such list could be obtained for the GPs, a convenient sampling of the GPs in the above-mentioned areas was done. A written informed consent was obtained from all the participants and complete confidentiality was maintained through all the phases of the study. A 10% prevalence of knowledge regarding ADHD and LD was established through piloting and was employed for sample size calculation. The participants (n = 228) were personally interviewed by the authors (AJ, AMZ, AN, SS) with the help of the objectively-structured questionnaire.

Data was entered utilising EpiData version 3.1 and was validated through dual entry. The Statistical Package for Social Science version 13.0 (SPSS Inc, Chicago, IL, USA) was employed for statistical analysis. Simple frequencies were calculated for the demographical details.

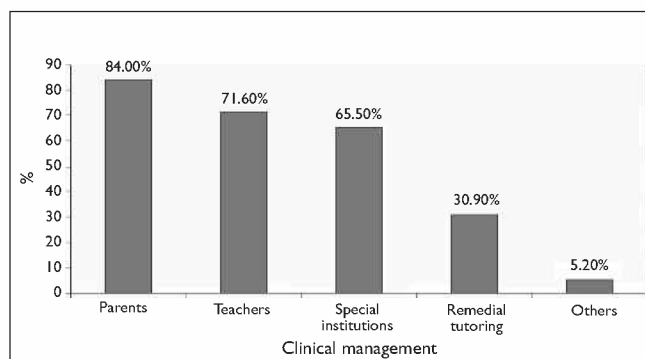


Fig. 2 Bar chart shows areas which play important supplementary roles to medical management of ADHD and LD according to the participants’ opinions.

Individual scores were calculated in each disease category and expressed as a percentage. A score of above 75% was arbitrarily taken as adequate knowledge, while a score of 0%–50% was considered inadequate, and the 51%–75% range was labelled intermediate. Chi-square test was applied to elaborate the associations between the level of knowledge and various potential influences.

RESULTS

The response rate was 95% for paediatricians and 75% for GPs, resulting in a total of 200 participants. Four paediatricians and two GPs were excluded on the basis of ambiguity regarding years of practice, giving a sample size of 194. The demographical characteristics of the sample population are given in the Table I. The means by which the primary paediatric care providers kept themselves abreast with the academic advancements/research were also taken into consideration. Peers/colleagues (59.3%, n = 115) were reported as the most common source of information, followed by medical journals (57.7%, n = 112), mass media (45.9%, n = 89), continuing medical education (CME) seminars (44.8%, n = 87) and miscellaneous sources (8.8%, n = 17).

Although only 46.4% and 43.8% had previously seen/treated ADHD and LD, respectively, a greater percentage of participants claimed to have adequate knowledge of these diseases (64.4% for ADHD; 69.1% for LD). Only 13.7% of GPs and 21.6% of paediatricians were shown to have sufficient knowledge to effectively screen/diagnose ADHD. Alarming, not a single GP was adequately familiar with the established risk factors and clinical symptoms of LD (Fig. 1). The association of various possible factors with the knowledge of ADHD and LD was explored by utilising the chi-square test. Regarding ADHD, a significantly better level of knowledge was

seen in paediatricians compared to GPs ($p = 0.004$). Similar associations were observed for those with higher qualifications ($p = 0.000$), participants of CME courses ($p = 0.000$), users of medical journals ($p = 0.002$) and those having seen/treated the disease previously ($p = 0.000$).

In case of LD, similar results were found with significant differences across the type of practice (paediatrics versus general practice) ($p = 0.009$), level of qualification ($p = 0.006$), participants of CME courses ($p = 0.047$) and readers of medical journals ($p = 0.037$). Previous exposure to the disease was not found to be a significant factor for knowledge ($p = 0.104$), neither were practice setting ($p = 0.135$), usage of peers ($p = 0.706$) or mass media ($p = 0.301$) as the source of information. With regard to the opinions about management of ADHD and LD, the majority of the participants (78.9%) felt that management should be done by the psychiatrist/psychologist. Other key areas supplementary to the medical management of ADHD and LD as opined by the participants are shown in Fig. 2. There was almost a unanimous agreement among the participants that parents and teachers play a substantial role in appropriate management of ADHD and LD, apart from the primary care physician.

