CHAPTER- 2

REVIEW OF LITERATURE
In this chapter we analyse various research studies done on the variables of the present study. This research aimed to determine the prevalence of ADHD in children aged 5-12 years in urban schools of Gwalior, Madhya Pradesh. Previous research studies suggest ADHD to be higher among males than females (American Psychiatric Association, 2013). Thereby, this study also purposes to identify if there is any gender based differences showcased among the participants of Gwalior. Children with ADHD are considered to be prone to various other behaviourial deficits or malfunction (Kessler, 2018). This study also investigates any such co-morbid factors associated with ADHD. With the rapid growth of this chronic condition most commonly among school-going children and inadequate prevalence studies in India on ADHD, this study facilitates the entire process.

The worldwide prevalence rate of ADHD ranges between 1-13% in both India (Suvarna & Kamath, 2009; Venkatesh, Ravikumar, & Virudhagirinathan, 2012) as well as western countries (Ford, Goodman, & Meltzer, 2003). In 2013, DSM-5 declared 5 percent of children to have ADHD (American Psychiatric Association, 2013). Studies done in different countries have showcased numerous prevalence rates across time like Canada-5-14 per cent; China-6-9 per cent, Germany-4 per cent, India-5-29 per cent; Japan-7-8 per cent; New Zealand-2-7 per cent, United Kingdom-3-5 per cent (Barkley, 2006; Hughes & Cooper, 2007); United States -11 per cent (Park, 2013). A DSM-IV based prevalence rate of 1.4% was found in 1999 and 1.5% in 2004 as per a research conducted by the Great Britain office of national statistics on around 10,000 children (Ramya, Goutham, & Pandit, 2017)

There are similar studies conducted among developing countries like in Brazil, DSM-IV based prevalence was estimated to be 1.8%, 2% in Bangladesh and 1.6% in India (Ramya, Goutham, & Pandit, 2017).
A cross sectional study was conducted by Ramya, Goutham and Pandit in (2017), on 3120 school age children of age group 5 to 12 years across 18 schools (both private and government) in Bengaluru, Karnataka. The data collection in this study was done in four phases. In the beginning of the study, an introduction to ADHD was given by the Paediatrician to the teachers. Further, the children with ADHD were screened by using Conner’s Rating Scale the short version with 27 items was used for both parents and teachers of the participants. The positive cases were again interviewed by a Psychiatrist using a semi-structured performa comprising of 12 simple questions (6 questions related to inattention and 6 questions related to hyperactivity and impulsivity) based on DSM- V criteria and also an IQ assessment was conducted on the suspected children with ADHD (Ramya, Goutham, & Pandit, 2017).

The prevalence rate of was found to be 1.3% among school children with an uneven distribution of male and female ADHD prevalence rate which is 1.6:1 with higher rates among boys with 56.7% prevalence and 43.3% among females. ADHD was seen the highest in the age group of 6-8 years. Also, sub-clinically among the positive cases 34.1% were belonging to hyperactivity type, 9.8% was inattention type and 56.1% was combined type. The findings also highlighted how the children with ADHD was distributed across the different schools considered for the study out of which 1.25% were from private school and 1.37% was from government schools (Ramya, Goutham, & Pandit, 2017).

In 2016, another study was conducted on 1147 school students of age group 8 to 15 years among three rural schools in Wardha district of Maharashtra. Initially, the teachers were sensitized about ADHD and by using Vanderbilt Attention Deficit hyperactive Diagnostic Teacher Rating Scale (VADTRS) was asked to be filled by
the teachers based on the selected students. Later, these students were seen by the Psychologist, Psychiatrist and Paediatrician to confirm the diagnosis based on DSM-IV criteria for ADHD (Naik, Patel, & Biswas, 2016).

The study found the ADHD prevalence rate to be estimated around 3.66% i.e. 42 children among 1147 children selected for the study. Among the children diagnosed with ADHD, 28 were boys with 66.67% which is higher than females who were 14 with an estimate of 33.33%. The 42 who were diagnosed with ADHD fell in the age group of 8-15 years (Naik, Patel, & Biswas, 2016).

A Meta analytical study was conducted to estimate the prevalence of ADHD through the perspective of teachers and parents in school children of Iran. Over 16 articles between the years 1996 and 2011 were collected with a total sample of 14,891 children of age group 7-12 years. Data were analysed using I2 index and relationship between years of study Meta regression was used. 8 per cent of ADHD prevalence rate was found which was 20 per cent according by the parents and 20 per cent according to the teachers. The results also found that there were more male participants in the target than the control group. The binominal distribution showed among these children, found that compared to 21 females, 179 males were more heavily represented (Arjmandi, Akikhavandi, & Sayehmiri, 2015).

Another study conducted in 2015, on 600 children from both urban and rural region of Egypt. In the beginning a questionnaire designed in Arabic language was asked to be filled by the parents of the children selected for the study enquiring about the risk factors of ADHD. It facilitated to know the socio-demographic history of the child, family size, family history of ADHD, whether living with both parents, pregnancy duration, birth weight of the child, etc. it also aimed to enquire about the
child’s medical history and school performance. A complete physical examination was also done on each child taken for the study. The screening of ADHD was done by another questionnaire developed using criteria of ADHD mentioned in DSM-IV,1994 measuring different sub characteristics like inattentive type, impulsivity, hyperactivity, to name a few years (El Namr, Badr, & Salem, 2015).

