

A.I.I.S.H. NORMS ON SOME ASPECTS OF CHILD DEVELOPMENT*

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The diagnosis of normal development of a child is of both practical and theoretical importance. A clinician who is engaged in evaluating the development of a child exhibiting one or more of several clinical conditions like mental deficiency, speech and hearing impairment, neurotic behaviour and so on faces the practical need for having data on normal development. Such data will help the clinician in diagnosing the condition and also in predicting future behaviour.

Child psychologists and members of other concerned professions who wish to develop a theory of behaviour development need empirical facts upon which to build such a theory. Carefully collected norms of development provide precisely such facts.

Although there are considerable individual variations, development in children follows recognizable patterns, with predictable stages (Hurlock 1956). Motor development, as a whole, is one such pattern which provides very useful information on the development of children, particularly during the early age levels. Delay in motor development is one of the earliest signs of a defective child. In fact, many of the items on any test purported to measure infant development are descriptive of motor behaviour. And this is one aspect of normal or delayed development which is relatively easier to observe or measure because development in this area is rapid and obvious (Watson 1959). Since the mental defectives invariably show considerable delay in sitting, standing and walking, delayed motor development has always been serving as a good index of mental deficiency in early childhood. Likewise the acquisition of speech is a slow process in mental defectives and hence is a good indicator of later development.

Indices of development established on the basis of the Western samples are regularly being used in our psychiatric, child guidance and pediatric clinics with an implicit assumption that these norms hold good for children here as well. But considering the almost total lack of norms for Indian children, it seems that such an assumption was never put to an empirical test.

Problem

The problem of the present investigation was to obtain norms on some aspects of motor development and one stage of language acquisition in children in and

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around Mysore through a cross section sample. The five stages of motor development chosen for study are:

1. Head holding.
2. Sitting alone
3. Creeping
4. Standing alone and
5. Walking alone.

The stage of language acquisition chosen for the study is the age at which children uttered their first few words.

Procedure

A medical exhibition was held during October—November (1967) by the Mysore Medical College where the All India Institute of Speech and Hearing had a stall of its own. This occasion was selected because a large number of people both from within and outside the state were supposed to visit Mysore for the Dasara Festival which meant that a near random sample of population in and around Mysore could be ensured.

In the All India Institute of Speech and Hearing stall, a relatively quiet place was ear-marked for questioning the mothers. All mothers who brought children under three years of age were questioned on the six variables of development. The informants were convinced of the purpose of such a questioning by telling them that the information was being collected on some aspects of child behaviour in general and that this did not involve any value judgements on the individual child. The willingness of the informants to give accurate information was thus ensured.

A standard question was asked for each item and where it was found necessary some explanation of the question was given (e.g., When did your child sit by himself?). The explanation could not be uniform to everybody in view of the heterogeneity of the sample (informants) in terms of age, education, social background and multiplicity of languages spoken and understood by them. However, the ages at which the mothers first observed the variables in question in their children were sought. Mostly the mother tongue of the mothers was used and when this was not possible English was made use of. Fathers of the children, when accompanied, supplied additional and/or confirmatory evidence. In no case was the information obtained in the absence of mother. Guessing by the mothers was discouraged. Data were not recorded when the mothers were hesitant or unsure of themselves. When parents gave conflicting reports no data was recorded. Although it is not possible to state the number of mothers who were not questioned for any one of these reasons, it is felt that such a number was insignificant.

Results and Discussion

In all it was possible to obtain information on 567 children on one variable (which is the maximum) and a minimum of 426 children on another variable. Sample numbers differ for different stages of development owing to some of the following reasons. A few children skipped certain stages, some parents were not able to specify the age of occurrence of certain behaviour, a few children were younger than the age at which some of the later milestones normally appear.

TABLE 1. *Mean Ages (in months), SD's, SEM's and the N for Six Stages of Development*

	Head Holding	Sitting Alone	Creeping	Standing Alone	Walking Alone	First Words
Mean	3.86	7.40	8.40	11.55	14.00	13.40
SD	1.47	1.01	1.89	3.36	3.57	4.16
SEm	0.05	0.04	0.09	0.15	0.11	0.18
N	567	552	426	500	465	481

Presented in the table number one are the means, standard deviations, standard errors of the means, and the number of children examined for all the six variables studied. Each variable will be discussed separately.

1. Head Holding

The mean age of head holding for the sample was 3.86 months with a SD of 1.47. The standard error of this mean was 0.05. In view of this negligible SEM, the mean of the sample can be assumed to be a reliable estimate of the population mean.