DISCUSSION

The primary paediatric care physician plays a pivotal role in the diagnosis and management of ADHD and LD. Albeit their role in the management of the ADHD and LD remains somewhat ill-defined and debatable, no such ambiguities exist with regard to their role in the diagnosis of the disorders.⁽²⁷⁾ Kelly et al recommended that, at a minimum, the primary paediatric care physician should be able to properly reduce parental concerns regarding the educational performance of the child, accurately evaluate any behavioural disturbances of the child accounted by the parents, and integrate any teacher-reported complaints – all of which can possibly be suggestive of ADHD or LD. Moreover, he/she should be able to effectually employ the screening tools to formulate a preliminary diagnosis of any behavioural disturbance in the child.⁽²⁸⁾ For performing this task, knowledge about the diseases and a high level of suspicion among the primary paediatric care physicians are prerequisites.

We have expounded that primary paediatric care physicians in Karachi, Pakistan are deficient in the knowledge regarding both ADHD and LD. Explorations into the knowledge of GPs regarding intellectual and developmental disabilities have been attempted before in Singapore and Australia, and substantial deficits have been

identified. Inadequate prior training has been cited as the underlying reason for this inadequacy of knowledge.^(24,29) Being a cross-sectional exploration, our study fails to elucidate the plausible explanation of this inadequacy of knowledge at the level of primary paediatric care. Considering the type of the pathologies we are dealing with, this insufficiency of knowledge, at least in the case of GPs, could be attributed to the fact that GPs in Pakistan do not receive any formal training in childhood and adult psychiatry.⁽³⁰⁾ It has also been observed before that GPs in Pakistan are deficient in knowledge even regarding diseases such as hypertension and diabetes mellitus, which are far commoner in clinical practice than childhood behavioural and educational disturbances.^(31,32) This general lack of knowledge among Pakistani GPs calls for immediate remedial measures by the governing authorities.

A comprehensive review of literature reveals that simple interventions which involve concise training and provision of supporting material (e.g. structured tools) phenomenally increased the diagnosis of childhood psychiatric disorders, including ADHD and LD, in the US.^(33,34) Though such an intervention has not been attempted for ADHD and LD in Pakistan, an isolated intervention only targeted at the level of primary health care may not be the solution to the problem. It has been demonstrated in an isolated study from Pakistan that CME seminars have been under-effective in improving general clinicians' applied knowledge.⁽³⁵⁾ For Pakistan and other East Mediterranean developing countries, only a multi-pronged approach targeted to ensure early screening of ADHD and LD might be the only effective solution. The approach should encompass parents, teachers and primary paediatric care physicians, with the latter being the principal focus.

Primary paediatric care physicians (GPs and paediatricians) can be educated regarding ADHD, LD and other common childhood educational/behavioural/emotional disturbances by: (1) incorporation of topics encompassing typical clinical presentation of childhood psychiatric disturbances into the undergraduate and postgraduate courses; (2) provision of guiding material to the practising physicians; and (3) CME seminars and workshops. The timing of the CME seminars should be kept such that the maximum number of physicians can benefit from them. Furthermore, there is a dire need to equip primary paediatric care physicians with established, objectively-structured screening tools. The paediatric symptoms checklist (PSC) has been shown to be an effective screening tool for childhood emotional and

