



BIOLOGICAL FACTORS AS PREDICTORS OF HYPERACTIVE BEHAVIOUR AMONG PUPILS IN SOUTH EAST NIGERIA

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ABSTRACT

This study investigated the extent biological factors predict hyperactive behaviours of pupils in South East, Nigeria. The study adopted a correlational research design. Two research questions and two null hypotheses tested at 0.05 level of significance, guided the study. The research questions and hypotheses sought to establish the extent of relationship that exists between biological factors and hyperactive behaviours of pupils. The sample for the study consisted of 1,566 (713 males and 853 females) respondents drawn through multi-stage sampling procedure from 3915 (1857 males and 2058) primary five pupils with hyperactive behaviour in 5477 public primary schools in South East, Nigeria. The data obtained through the administration of the instruments were analysed using Pearson Product Moment Correlation Coefficient to answer research questions. Linear regression was used to test null hypotheses at 0.05 level of significance. The study revealed the following findings: Biological factors to a very highly positive and significant extent predicted hyperactive behaviours of pupils in the South-East Zone of Nigeria. Biological factors predicted 82.10% of the variance observed in hyperactive behaviours of pupils; there was no significant gender difference in the relationship between biological factors and hyperactive behaviours of pupils. Gender predicted only 11.4% of the variance observed in the relationship between biological factors and hyperactive behaviours of pupils. Among the educational implications was that the study could provide supportive frameworks from which one can assess how the pupils explore the environment and master the challenges within that environment. It was thus recommended that Educational psychologists, school counsellors and teachers should provide primary school pupils with hyperactive behaviour and their parents information from this study; which would help them understand the primary components of biological approach to hyperactivity and the impact of hyperactivity in the exploration of the environment of pupils with hyperactive behaviour.

KEYWORD: Biological factors, hyperactive behaviours, academic achievement

INTRODUCTION

It may be difficult to explain hyperactivity since it often depends on the observer. A behaviour that seems excessive to one person may not seem to be excessive to another observer. What may guide an individual in understanding a hyperactive behaviour is that certain children, when compared to others, are clearly far more active. Being active by such children may only become a problem if it interferes with school work or making friends (Berrios, 2013).

Hyperactivity can therefore, be defined as a state of being unusually or abnormally active. Child hyperactivity was defined by Alejandra (2017) as a behavioural disorder characterized mainly by the presence of restless behaviours and a noticeable lack of attention. Hyperactive children often find their impaired. They are usually distracted by irrelevant stimuli and find it difficult to maintain attention in activities that require a moderate attentional effort; hyperactive children are quite impulsive. Hyperactive behaviour may operationally

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be defined as a pervasive disorder that touches every aspect of the child's life which has long been seen as a prerequisite of significant learning difficulties.

According to DSM-5 as reported by American Psychiatric Association in Ullrich (2017) the following are the Diagnostic Criteria for Attention-Deficit/Hyperactivity Disorder (ADHD). The child may have persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development, which may involve six (or more) of the following symptoms which may have persisted for at least 6 months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities, they include such characteristics as the following;

1. The inability to often fail to give close attention to details or makes careless mistakes in schoolwork, or during other activities (such as, overlooking or missing details or work being inaccurate).
2. Often has difficulty sustaining attention in tasks or play activities (such as having difficulty remaining focused during lectures, conversations, or lengthy reading).
3. Often does not seem to listen when spoken to directly (for instance, mind seems elsewhere, even in the absence of any obvious distraction).
4. Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (for instance, starts tasks but quickly loses focus and is easily side tracked).
5. Often has difficulty organizing tasks and activities (such as, difficulty managing sequential tasks; difficulty keeping materials and belongings in order; messy, disorganized work; output has poor time management; fails to meet deadlines).
6. Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as, schoolwork or homework; for older adolescents and adults, preparing reports, completing forms, reviewing lengthy papers).
7. Misplaces things necessary for tasks or activities (such as, school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile telephones).
8. Is often easily distracted by extraneous stimuli (for older adolescents and adults, may include unrelated thoughts).
9. Is often forgetful in daily activities (such as, doing chores, running errands; for older adolescents and adults, returning calls, paying bills, keeping appointments).