Head holding is a prominent feature of development taking place in the head and neck region and is one of the earliest signs of normal progress of a child. The obtained mean age indicates that when a child is seated with adequate support on a person's lap, he should be able to hold his head for a considerable period by the age of 3.86 months. The Western studies have obtained a mean age of four months for the same development to appear (Hurlock 1964). The mean of the present study is quite close to those of the Western samples.

Sex difference: Out of the total number of 567 children sampled, 271 were boys and 296 were girls. Head holding was observed at an earlier age in boys than in girls. The mean age of head holding in boys was 2.81 (SEM 0.11) and the same for the girls was 3.89 (SEM 0.07). However boys also showed greater variability (SD 2.01) than did girls (SD 1.26). Critical ratio for the observed mean difference was 6.35, significant at 0.01 per cent level. Western studies have not reported any sex difference on this variable (Hurlock 1964).

2. Sitting Alone

Sitting represents a transitional stage between the supine and the standing postures. In the present sample sitting alone was first observed at a mean age of 7.40 months, indicating that children at this age should be able to sit without any support. The SD and SEM of this mean were 1.01 and 0.04 respectively the latter indicating the greater reliability of the mean.

The Western studies have obtained a mean age of seven months (Shirley 1933; Gesell, 1963) and the mean of the present sample is very close to that.

Sex difference: 260 boys and 292 girls were sampled with a total of 552 children. Girls sat slightly earlier than boys, with mean ages of 7.01 (SD 1.02; SEM 0.15) and 7.96 (SD 1.50; SEM 0.11) months, respectively. The CR for this mean difference was 5.6 which was significant at 0.01 per cent level. Western studies have also shown some difference in favour of girls (Hurlock 1964).

3. Creeping

Creeping is one of the earliest and important developments leading finally to locomotion. At this stage the child can raise his knees from the floor, stiffen his legs, and 'walk on all fours'. In the present sample this behaviour was first observed at a mean age of 8.40 months (SD 1.89, SEM 0.09). Again, both the variability and standard error of the mean are small.

The Western norms place the onset of this behaviour at a mean age of 9 months (Hurlock 1964). Other workers have obtained a slightly higher age of 10 months (Shirley 1933). Since the mean of the present sample falls below even the lowest mentioned age in the Western literature, the probability of a true difference cannot be ruled out. However, a more definite conclusion needs further data.

Sex Difference: The total sample of 426 children consisted of 210 boys and 216 girls. Girls crept at a mean age of 8.33 months (SD 2.20, SEM 0.15) and boys at 8.65 months (SD 2.12, SEM 0.14). The CR for this difference was 0.09 which did not reach any level of significance.

4. Standing Alone

Standing alone is the next step in the developmental sequence leading up to walking. In the present sample children stood at a mean age of 11.55 months (SD 3.36, SEM 0.15). Variability is considerable but the SEM is negligible.

Norms based on the Western samples vary from less than a year (47 weeks) when the child can just pull himself to standing position to 14 months when the child can stand more firmly, more often and for a fairly longer duration (Hurlock 1964; Gesell 1963; Shirley 1933). Since what was asked in the present study was the very first appearance of the behaviour in question, the obtained age of

11.55 months is in close agreement with the corresponding age of less than an year in the Western studies.

Sex difference: 500 children were sampled out of which 256 were girls and 244 boys. The mean age of standing alone was 11.20 months (SD 2.81; SEM 0.10) for girls and 12.10 months (SD 2.72; SEM 0.11) for boys. The obtained CR of 0.40 was not statistically significant. However girls stood approximately a month earlier than boys and a similar trend is reported in the Western literature.

5. Walking Alone

Judging from the ease with which information on this variable was observed, walking alone is perhaps the most dramatic of all the stages of development in infancy. Walking is of great social and psychological significance to a child because it is at this stage that his contacts with the physical and social environment increases rapidly. In the present sample children walked at a mean age of 14.00 months (SD 3.57; SEM 0.11).

The Western norms on walking show considerable variations. Gesell (1963) reports that a normal child should walk anywhere between the age ranges of less than a year to 18 months. But Shirley (1933) has mentioned a mean age of 15 months. In general the mean of the present study is comparable to those of the Western studies.

It has been found that the walking age would be approximately twice the sitting age (Hurlock 1964). This rule is sustained in the present findings. The children sat at 7.40 and walked at 14.00 months. However, another rule that walking age would be 1 $\frac{1}{2}$ times the creeping age was not adequately supported. According to this rule the walking age should have been close to 13.00 months. But in this evaluation, the SD of 3.57 of the mean walking age should perhaps be considered.