behavioural disturbances with an encouraging likelihood ratio.^(36,37) Moreover, the tool with minor modifications has also been validated outside the United States.⁽³⁸⁾ Similarly, the strengths and difficulties questionnaire (SDQ) is another screening instrument for paediatric behavioural and emotional problems and has also been validated for use in Pakistan.⁽³⁹⁾ Such broad-range screening tools can also be used to evaluate the child on routine health visits for any behavioural, educational and emotional disturbances. Borowsky et al advocated an extension of psychiatric screening assessments even to acute healthcare visits, based upon their observation that it has a fairly high likelihood ratio.⁽⁴⁰⁾ From a developing world's perspective, it is also reasonable to believe that most paediatric healthcare visits in clinical settings are for acute health conditions. Limiting the scope of psychiatric screening to well-child visits only, would definitely impede an effective population-wide screening. Moreover, a close collaboration between the primary healthcare and education sectors can be an effective means of ensuring a targeted screening of children with mental health problems. School-based / collaborated health systems have proven a major success for the correct diagnosis of adolescent mental health problems in certain areas of the United States.⁽⁴¹⁾ School-collaborated health systems can be effectively employed to screen the children for any behavioural, emotional or developmental disturbance at the time of school enrollment and thereafter as suggested by the teacher or school authorities.

Further research is required to establish the feasibility of this screening model. There are critical limitations to our study. The cut-off for adequacy of knowledge (75%) chosen for our investigation, although precedent in literature, has not been recommended by any of the expert panels on either of the disorders.⁽²⁴⁾ Furthermore, two population groups (GPs and paediatricians) which widely differ in terms of qualification, training and practice setting, were dealt as one in our study. This was due to the lack of a proper system of referral in Pakistan and the fact that paediatric patients can initially present to either of the two categories of professionals. It must also be considered that the healthcare providers that we surveyed practice in Karachi, the largest city in Pakistan. The study population is a fairly accurate representative of the primary healthcare providers of Karachi. However, a disparity in the level of knowledge of primary healthcare providers practising in other parts of the country is nevertheless possible. We strongly recommend that the above-mentioned limitations should be critically considered before deriving any practical implications from our study.

In conclusion, we observed an inadequacy of knowledge regarding ADHD and LD among both GPs and paediatricians in Karachi. This inadequacy of knowledge raises serious questions about the screening of ADHD and LD at the level of primary care in Pakistan. In our opinion, strategic interventions, which should include an emphasis on the neglected avenue of paediatric mental and developmental health in the undergraduate and postgraduate medical curricula, provision of objective developmental screening tools to the practising physicians, regular CME seminars, and collaboration between the health and education sectors, can serve to ensure the early identification of ADHD and LD.

REFERENCES

- Costello EJ, Egger H, Angold A. 10-year research update review: the epidemiology of child and adolescent psychiatric disorders: I. Methods and public health burden. *Am Acad Child Adolesc Psychiatry* 2005; 44:972-86.
- American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders. 4th ed. Washington DC: American Psychiatric Association, 1994.
- World Health Organisation. The ICD 10 Classification of Mental and Behavioral Disorders. Geneva: World Health Organisation, 1993. Available at: www.who.int/classifications/icd/en/GRNBOOK.pdf. Accessed February 14, 2007.
- Brook U, Boaz M. Attention deficit and learning disabilities (ADHD/LD) among high school pupils in Holon (Israel). *Patient Educ Couns* 2005; 58:164-7.
- Parry TS. 12. Assessment of developmental learning and behavioural problems in children and young people. *Med J Aust* 2005; 83:43-8.
- Sidana A, Bhatia MS, Choudhary S. Prevalence and pattern of psychiatric morbidity in children. *Indian J Med Sci* 1998; 52:556-8.
- Javed MA, Kundi MZ, Khan PA. Emotional and behavioural problems among school children in Pakistan. *J Pak Med Assoc* 1992; 42:181-3.
- Foy JM, Earls MF. A process for developing community consensus regarding the diagnosis and management of attention-deficit/hyperactivity disorder. *Pediatrics* 2005; 115:e97-104.
- Wilens TE. Attention-deficit/hyperactivity disorder and the substance use disorders: the nature of the relationship, subtypes at risk, and treatment issues. *Psychiatr Clin North Am* 2004; 27:283-301.
- Schmitz M, Cadore L, Paczko M, et al. Neuropsychological performance in DSM-IV ADHD subtypes: an exploratory study with untreated adolescents. *Can J Psychiatry* 2002; 47:863-9.
- McGee R, Prior M, Williams S, Smart D, Sanson A. The long-term significance of teacher-rated hyperactivity and reading ability in childhood: findings from two longitudinal studies. *J Child Psychol Psychiatry* 2002; 43:1004-17.
- Tsai CH, Gau SF. Long-term outcome studies of hyperactive children: literature review. *Kaohsiung J Med Sci* 1999; 15:307-14.
- Kurzweil SR. Developmental reading disorder: predictors of outcome in adolescents who received early diagnosis and treatment. *J Dev Behav Pediatr* 1992; 13:399-404.
- Ramey CT, Ramey SL. Prevention of intellectual disabilities: early interventions to improve cognitive development. *Prev Med* 1998; 27:224-32.
- Kessler RC, Berglund P, Demler O, et al. Lifetime prevalence and