Smith, Lawrence and Segal (2018) concluded that hyperactive children may show high incidence of other associated difficulties such as problems of motor control, conduct and emotional disorders and social interactional difficulties. The hyperactive children have a disorder that not only constitutes a personal "handicap" but is particularly notable in causing secondary dysfunction in the child's

educational, family and social domains. Amalu et al (2023) noted that learning disabilities that affect the acquisition of knowledge and skills, particularly a neuro developmental condition affecting intellectual processes, educational attainment, and the acquisition of skills needed for independent living and social functioning.

A number of conferences and workshops have been organized with a view to addressing the problem of hyperactive behaviour among children (Ghaemi, 2009). As a result, a number of strategies have been recommended for management of hyperactive behaviour. For instance, Stallman and Bari (2017) indicated that there are different ways to treat a case of child hyperactivity which include psychological therapy using time-out and isolation. Brown, Bonello and Pollard (2015) also recommended the use of multiple therapies such as self-control technique and specialized groups that address each of the difficulties associated with child hyperactivity. Suggestion was also made by Stallman and Bari (2017) that parents should adopt situational educational style where parents would not be overprotective but rules and limits are made quite clear; to enable the children adjust properly in the educational environment. All these recommended approaches look quite interesting in their theoretical orientation, but evidence shows that the problems of child hyperactivity are still prevalent.

Literature reports emanating from studies outside Nigeria tend to suggest that bio-psychosocial factors have the potentials of predicting hyperactive behaviour. The biological factors or model was explained by Stallman and Bari (2017) as a tool that psychologists use to examine how psychological disorders develop. The authors reasoned that there is so much to consider that psychologists have adapted what is called the bio-psychosocial (BPS) model, which examines biological, psychological, and social factors affecting an individual, to examine how and why disorders occur. The various types of behavioural and psychological imbalances observed in students today is a reflection of their mental or psychological state (Njoku et al, 2020).

The biological aspect of the BPS model deals with studying the physiological causes of hyperactivity (Yaşam, Davranış & Cinsiyet, 2016). According to the model, the physiological causes alone are not enough for the occurrence of hyperactivity, unless they are accompanied by the other two aspects of the model as well. Much hyperactive behaviour may have biological factors at their base, such as genetic issues, low immunity, hormones, and physical trauma, to name a few (Sharpe, 2012). An important connection to make here is that the elements of the BPS model are all connected. Biology can affect psychology, which can affect social well-being, which can further affect biology and so on. Thus, the power of the BPS model is that it looks at hyperactive behaviour in a variety of contexts and examines how the interaction of

different factors lead to specific issues for an individual such as hyperactive behaviour. One wonders the extent the biological factors could predict the hyperactive behaviours of pupils in South East, Nigeria; especially when the academic achievements of these pupils have been observed to be declining.

Primary education is the education given in an institution for children aged six (6) to eleven (11) years plus. Primary education is the bed-rock for success in other levels of education and plays a crucial formative role in the survival of the whole educational system (FRN, 2014). In spite of the importance of primary education as the basis for achievement of pupils in the whole educational system and involvement in national development, Ejiofor (2020) indicated that the achievements of pupils in internal and external examinations such as First School Leaving Certificate (FSLC) examinations in South-East, Nigeria in the period under review (2018-2021) have been declining steadily. For instance, a close analysis of the results of the First School Leaving Certificate (FSLC) examinations in Education Authorities in South-East, Nigeria for the years 2018-2021 show that only 56%, 53%, 48% and 38% of the pupils respectively passed at credit level and above (Ministry of Education, MOE, Abia, Anambra, Ebonyi, Enugu and Imo States, 2018-2021). The observed poor achievement of pupils in the First School Leaving Certificate (FSLC) examinations was related to poor reading comprehension which was suspected to be linked with hyperactive behaviour among the pupils and ineffective teaching (Ejiofor, 2020). The persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with the teaching and learning process, has continued to create concerns in the minds of teachers, parents, curriculum experts and evaluators. Some of the social problems include avoiding people, avoiding type or class of people, irritation, depending on others, avoiding social meetings or gatherings (Ofoegbu, et al, 2022).

