

Cluster Formation in Child Psychiatry - Part II: Some Empirical Classification

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Abstract

Six clusters of patients obtained by employing suitable clustering technique on 435 child guidance clinic cases were presented. They were named as childhood psychosis, hysterical syndrome, anxiety disorders, conduct disorders, hyperactivity syndrome and scholastic backwardness. These clusters were characterized by the frequency of occurrence of all the variables included in the study. The clusters have good communicative values for both research and clinical work, reflect actual clinical experience and further may suggest an ideal diagnostic classification system.

Key words -

Empirical classification,

Childhood psychosis,

Conduct disorder,

Hyperactivity syndrome,

Scholastic backwardness

Discontent with the classification of child psychiatric patients obtained by traditional methods, many attempts have been made during the past 30 years, to obtain psychiatric classification resorting to cluster analysis. The cluster analytic techniques permit identification of similar patterns of problem behaviours which represent empirically derived diagnostic categories or syndromes. The power of this model is reflected in the fact that a quantitative score is assigned to each variable studied. Information is communicated that is not contained in traditional psychiatric diagnosis and more clearly reflect actual clinical experience. Several investigators [1] have employed cluster analytic methods in child psychiatry and offered promising starts towards the development of empirical typologies with their respective inventories, but the identification of groups was not based on demographic, psychosocial and clinical variables put together. Recently, Kapur et al [2], [3] applied suitable cluster analytic method on 221 child guidance clinic cases based on developmental psychopathology checklist items along with demographic variables and obtained seven distinct clusters.

The basis for the study was 435 cases selected from 701 cases registered in child guidance clinic, National Institute of Mental Health & Neuro Sciences, Bangalore, India. The wealth of data gathered on these 435 cases, described fully in an earlier paper [1] as part I, motivated the present authors to set up twin objectives viz.,

- (1) to evaluate currently available classification cluster methods for their performance efficiency by employing them on the same data and
- (2) to select relatively the 'best' meaningful classification in child psychiatry.

Objective (1) is fully discussed in evaluates seven hierarchical agglomerative methods and two partition methods. This led to the selection of the Forgy method with cluster centroids of complete linkage method using Euclidian Distance as the best method for the data that was analysed. Objective (2) forms the basis of the present study; the clusters obtained are presented in terms of all the variable included in the proforma employed to collect the data as a basis for a good classification system.

The Present Classification

The six clusters produced by the k-means algorithm of Forgy method using the centroids generated by the Complete Linkage Euclidian Distance were named as the Childhood Psychosis (79 cases), Hysterical syndrome (111), Anxiety Disorders (76), conduct Disorders (60), Attention Deficit-Hyperactivity (50) and Scholastic Backwardness (59). They were symbolised by PSY, HYS, AD, CD, HYP and SB respectively in the present study.

Table I presents the six clusters in terms of general information including demographic variables and chief complaints. The mean age of the whole sample of 435 children was 10.6 years. The PSY has oldest children of mean age 11.5 years, followed by HYS, AD, CD, SB and HYP in this order. The HYP group consists of significantly more number of males. Muslims in PSY and Christians in SB were significantly higher. Most of the children of HYS were referred by specialist doctors, of SB by school, and AD by family. Precipitating factors were present, onset is acute and course is episodic in HYS group. Duration of illness is significantly less in case of HYS, while it is high in CD, HYP and SB. Significantly high percentage of HYS children had previous treatment.

Table I - General Information of the Clusters - (Except with decimal points, the figures are frequency of occurrence in %)

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*p < 0.05, ** p < 0.01

Table II presents the frequency of occurrence of symptoms associated with the six clusters. Stammering with PSY, lisping with HYP and both under talkative with SB were significantly associated. Reading difficulties in own/foreign languages and spelling mistakes were significantly associated with SB and HYP. Sleep disorders such as disturbed sleep, initial insomnia and excessive reported dreams were significantly associated with PSY. Abnormal appetite in PSY and food fads in CD were significant. Encopresis was associated with HYP.

Table II - Frequency of Occurrence of Symptoms associated with Six Clusters (figures in %)

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From Table II, we note most of the behavioural disorders were associated with CD and HYP groups. Timid and nervous were not significant in these groups, but they were significant in both PSY and AD. Wandering is associated with both PSY and HYP, while motor retardation is associated only with PSY.