The study estimated a prevalence rate of 19.7% among the sample population. They found the most common type of ADHD among the children was that of the ‘combined type’. The study also found that the risk factors associated with socio-demographic details of the child with ADHD which showed that ADHD was higher among children from the urban area and in low socio-economic status children. The study also highlighted that ADHD was high among children who came from large family size, with a family history of ADHD and among single parent children and children born prematurely. Here, again there were gender differences seen with higher prevalence of ADHD in males (72.9%) than females with ratio 2.7:1 and the children with ADHD fell in the age group of 5-12 years (El Namr, Badr, & Salem, 2015).

In 2015 another study was conducted on 500 students from 6th to 10th standard in an English medium school in New Delhi. Initially, a DSM-IV based ADHD questionnaire was asked to be filled by the parents and teachers. Along with this, significant details like socio-demographic details and family environment were also recorded using modified Prasad classification. Also, school performance of the selected children was assessed based on the previous year’s final examination marks which were classified into few categories based on percentage obtained by each child. The general mood of the child was also analysed by classifying the same into
happy, angry, irritable, nervous and stressed (Yewatkar, Pande, Bangde, & Joshi, 2015).

It was found that the ADHD prevalence was 6.4% in the urban population only. Among the positive cases, 25 were boys and 7 were girls, again showing the gender differences higher among males in the sample population. Also, the 32 diagnosed with ADHD fell in the age group of 12 (mostly females) and 14 years (mostly males). It was also found that out of the total 32 children with ADHD, majority of 22 children were of the inattentive type, 2 were of hyperactive type and the 8 were of the combined type. Socio-demographically, 22 which was the majority of children were of the upper middle or high class (Yewatkar, Pande, Bangde, & Joshi, 2015).

Marked instability in family environment was found to be significant among the children screened with ADHD symptoms. The mood spread across times among these children were found to be mostly angry, irritable, and nervous and stressed. Also, these children were found to have unfavourable peer relationships (Yewatkar, Pande, Bangde, & Joshi, 2015).

In 2014, a prevalence study was also carried out on school going children of ages 12-13 years. The sample was collected from 25 schools of Kanpur city, Uttar Pradesh and comprised of a total of 1300 students (650 boys and 650 girls). The Researcher used Vanderbilt ADHD Scales for both teachers and parents of the children selected for the study. Findings showed 5.8 per cent of the children participants had ADHD. These children fell in the age group of 12-13 years. The study also found the prevalence ration among boys and girls to be 5:1 (Verma & Khushwaha, 2014).
In 2013, another study was conducted on 770 primary school children aged between 6 and 11 years in Coimbatore district of Tamil Nadu. The sample was collected from four different schools which were divided into two groups based on Tamil or English as the medium of instruction. All the tools were translated into Tamil and again translated into English to ensure appropriate translation based on the requirement of the teachers and parents of the children who were selected for the study. This study used Conner’s Abbreviated Rating Scale (CARS). It was rated by both parents and teachers. The positive cases of ADHD were again screened by teachers using Children’s Behaviour Questionnaire (CBQ) both A and B forms measuring academic performance and behavioural difficulties, respectively. In order to find drug history and assess social behaviour, any deficits in academic performance and family history of ADHD or any other psychiatric disorder, Personal information Questionnaire, was given to the parents of the children identified with ADHD (Venkata & Panicker, 2013).

The study thus, elicited a prevalence of ADHD to be 11.33% among primary school children which was 72 out of 635 children. There was a significant difference in the male and female ratio with a higher rate in Males being 14.81% (n=48/324) and females 7.71% (n=24/311). Among 72 out of 635 children who were diagnosed of ADHD, 66.7% were males and 33.3% were females, respectively. The children with ADHD fell in the age group of 9-10 years. According to CBQ-A questionnaire, 24(33.3%) children were found to have poor academic performance, 11(15.3%) children were found to have reading difficulty, 15 children were found to have writing difficulty (Venkata & Panicker, 2013).

Based on CBQ-B questionnaire 26 (36.11%) children with ADHD were found to have associated behavioural difficulties. Based on Personal information
questionnaire again, the results indicated that the children with ADHD had a history of frequently falling ill (16 children), presence of family history of psychiatric illness were among 6 children, exposure to recent stressor was found among five children, poor social behaviour among friends were found among 9 children. Socio-demographically, 49 children from the lower socio-economic status were found to have ADHD and 23 children from middle socio-economic status were found to have ADHD which was marked as highly significant (Venkata & Panicker, 2013).

Few more studies done based on systematic review of literature aimed to study the age at onset of ADHD through databases collected of 2,097 abstracts, 31 studies reporting original data through which findings were summarized. The results showcased differences in ages at onset criterion, which exhibited a later onset and not before 7 years criterion mentioned in the DSM-5. Data collected from an adult population survey also showed that only 50% of individuals with clinical features of ADHD had an onset before age 7 years and by contrast 95% reported onset before age 12 age 12 years and 99% before age 16 years (Kieling, et al., 2010).