- age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry* 2005; 62:593-602.
16. Brown RT, Amler RW, Freeman WS, et al. Treatment of attention-deficit/hyperactivity disorder: overview of the evidence. *Pediatrics* 2005; 115:e749-57.
 17. Lambros KM, Leslie LK. Management of the child with a learning disorder. *Pediatr Ann* 2005; 34:275-87.
 18. Kaur P, Chavan BS, Lata S, et al. Early intervention in developmental delay. *Indian J Pediatr* 2006; 73:405-8.
 19. Wake M, Gerner B, Gallagher S. Does parents' evaluation of developmental status at school entry predict language, achievement, and quality of life 2 years later? *Ambul Pediatr* 2005; 5:143-9.
 20. Brook U, Waternberg N, Geva D. Attitude and knowledge of attention deficit hyperactivity disorder and learning disability among high school teachers. *Patient Educ Couns* 2000; 40:247-52.
 21. Havey JM, Olson JM, McCormick C, Cates GL. Teachers' perceptions of the incidence and management of attention-deficit hyperactivity disorder. *Appl Neuropsychol* 2005; 12:120-7.
 22. Syed EU, Hussein AH, Yousafzai AW. Developing services with limited resources: Establishing a CAMHS in Pakistan. *Child Adolesc Ment Health* 2007; 12:121-4. doi:10.1111/j.1475-3588.2006.00429.x
 23. Nishtar S, Minhas FA, Ahmed A, Badar A, Mohamud KB. Prevention and control of mental illnesses and mental health: National Action Plan for NCD Prevention, Control and Health Promotion in Pakistan. *J Pak Med Assoc* 2004; 54:S69-77.
 24. Lian WB, Ho SK, Yeo CL, Ho LY. General practitioners' knowledge on childhood development and behavioral disorders. *Singapore Med J* 2003; 44:397-403.
 25. Shaw K, Wagner I, Eastwood H, Mitchell G. A qualitative study of Australian GPs' attitudes and practices in the diagnosis and management of attention-deficit/hyperactivity disorder (ADHD). *Fam Pract* 2003; 20:129-34.
 26. CDGK Towns. Official Web Portal of City District Government Karachi [online]. Available at: www.karachicity.gov.pk. Accessed December 18, 2007.
 27. Thapar A, Thapar A. Is primary care ready to take on attention deficit hyperactivity disorder? *BMC Fam Pract* 2002; 3:7.
 28. Kelly DP, Aylward GP. Identifying school performance problems in the pediatric office. *Pediatr Ann* 2005; 34:288-98.
 29. Phillips A, Morrison J, Davis RW. General practitioners' educational needs in intellectual disability health. *J Intellect Disabil Res* 2004; 48(Pt 2):142-9.
 30. Gadit A. Primary care psychiatry in Pakistan--a long way ahead. *J Pak Med Assoc* 2006; 56:49-50.
 31. Jafar TH, Jessani S, Jafary FH, et al. General practitioners' approach to hypertension in urban Pakistan: disturbing trends in practice. *Circulation* 2005; 111:1278-83.
 32. Shera AS, Jawad F, Basit A. Diabetes related knowledge, attitude and practices of family physicians in Pakistan. *J Pak Med Assoc* 2002; 52:465-70.
 33. Olson BG, Rosenbaum PF, Dosa NP, et al. Improving guideline adherence for the diagnosis of ADHD in an ambulatory pediatric setting. *Ambul Pediatr* 2005; 5:138-42.
 34. Polaha J, Cooper SL, Meadows T, et al. The assessment of attention-deficit/hyperactivity disorder in rural primary care: the portability of the American Academy of Pediatrics guidelines to the "real world". *Pediatrics* 2005; 115:e120-6.
 35. Thaver IH. Do workshops make a difference in improving the capability of physicians? *J Pak Med Assoc* 1997; 47:186-8.
 36. Navon M, Nelson D, Pagano M, Murphy M. Use of the pediatric symptom checklist in strategies to improve preventive behavioral health care. *Psychiatr Serv* 2001; 52:800-4.
 37. Jellinek MS, Murphy JM, Little M, et al. Use of the Pediatric Symptom Checklist to screen for psychosocial problems in pediatric primary care: a national feasibility study. *Arch Pediatr Adolesc Med* 1999; 153:254-60.
 38. Reijneveld SA, Vogels AG, Hoekstra F, Crone MR. Use of the Pediatric Symptom Checklist for the detection of psychosocial problems in preventive child healthcare. *BMC Public Health* 2006; 6:197.
 39. Samad L, Hollis C, Prince M, Goodman R. Child and adolescent psychopathology in a developing country: testing the validity of the strengths and difficulties questionnaire (Urdu version). *Int J Methods Psychiatr Res* 2005; 14:158-66.
 40. Borowsky IW, Mozayeny S, Ireland M. Brief psychosocial screening at health supervision and acute care visits. *Pediatrics* 2003; 112:129-33.
 41. Gall G, Pagano ME, Desmond MS, Perrin JM, Murphy JM. Utility of psychosocial screening at a school-based health center. *J Sch Health* 2000; 70:292-8.