A factor that is believed to moderate the relationship between biological factors and child hyperactive behaviour is gender. Gender is the social and psychological aspects of being female or male; it includes a person's understanding of the meaning to his own life of being a male or a female (Halpern-Felsher, 2012). The problem of hyperactive behaviour disorder is yet to be adequately published in literature in Nigeria. The few Nigerian studies that have been published reported a prevalence of hyperactive behaviour disorder of 7.6%; a higher prevalence is often reported in males, than in females (Chinawa, 2014). In other African countries, such as South Africa, Democratic Republic of Congo, or Ethiopia, the prevalence of hyperactive behaviour disorder has been reported to vary from 5.4% to 8.7% among school children; with a higher prevalence often reported in males than in females (Chinawa, 2014 & Bakare, 2012). One wonders what would be

the influence of biological factors as predictors of hyperactive behaviour of primary school pupils in South-East, Nigeria which is what the study is set to investigate, where the academic achievements of pupils in the internal and external examinations have been declining steadily.

STATEMENT OF THE PROBLEM

Children naturally are expected to emit behaviours that involve sustained attention, focus and calm predisposition which would not generate tension and anxiety for them. The attention may result to quality academic achievements of primary school pupils. However, personal experiences of the researcher as teachers and parents show that the hyperactive children do not follow that pattern. They hardly remain seated at the dinner table while eating or in the classroom when lessons are going on. They constantly chatter or talk too loudly and at the wrong times. They always interrupt other people's conversations because they are unable to wait. They have difficulty getting to bed, staying in bed, or getting to sleep at night and are always throwing things (such as balls) in the house without thinking; thereby breaking windows or furniture by accident. Stake-holders in education such as psychologists, school counsellors, government, communities, and parents are worried about these hyperactive behaviours.

Efforts have been made with a view to addressing the problem of hyperactive behaviour among children. As a result, a number of strategies have been recommended for management of hyperactive behaviour; but the problem is still prevalent. Literature reports emanating from studies outside Nigeria tend to suggest that biological factors have the potentials of predicting hyperactive behaviour. The bio-psychosocial (BPS) model is a tool that psychologists use to examine how psychological disorders develop. Biopsychosocial (BPS) model, examines biological, psychological, and social factors affecting an individual and how and why the disorders occur. The extent to which biological factors would predict the hyperactive behaviour of pupils in South-East, Nigeria who operate in different socio-cultural circumstances is yet to be determined. The problem of this study therefore, put in a question form is: To what extent do biological factors predict the hyperactive behaviour of primary school pupils in South-East, Nigeria?

Purpose of the Study

The purpose of the study was to determine the extent to which biological factors predict hyperactive behaviours of pupils in the South-East, Nigeria.

Specifically, the study sought to;

1. Determine the relationship between biological factors and hyperactive behaviours of pupils.

2. Find out the gender difference in the relationship between biological factors and hyperactive behaviours of pupils.

Research Questions

The following research questions guided the study;

1. What is the relationship between biological factors and hyperactive behaviours of pupils?
2. What is the gender difference in the relationship between biological factors and hyperactive behaviours of pupils?

Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance:

HO₁: Biological factors have no significant relationship with hyperactive behaviours of pupils.

HO₂: There is no significant gender difference in the relationship between biological factors and hyperactive behaviours of pupils.

METHODOLOGY

A preliminary survey was initially conducted to identify pupils with hyperactive behaviour using the Identification Questionnaire (CHBIQ). Two instruments namely: Child Hyperactive Behaviour Identification Questionnaire (CHBIQ) and Biological Factors Questionnaire (BFQ) were developed by the researcher and administered to the respondents and validated by three experts. To determine the internal consistency of the items of the instruments they were administered to 30 pupils with hyperactive behaviour that were outside the study area and the computation was done using Cronbach’s Alpha method, which yielded reliability estimates of 0.77 and 0.91 for CHBIQ and BFQ respectively.

The study adopted a correlational research design. A total of 1,566 pupils (713 males and 853 females) were drawn through multi-stage sampling technique from 3915 primary five pupils (1857 males and 2058) females with hyperactive behaviour in 5477 public primary schools in South East, Nigeria were used for the study. A preliminary survey was initially conducted to identify pupils with hyperactive behaviour using the Child Hyperactive Behaviour Identification Questionnaire (CHBIQ). Two instruments namely: Child Hyperactive Behaviour Identification Questionnaire (CHBIQ) and Biological Factors Questionnaire (BFQ) were developed by the researchers and validated by three experts from Educational Psychology, Guidance and Counselling and Measurement and Evaluation. Each of the Child Hyperactive Behaviour Identification Questionnaire (CHBIQ) and Biological Factors Questionnaire (BFQ) was a four-point rating scale of: Very High Extent (VHE = 4), High Extent (HE = 3), Low Extent (LE = 2), and Very Low Extent (VLE = 1). Negative item statements were reversed while scoring.