Biederman et al. in the year 2005, conducted another study on non-referred group of 577 subjects with and without ADHD in Boston. In this comparison between the non-referred siblings of probands with ADHD and non-ADHD subjects only 98 of the non-referred siblings met the criteria for diagnosis of ADHD and 479 did not. The tools and techniques used for the study were a mixture of both Psychiatric interview and Psychometric evaluation based on the age groups above and below 18 years of age. Schedule for Affective Disorders and Schizophrenia for School-Age children – Epidemiologic version (K-SADS-E) and Structured Clinical Interview for DSM III R for adults were used. Based on the indirect interviews with primary caregivers and direct interviews with children older than 12 years primary
diagnosis was made. Further investigations were carried out by Psychiatrists (Biederman, et al., 2005).

The results found no significant differences between genders in subtypes of ADHD. The most common in both the genders were combined type. Moreover, there were no significant differences found even in the age at onset, impairment related to ADHD, duration of the disorder or any individual symptoms. Subjects with ADHD showed greater impairments for cognitive, school, psychological, family or treatment variables irrespective of gender. This study also threw light on the fact that if gender differences apply to the prevalence of ADHD at a global level, it could be due to differences in paediatric referrals based on comorbidity with disruptive behaviour patterns in comparison with self-referrals by adult ADHD patients, which are due to the morbidity associated with ADHD itself (Biederman, et al., 2005).

ADHD has its own cardinal features for diagnosis namely hyperactivity, inattention and impulsivity. Studies have found several other factors that are comorbid with ADHD in general. It ranges from Autistic symptoms, Tics symptoms, Anti-social traits, anxiety symptoms, learning issues, substance use symptoms, to name a few.

A study was conducted on 205 German children with diagnosed ADHD in age group 6-13 years with distribution of 9.8% falling in the hyperactive/impulsive subtype and 23.4% with the inattentive subtype and combined type of 66.8%. Among these children, those with clinical behaviour of Autism Spectrum Disorder (ASD) like lack of contact, communication and social interaction problems as reported by parents or observed in direct clinical observation were assessed with Autistic
Diagnostic Observation Schedule (ADOS) and Social Communication Questionnaire (SCQ) (Kroger, Hanig, Seiz, Palmason, Meyer, & Freitag, 2011).

The findings showed increased symptoms of ASD in this clinical sample of children with ADHD without ASD. Hyperactive-impulsive subtype of ADHD showed more ASD symptoms with most significant scores in SCQ which highlights of a probable genetic association. Moreover, lack of self-control might lead to exposure to peer rejection which could refrain a child from social interactions and development of further social skills. Also elevated ASD symptoms in children and their mothers were found with their mothers throwing light on genetic predisposition. Psychological risk factors were also constant factor that remain responsible for ASD symptoms to brew among ADHD children (Kroger, et al., 2011).

Another study conducted on 522 adolescent children with distribution of 280 children with ADHD and 242 without ADHD. Participants were assessed with DSM-III-R structured clinical interviews for both ADHD and Schedule for Affective Disorders and Schizophrenia for School Age Children for other Psychiatric disorders. Findings showed that the children with ADHD were more likely to have comorbid psychiatric disorders in comparison with the children without ADHD. These psychiatric disorders included mostly mood disorder like bi-polar disorder, depression and other disruptive behaviours disorders like conduct and oppositional defiant disorder, multiple anxiety disorders, substance use disorders, tic disorders and enuresis and encopresis (Busch, et al., 2002).

Another study could highlight deficient emotional self-regulation (DESR) to be prevalent and morbid among patients with ADHD which could be a result of genes or familial environmental risk factors. The participants were 83 probands with
or without ADHD and 128 siblings. They were assessed with the Structured Clinical Interview for DSM-IV Axis I Disorders, Schedule for Affective Disorders and Schizophrenia for School Age Children–Epidemiologic version, self-report Current Behaviour Scale, developed by Barkley to assess DESR. The results showed how there was a high risk for DESR in siblings of ADHD but not in the siblings of ADHD probands and how other psychiatric disorders was similar in siblings of ADHD proband groups (Surman, et al., 2011).

Another meta-analytical study reviewed databases through online journals. The findings highlight higher prevalence of ADHD among relatives of Bipolar I probands and also higher prevalence of Bipolar I disorder among relatives of ADHD probands. It was based on 6,238 relatives in paediatric bipolar I family studies and 3,478 relatives in ADHD family studies (Faraone, Biederman, & Wozniak, 2012).

Comorbidity with Tic disorder on ADHD has also been studied to a great extent. Based on DSM III-R criterion structured clinical interview was conducted supplemented with modules from the Schedule for Affective Disorders and Schizophrenia for School-Age Children—Epidemiologic Version (KSADS-E) covering childhood diagnoses and DSM III-R based interview for Tourette’s Syndrome were also used. Participants were 312 adults with ADHD and 253 without ADHD. Findings showed about 12% participants with ADHD compared to 4% participants without ADHD had tic disorders (Spencer, et al., 2001).