Most of the mood disorders were significantly present in PSY. However irritability, hostility and suspiciousness were significantly with CD. Most of the items of situation specific anxiety were significant with AD. However fear of crowds was associated with PSY. Scholastic backwardness was reported in SB (98%), HYP (84%) and CD (62%), while below average intelligence was significantly associated with SB and HYP. Irregular too school and truancy to school were associated only with VD, while abnormal peer group, adjustment was associated with HYP. Neurotic disorders such as nail biting, thumb sucking and cruelty to animals were significantly associated with HYP while tics was with PSY. Most of the hysterical symptoms were significantly present with HYS. However, sensory symptoms were significantly higher with AD.

All psychotic symptoms were highly associated with PSY. As far as the physical complaints were concerned, headache with AD, giddiness with HYS, epilepsy with HYP, and menstrual complaints with PSY were highly associated.

As shown in Table III, most of the children in HYP group from joint families. But the average family size is significantly high in PSY. The mean family income is high in AD group in which the family occupation was either service or professional families with skilled occupation was associated with skilled occupation was associated with PSY. Illiterate parents were significantly high with PSY, while high educated parents (graduates, professionals) were associated with AD. HYS was associated with middle educated (primary, secondary) fathers. Mother's mental health was abnormal in most of the cases of PSY. Discordant intra-familial relationship, familial over involvement and inadequate parental control were associated with CD. Inadequate living conditions was associated with PSY, stresses in school with HYS and migration or social transplantation with AD.

Table III - Family members of six clusters including demographic particulars of parents (except with decimal points, the figures are frequency of occurrence in %)

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Table IV shows abnormal delivery and abnormal birth weight were significantly associated with HYP, while abnormal birth cry, hyperpyrexia and convulsions were associated with SB. Delays in motor developments as well as speech were significant in both HYP and SB, mean present class was significantly high in PSY, HYS and AD, while the strained relationship with the teacher is significantly present in other three clusters. Change in the medium of instruction and help in studies at home are significantly associated with SB, while difficulty at starting school is significantly associated with both HYP and SB. It is interesting to note that all the items on abnormality in premorbid temperament are significantly present in HYP. However, abnormality in attitude to work, interpersonal relationship and self critical were significant with SB. Complaints were also associated with CD.

Table IV - Personal history, milestones of development, school and study pattern and premorbid temperament in six clusters (except with decimal points, the figures are frequency of occurrence in %)

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As shown in Table V abnormality in general appearance, abnormal mood, abnormal thoughts and verbalization, senses and perception, self-image were associated with PSY. Abnormality in attention and concentration, poor memory, below average intelligence were associated with HYP. However, abnormal level of motor activity was significant with both PSY and HYP, while abnormal perception of own problem was significance with both HYP and HYS. Abnormal feeling about family members was significant only with CD.

Table V - Mental status examination particulars of six clusters (figures are frequency of occurrence in %)

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Discussion and conclusions

On comparing the results of the present study with that of Jenkins [4], it was noted that the present study has identified two distinct clusters, viz., Hysterical syndrome and Scholastic Backwardness. Probably, this may be due to the difference in the social and cultural aspect of the population from which the cases emerged. Arnold & Smeltzer [5] employed factor analysis to classify 185 children (below 12 years) and reached similar results obtained by Jenkins.

In the present study, variables which were present in less than 10% or present in more than 90% of all cases have been excluded from the analysis. If each one of these six groups were analysed further including some of the variables with less than 10% or more than 90% incidence omitted earlier, it might be possible to obtain more specific categories within each group. Autism is perhaps one such entity [2], [3]. Such a procedure is essential because, for instance, as Prior [6] stated childhood psychosis was a blanket term used to describe a multitude of disorders ranging from developmental retardation to schizophrenia.

Each group may display more than one syndrome or syndromes may overlap also. In the present study, both the childhood psychosis and anxiety disorder groups were characterised by the presence of symptoms nervous (30%, 21%), timid (37%, 36%) and headache (27%, 29%). However childhood psychosis was distinguished by the presence of disturbed sleep (38%), abnormal appetite (37%), unduly happy (11%) or depressed (18%), talks to self (22%), and laughs to self (17%). Similarly, the anxiety disorder group was distinguished by the presence of sensory symptoms (13%), small family 3 to 6 members (80%), and socially and economically upper class family.