The decision rule of 0.00 – 0.20 is Very Low Relationship, 0.21 – 0.40 is Low Relationship, while 0.41 – 0.60 is Moderate Relationship, 0.61 – 0.80 is High Relationship and 0.81 – 1.00 is Very High Relationship, these were used for the interpretation. To determine the internal consistency of the items of the instruments they were administered to 30 pupils with hyperactive behaviour that were outside the study area and the computation was done using Cronbach’s Alpha method, which yielded reliability estimates of 0.77 and 0.91 for CHBIQ and BFQ respectively. The data obtained through the administration of the instruments were analysed using Pearson Product Moment Correlation Coefficient to answer research questions. Linear regression was used to test null hypotheses at 0.05 level of significance.

RESULTS

The results of this study were presented in line with the research questions and hypotheses that guided the study.

Research Question One: What is the relationship between biological factors and hyperactive behaviours of pupils?

Table 1: Correlation Matrix of Biological Factors and Hyperactive Behaviours of Pupils

S	o	u	r	c	eB	FH	B	P
					Pearson Correlation	1	.82	1
B					FSig. (2-tailed)	.000	.000	.000
					N	1,566	566	566
					Pearson Correlation	.821	.821	.821
H	B				PSig. (2-tailed)	.000	.000	.000
					N	1,566	566	566

BF = Biological Factors, HBP = Hyperactive Behaviours of Pupils.

* Correlation is significant at the 0.05 level (2-tailed).

Data in Table 1 indicated a correlation coefficient (r) of .82 which is positive and within the coefficient limit of ± 0.81-1.00. This indicated that biological factors to a very highly positive extent predicted hyperactive behaviours of pupils in the South-East Zone of Nigeria. Biological factors therefore, predicted 82.10% of the variance observed in hyperactive behaviours of pupils.

Hypothesis One: Biological factors have no significant relationship with hyperactive behaviours of pupils.

Table 2: Linear Regression Analysis of the Relationship between Biological Factors and Hyperactive Behaviours of Pupils

M o d e l	S u m D	f	M e a n S q u a r e	F	S i g .
of Squares					
Regression	111.5431	111.54	31312.271		.000 ^b
Residual	132.8521	565.	085		
T o t a l	244.3951	566			

Df= degree of freedom, F = F-calculated, Correlation is significant at the 0.05 level (2-tailed)

The data in Table 2 above showed that there was significant relationship between biological factors and hyperactive behaviours of pupils. The calculated f-value of 1312.271 in respect of the relationship between biological factors and hyperactive behaviours of pupils is higher than f-critical value of 1.96 with degree of freedom of 1565 at 0.05 level of significance. Therefore, the

null hypothesis of no significant relationship between biological factors and hyperactive behaviours of pupils was rejected. Consequently, biological factors significantly predict hyperactive behaviours of pupils.

Research Question Two: What is the gender difference in the relationship between biological factors and hyperactive behaviours of pupils?

Table 3: Correlation Matrix of the Gender Difference in the Relationship between Biological Factors and Hyperactive Behaviours of Pupils

S o u r c e	G e n d e r	B F & H B P
Pearson Correlation	1	.114* (11.4%)
Gender Sig. (2-tailed)	1	1
N	156	515
Pearson Correlation	.665*	1
BF & HBP Sig. (2-tailed)	0	0
N	156	515

Gender, BF& HBP = Biological Factors and Hyperactive Behaviours of Pupils. *Correlation is significant at the 0.05 level (2-tailed)

Data in Table 3 indicated a correlation coefficient (r) of .11 which was positive and within the coefficient limit of ±0.00-0.20. This indicates that gender difference in the relationship between biological factors and hyperactive behaviours of pupils is to a

positive but a very low extent. Consequently, gender predicted only 11.4% of the variance observed in the relationship between biological factors and hyperactive behaviours of pupils.