Sex Difference: In the total sample of 465 children, there were 223 boys and 242 girls. Again the girls were ahead of the boys in learning to walk with a mean age of 13.86 (SD 3.86; SEM 0.22) and 14.34 (SD 3.48; SEM 0.25A) respectively. A CR of 1.15, however, was not statistically significant.

6. Acquisition of Language

First words: In the present sample of 481, children uttered their first few words at a mean age of 13.40 months (SD 4.16; SEM 0.18). The variability of the distribution is considerable. The first few words uttered by the children are 'papa' (daddy), 'amma' (Mummy) and one or two other words.

The Western norms on 'first words' vary to a marked degree. Gesell (1963) places the first words at 40 weeks, where as Shirley (1933) places it at 60 weeks, depending upon her own observation. But the mothers themselves credited their infants with a vocabulary of two or three words at 52 weeks. But almost

all the observers have reported within group variation to a great extent. Few infants uttered their words (Shirley 1933) as early as 8 months whereas a few others did not do so even at the age of two years. However many investigators agree that the first few words appear approximately at the end of the first year (Watson 1954). Thus the mean age of 13.40 months agrees closely with the Western norms.

Sex Difference: There were 232 boys and 249 girls in the sample. Boys uttered their first few words at a mean age of 14.68 months (SD 4.32; SEM 0.28) and girls, at a mean age of 9.67 months.(SD 4.14; SEM 0.26). The CR for this difference was 13.18, which was significant beyond 0.01 per cent level.

The development of language behaviour is of special clinical significance. Most of the methods used in the assessment of child development in late infancy depend largely upon verbal items. Further, of the various clinical conditions of child development, disturbances in the acquisition of language is easily observed and quickly attended to. In the sequence of language development the appearance of the first few words is an important stage. Norms on this variable would be of considerable help in the clinical evaluation of children.

Most investigators have reported a general superiority of girls over boys in language development (Gesell 1963; Hurlock 1964; Watson 1954). At all stages of language development boys lag behind girls. Girls have larger vocabularies, have grammatically better speech, and they pronounce words more accurately. Available evidences, however, are greater in case of speech disorders. Speech disorders, especially stuttering, is more common in boys than in girls.

This well established sex difference both in the development and disorders of language behaviour does lead one to think in terms of a genetic basis. But explanations offered so far have not always been satisfactory (McCarthy 1954).

Limitations of the present study: The questions regarding the sample, the adequacy of information provided by the parents and the place of interview are obvious. These questions, fortunately, can be answered. The sample was quite large (more than 426 on any variable and as large as 567 on one variable) and in the absence of any tendency to choose the subjects, everybody entering the stall with a child (of certain age) was questioned. And hence there is no reason to believe that it was a biased sample. However the possibility that the exhibition visitors themselves were a biased sample cannot be ruled out. In such a case there could have been a slight undersampling of lower social classes, to mention at least one aspect of it. The statistical analyses lends further support to the assumption that the sampling was perhaps representative, in addition to answering the other two questions. The standard errors of the various means are quite low: the lowest was 0.04 and even the maximum was as small as 0.28. This indicates good stability of the estimated means.

The comparison of these norms with those of the Western studies, some of them obtained through controlled observations of smaller samples, has shown a

close parallel. All these factors indicate that the errors mentioned above have not affected the results. However, this is not to deny the need for a cross validation.

Summary and Conclusions

Making use of an occasion when a large number of people from various strata of society would be available for questioning, a study was designed to collect developmental norms for children. The data was gathered at the All India Institute of Speech and Hearing stall at the Mysore Medical Exhibition, 1967. All mothers who brought with them children under three years of age were questioned about the age at which the five stages of motor development and one of speech development were first observed in their children. The obtained results were statistically analysed, discussed and compared with those of the Western studies. On the basis of this analysis, the following general conclusions can be drawn:

1. By the age of fourth month, normal children hold their heads. Boys do this significantly earlier than the girls.
2. By the age of seven to seven and-a-half months normal children sit alone for a few moments. Girls sit earlier than boys.
3. Within the age ranges of eight and nine months normal children creep. There is no significant sex difference.
4. Within the age ranges of eleven and twelve months normal children stand alone. Girls stand earlier than boys.
5. By the age of fourteen months normal children walk alone a few steps. Girls walk earlier than boys.
6. Within the age ranges of thirteen and fourteen months normal children say a few words. Girls speak significantly earlier than boys.
7. The norms of the present investigation are close to those of the Western studies. However the norms obtained for creeping indicate the possibility of a real difference between the Indian and the Western children.
8. In view of the above conclusions, there does not seem to be significant inter-cultural differences in the above mentioned patterns of child development except perhaps in the stage of 'creeping'.

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