Prior [7], Barkley [8], Loney and Milich [9], Milich and Londau [9], Hinshaw, and Fergusson [11] have debated whether conduct disorder and attention deficits constitute a single entity or different entities. Applying Common factor analysis, confirmatory factor analysis and symptoms overlapping methods, researchers found in more than two third of the studies that the conduct disorder and attention deficits,

constituted two distinct entities. Recently, Kaliaperumal [13] applied structural equation models and confirmed these findings. In the present study, conduct disorder cluster was distinguished by the presence of symptoms irritability (20% as against 12% in hyperactivity), hostility (10% against 2%) suspiciousness (5% against nil), irregular to school (33% against 14%), truancy to school (23% against 10%), inadequate parental control (70% against 28%), discordant intra-familial relationship in the family (35% against 24%) familial over involved (58% against 46%), and abnormal feeling about family members (37% against 14%). Similarly, the hyperactivity was distinguished by the presence of reading/spelling difficulties (30% against 8%), distractibility (92% against 2%), wandering (16% against 7%), below average intelligence (50% against 10%), neurotic symptoms such as nail biting, thumb sucking, cruelty to animals (10% against 2%), abnormal delivery (16% against 10%) delay in motor developments (16% against 5%) and delay in speech developments (245% against 8%). Hyperactivity was distinguished from conduct disorders by the presence of abnormality in premonitory temperament such as social relation (26% against 2%), intellectual activity (46% against 10%), mood (18% against 7%), attitude to work (54% against 7%), interpersonal relationship (46% against 5%) and self critical (46% against 8%). In mental status examination, hyperactivity syndrome was distinguished by the presence of abnormal level of motor activity (74% against 5%), abnormal attention and concentration (80% against 3%), poor memory (4% against nil), below average intelligence (36% against 3%), abnormal perception of his own problem (72% against 38%).

Venkataramaiah & Embar [14] have reported hysteria as one of the commonest neurotic disorders in children. Lal Manchanda [16], Trivedi [17], have reported that hysteria was more prevalent among girls. Rock [18], Sharma [19], Maloney [20] and Uma and Kapur [21] have reported equal sex distribution regardless of age. In the present study there were 15 males for every 100 females, showing significantly more males with Hysteria. Stress in the school environment was reported in 41% of cases in the Hysteria Cluster in the present study.

Maloney [20], Goodyear and Uma [22] have reported that the children showed concern for the symptoms and were willing to discuss their problems. Hence, Uma [23] concluded that the phenomenon La belle indifference often described in hysterical adults was not a consistent feature of childhood hysteria. In the present study, in respect of 65% of cases with hysteria, there was poor perception of own problem and thus the phenomenon La belle indifference was confirmed.

John & Kapur [24] stated that childhood psychiatric problems are generally less readily recognized and a child who has a problem in school is easily identified both by parent and by teacher. Thus, a common problem of referral to a child guidance clinic has been mostly scholastic backwardness. In the present study, the cluster designated as 'Scholastic Backwardness' consists of 59 cases and they were from educated middle class families. This found an agreement with Malhotra and Chadda [25] and John and Kapur [24]. Majority of the cases in this group in the present study did not report any psychiatric symptoms, except a few behavioural problems such as inattention (12%) and getting bullied (10%).

Scholastic backwardness was noticed in the hyperactive cluster (84%), conduct disorders (62%), and anxiety disorders (30%) clusters also, However, scholastic backwardness cluster was distinguished from these clusters by less frequencies for irregular to school (9%), and abnormal peer adjustment (19%). This group was also characterised by the absence of psychiatric symptoms. The symptom 'timid' was present in 25% of cases, stubborn in 37%, demanding in 15, disobedient or temper tantrum in 12% and lonely in 12%. John & Kapur [24] found that more than 40% of the children were stubborn, disobedient, aggressive, had temper tantrum and were anxious, withdrawn and told lies. This high

percentage of symptoms was due to the inclusion of all children with scholastic backwardness. In this respect, the cluster identified in the present report consisted of 59 children who could not be labelled either as the aggressive group or as the inhibited group. This achievement was possible due to analytical procedure which will look into the covariance structure of the data without assuming any prior knowledge about the classification.

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