Hypothesis Two: Gender does not have significant difference in the relationship between biological factors and hyperactive behaviours of pupils.

Table 4: Linear Regression Analysis of Gender Difference in the Relationship between Biological Factors and Hyperactive Behaviours of Pupils

M o d e l	S u m of Squares	D	f	M e a n S q u a r e	F	S i g .
Regression.	0112		.0060	.039		.182 ^a
Residual	243.8321	565	156			
T o t a l	243.8431	566				

Df= degree of freedom, F = F-calculated, Correlation is significant at the 0.05 level (2-tailed)

The data in the Table 4 above showed that there was no significant gender difference in the relationship between biological factors and hyperactive behaviours of pupils. The calculated f-value of 0.039 in respect of the gender difference in the relationship between biological factors and hyperactive behaviours of pupils is less than f-critical value of 1.96 with degree of freedom of 1565 at 0.05 level of significance. Therefore, the

null hypothesis of no significant gender difference in the relationship between biological factors and hyperactive behaviours of pupils was retained. Consequently, there was no significant gender difference in the relationship between biological factors and hyperactive behaviours of pupils.

Major Findings of the Study

It was found from the study that:

1. Biological factors to a very highly positive and significant extent predicted hyperactive behaviours of pupils in the South-East Zone of Nigeria. Biological factors predicted 82.10% of the variance observed in hyperactive behaviours of pupils.
2. There was no significant gender difference in the relationship between biological factors and hyperactive behaviours of pupils. Gender predicted only 11.4% of the variance observed in the relationship between biological factors and hyperactive behaviours of pupils.

DISCUSSIONS

The discussions based on the major findings of the study showed that biological factors to a very highly positive and significant extent predicted hyperactive behaviours of pupils in the South-East Zone of Nigeria. Biological factors predicted 82.10% of the variance observed in hyperactive behaviours of pupils. The findings of this study support the findings of the study by Meer, Hoekstra and Bralten (2017) which was conducted to identify genetic variants contributing to attention-deficit/hyperactivity disorder (ADHD) in Indonesia. The finding of the study showed that the model explained 12.5% of variance in ADHD as severity. This finding supports the 'bio' component of the biopsychosocial factor/model by Stallman and Bari (2017) which reported biological influence on hyperactive behaviour. The finding of this study confirms the report by Yaşam, Davranış and Cinsiyet (2016) that some of the hyperactive behaviours may have biological factors at their base, such as genetic issues, low immunity, hormones, and physical trauma, to name a few. The finding of the study also indicated that there was no significant gender difference in the relationship between biological factors and hyperactive behaviours of pupils. Gender predicted only 11.4% of the variance observed in the relationship between biological factors and hyperactive behaviours of pupils. The finding of the study agrees with the findings of the study carried out by Ludwig and Pittman (2017) which examined the relationship between biological factors and hyperactive behaviours of pupils. The findings of the study indicated no significant gender differences in the relationship between biological factors and hyperactive behaviours of pupils. The finding of this study agrees with the finding of the study by Ying and Samuel (2012) which was carried out on the relationships between psychosocial factors and hyperactive behaviours among pupils in University demonstration primary schools in Taiwan. The result of the analysed data revealed that there were no significant gender differences in the relationships between psychosocial factors and hyperactive behaviours. The pupils used for this study tend to exhibit the risk-taking behaviour characteristics such as running about or climbing in situations where it is inappropriate, being unable to engage in leisure

activities quietly, engaging in purposeless activities among others without gender discrimination.

CONCLUSIONS

Biological factors to a very highly positive and significant extent predicted hyperactive behaviours of pupils in the South-East Zone of Nigeria. Biological factors predicted 82.10% of the variance observed in hyperactive behaviours of pupils. Biological factors may provide supportive frameworks from which one can assess the extent hyperactive behaviours of pupils could determine the nature of academic materials the pupils could be exposed to.

There was no significant gender difference in the relationship between biological factors and hyperactive behaviours of pupils. Gender predicted only 11.4% of the variance observed in the relationship between biological factors and hyperactive behaviours of pupils. Conclusion could be made therefore that hyperactive behaviours of pupils depend on biological factors without gender discrimination. These conclusions should first be study area specific before being generalized.