Appendix I**Knowledge of primary paediatric care providers regarding attention deficit hyperactivity disorder (ADHD) and learning disorder (LD)**

We are conducting the above-titled study on general practitioners and paediatricians of Karachi, in collaboration with Department of Community Health Sciences and Department of Psychiatry, Aga Khan University. We would request your kind participation in the study by filling in the attached questionnaire. It will take approximately 15 minutes. All the information pertaining to your clinical practice will be kept confidential. You hold the right to withdraw from the study at any stage of the project. We would like to start with your consent.

Yes No

SECTION I: PERSONAL INFORMATION

Name (optional): _____

Gender: Male Female

Age: _____

Practice: General Practice Paediatrician

Academic qualification: Graduate Postgraduate

Years of clinical experience: _____

Practice setting: Teaching hospital Non-teaching hospital
Private Private as well as hospital

Number of patients seen monthly: _____

Commonly-used sources of knowledge update (tick all that apply):

Medical journals/texts Colleagues/seniors
Media CME seminars
Mass media Miscellaneous

SECTION II: ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD)

1. A child with ADHD will most likely present at age (choose all that apply):

- (a) < 3 years.
- (b) 3–7 years.
- (c) 7–13 years.
- (d) > 13 years.
- (e) Can present at any age.

2. ADHD is present more in:

- (a) Males.
- (b) Females.
- (c) Equal in both.