RECOMMENDATIONS

Based on the findings of this study the following recommendations are made:-

1. Primary school pupils with hyperactive behaviour should be provided with information from this study; which would help them understand the primary components of biological approach to hyperactivity and the impact of hyperactivity on their academic achievement.
2. There should be establishment of functional counseling centres in all the public primary schools and professional counsellors/psychologists should be engaged to provide services for solving hyperactivity problems among pupils
3. Stakeholders such as counsellors/psychologists, parents/guardians, teachers/school administrators should evolve new approaches and techniques for making educational system effective by orienting them on the modern techniques that would ensure appropriate management of hyperactive behaviours.

REFERENCES

- Alejandra, S., 2017. Child hyperactivity: Causes and how education plays a role? *Comprehensive Psychiatry*. 42 (2): 53–71.
- Amalu, M., et al., 2023. Prediction of Self-Concept and Anxiety on the Tendency of Postgraduate Students with Learning Disability (LD) to Acquire Research Skills in Two Public Universities of Cross River State, Nigeria: Implications for Counselling. 11 (3) 146-156 (<http://creativecommons.org/licenses/by/4.0> 1).

- Bakare, M.O., 2012. Attention deficit hyperactivity symptoms and disorder (ADHD) among African children: A review of epidemiology and co-morbidities. *African Journal of Psychiatry*, 15,358-361.
- Berrios, G. E., 2013. European views on personality disorders: A conceptual history. *Comprehensive Psychiatry*. 34 (1): 14–30.
- Brown, B.T., Bonello, R., and Pollard, H., 2015. . *Chiropractic and Osteopathy*. 13 (1): 5.
- Chinawa, J.M., 2014. Attention deficit hyperactivity disorder: A neglected issue in the developing world. Research article on *Journal of Behavioural Neurology*, 1694764, Hindawi Publishing Corporation.
- Ejiofor, S., 2020. Achievements of pupils in internal examinations and the transition examination into junior secondary schools in South-East, Nigeria. *Journal of Behavioural Assessment*. 43 (2): 426– 438 Federal Government of Nigeria. , 2014. National policy of education: Lagos: NERDC Press
- Ghaemi, K., 2009. *Hyperkinetic behaviour*:. New York: Guilford Press.
- Halpern-Felsher, B., 2012. *Adolescent decision making: An overview*. New York: McGraw Press.
- Ludwig, K. B., and Pittman J., 2017. Pupils' pro-social values and hyperactive behaviour. *Youth and Society*. 30 (4) 461-482.
- Meer, D., Hoekstra, P.J., and Bralten, J., 2017. Predicting attention-deficit/hyperactivity disorder severity from psychosocial stress and stress-response genes: A random forest regression approach. *Translational Psychiatry* 7, 1145.
- Njoku, J. N., Bekomson, A. N., and Ofoegbu, J. U., 2020. Influence of Gender and Age on Psychological Disorders among Undergraduates of University of Calabar, Cross River State, Nigeria. *European Journal of Scientific Research* 156(3), 341-347. <http://www.europeanofscientificresearch.com>
- Ofoegbu, J. U. et al., 2022. Abduction Threat Surviving Skills in Teacher Education Curriculum: Key to Learners' safety in School Environment. *Global Journal of Educational Research*, Vol. 21 (135-142) www.gloaljournalseries.com.ng.
- Sharpe, L., 2012. A reformulated cognitive-behavioral model of problem gambling: A bio-psychosocial perspective. *Clinical Psychology Review*. 22 (1): 1–25.
- Smith, M.A., Lawrence, R., and Segal, J., 2018. *Hyperactive behaviours*. London: ADAM Health Solutions Publishers
- Stallman, H. M. and Bari, A., 2017. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5405419>. *BJPsych Open*. 3 (2): 96–101.
- Ullrich, S., 2017. <https://www.researchgate.net/publications/5775313>. *Journal of Personality Disorders*. 21 (6):657–63.
- Yaşam, K., Davranış, P., and Cinsiyet, P., 2016. Psychosocial correlates of behavioural problems in children with ADHD in special schools in Pakistan. *The Journal of Neurobehavioral Sciences* 3 (3), 213-224.
- Ying, L., and Samuel, R., 2012. Relationships between psychosocial factors and hyperactive behaviours among pupils in University demonstration Primary schools in Taiwan. *Developmental Psychology*. 40 (4), 572-582.