A child with ADHD will:

	Yes	No	Don't know
3. Fail to give close attention to details.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Make careless mistakes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Be able to sustain attention in tasks or play activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Listen very attentively when addressed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Fail to finish school work or chores.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Not follow instructions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Be able to organise tasks with ease.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Be reluctant to engage in sustained mental effort.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Often lose things necessary for activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Not be easily distracted by extraneous stimuli.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Sit still for very long periods.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Indulge in leisure activities quietly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Talk excessively and interrupt conversations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. A child with ADHD can present without hyperactivity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ADHD commonly occurs with:	Yes	No	Don't know
17. Conduct disorder.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Tic disorder.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Cardiac dysfunction.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Learning disorder.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Autism.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Mania.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Speech language disorder.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Growth hormone insufficiency.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Suicidal ideation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Substance abuse.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Psychosis.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Anxiety.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Epilepsy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION III: LEARNING DISORDERS

1. What risk factors are strongly associated with learning disorders? (tick all that apply)

- (a) Family history of learning disorders.
- (b) Smoking during maternal pregnancy.
- (c) Substance abuse during pregnancy.
- (d) Complicated delivery.
- (e) Exposure to toxins (e.g. lead, cadmium, etc.) during child growth.

2. In your opinion, the clinical management of LD should be done:

- (a) At the level of primary care (GPs and paediatricians).
- (b) By an expert (psychiatrist / psychologist).

3. Apart from clinical management, which areas do you identify as significant in terms of management of LD (tick all you consider important):

- (a) Parents.
- (b) School teachers.
- (c) Special education institutions.
- (d) Remedial tutoring.
- (e) Others (specify).

SECTION IV: LEARNING DISORDER OF WRITTEN EXPRESSION

While writing, a child with disorder of written expression will:	Yes	No	Don't know
4. Have illegible writing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Show difficulty with sentence structure (e.g. incomplete sentences, poor use of grammar).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Show good penmanship (e.g. good formed letters, correct use of capitals).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Have unfinished words or letters or omitted words in letters.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Show consistency in spacing between words and letters.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Exhibit strange wrist, body or paper position.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Have difficulty pre-visualising letter formation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Have good copying or writing skill.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Show poor spatial planning on paper (geometrical figures).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Have cramped or unusual grip or may complain of having a sore hand.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Show no difficulty thinking and writing at the same time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Have other learning disabilities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Have social impairment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Have low IQ.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Have motor tics.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

READING DISORDER

In 'reading disorder of learning', the child will:	Yes	No	Don't know
19. Have achievements that are 2–3 classes lower with reference to his/her chronological age.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Have reading achievements are 2–3 classes lower with reference to his/her intelligence.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Avoid reading as much as possible.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Have difficulty in differentiating between past and present tense in the text.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

23. Have difficulty in pronouncing the same words which his/her classmates can sound easily.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Have lower levels of intelligence as compared to other children his/her own age.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Have a weak vocabulary.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Be often unable to identify a word or phrase he/she has read before.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Skip particular words or sentences while reading a paragraph appropriate to his/her education.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Be unable to differentiate between text printed in different fonts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Take longer to complete a reading assignment in comparison to other children his/her own age.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Show visual impairment due to which he/she cannot read.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Show difficulty in reading but can spell the words correctly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Have poor academic performance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Have a sensory deficit (weak eyesight or impaired hearing) that is out of proportion to the child's disability to read.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Be emotionally disturbed due to which he/she cannot read.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MATHEMATICAL LEARNING DISORDER			
35. A child with mathematical learning disorder can present:			
(a) Only at preschool age.			
(b) At school age.			
(c) Both at pre-school and school-going age.			
(d) In adolescence.			
A child with mathematical learning disorder:	Yes	No	Don't know
36. Must have problems with language acquisition.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Must have subnormal IQ.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Will have difficulty in managing time and will be chronically late.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Will have a good sense of direction.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Will have difficulty in grasping mathematical concepts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Once he understands a mathematical concept, he will be able to apply it consistently.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Cannot do financial planning or budgeting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Will have poor athletic coordination.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Can keep scores during games.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. Will have mistaken recollection of names.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mathematical learning disorder commonly occurs with:	Yes	No	Don't know
46. Reading disorder.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. ADHD.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. Conduct disorder.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. Schizoid personality disorder.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50. Memory disorder.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. Motor disorder.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>