# COMMUNICATIVE DISORDERS IN SOME MINORITY PRESCHOOL AND SCHOOL-AGE CHILDREN IN U. S. A.

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ABSRACT

***The specific purposes of this study were to survey and to determine the number and prevalence of communicative disorders in a metropolitan, minority-based, comprehensive health-care facility. The rationales were •developed from the limited and/or lack of accurate data on medical facilities, language disorders, and preschool children. The methodology included surveying the records for children referred Jor speech-language and audiological evaluations during the five-year calendar period 1973 through 1977. The results revealed that 3,827 children were seen for evaluation ; of this number 38'5% were diagnosed with communicative disorders. The distribution of the hearing, speech, language and learning disabilities was 63'6, 21-9, 10-9 and 4-3% respectively ; the population prevalences were 4-88, 1-63, 0-84 and 0-33% respectively, totaling 7-7%. The distribution for the preschool, elementary and Junior-Senior high groups was 39'2, 38-9 and 21-9% respectively; the population prevalence were 3'02, 3'00 and 1'68% respectively. The male-female ratios in the population and for the disorders were both 1'2: 1, indicating no differences Other specific results and implications were discussed.***

The present study reports on a survey of the types and prevalences of communicative disorders seen at a comprehensive health-care facility. The rationales for the study lie in the renewed professional interest in prevalence estimates referred to by Bensburg and Sigelman (1976) and in the need for more current and accurate data. In addition, data on communicative disorders in health-care facilities are more than difficult to obtain, more so than from other sources such as federal, state, local or others. This is due, in part, to public Law 93-308 {Family Educational Rights and Privacy Act of 1974 and its predecessors). It is 4ue, more generally, to the related or divisional status of speech-language pathology and audiology services within the health-care setting. Seldom, if ever, does a patient

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report to seek these services directly. Generally, the services are sought as a-consequence of medical interventions, management or referral: therefore, records are kept accordingly. This, additionally, compounds another problem, which has. been ignored in the profession of speech-language pathology and audiology. This problem involves whether or not communicative disorders are related or primary-handicaps. This problem is not germane to the present study, but it is germane to prevalence estimates in general.

ASHA (1977) identified four areas in which data on communicative disorders were lacking. These areas included (a) language impairments (b) disorders categorized by etiology and age of onset, and (c) disorders in treated versus un-treated populations. Ol the above, Healey et. al., (1981), advocating ASHA's more current position, found data not available in (a), (b) and (c). Their summation was based on what they cited as "..a comprehensive review and critique of the literature regarding the prevalence of communicative disorders and related disabi-lities.." (p. 1). A third source, which also reflected on the status of prevalence estimates, was Leske (1981a, b.). Her position was supportive of the other sources. She stated that " Despite the magnitude and socioeconomic impact of the commu-nicative disorder, epidemiologic data on these disorders are limited and often of poor quality " (p. 217). More to the point, Leske further stated that " Valid estimates of prevalence, or number of persons affected at a point in time, are difficult to obtain " (p. 217)

In reviewing the work of Healey et. al., (1981), one finds the report lacking in several critical areas. They do not discuss important topics such as minorities-(Taylor, 1980; Fay, et. al., 1970; Head Start Bureau, 1979, 1980, 1981 : Stewart, 1981); communicative disorders in medical or health care-facilities (Bunch, 1931;. Bunch and Raiford, 1931 ; Haller and Thompson, 1975 ; Stewart Martin, and Brady, 1979; see also Ciocco and Palmer, 1941 ; Watson and Tolson, 1977); and preschool children (Head Start Bureau, 1979, 1980, 1981). This latter area impacts-clearly treated versus untreated populations. In addition, they overlooked studies which would have yielded some data on language impairments (DesRoches, 1976; Stewart et. al., 1979; Head Start Bureau, 1979, 1980, 1981).

Within the context of the foregone discussion, the specific purpose of ther present study is to determine the number of communicative disorders in a major metropolitan, minority-based, comprehensive health-care facility by types of disor-der and sex. The survey comes from the unspecified prevalence data originally developed by Stewart et. al., (1979), The terms unspecified prevalence is synono-mous with the number of cases seen. Its usage better addresses the problem associated with hospital prevalences. The study is intended to add depth to-

areas considered deficient in the profession of speech-language pathology and audiology and to issues not covered by Stewart et. al.,

The study meets a number of professional needs. First, it presents an update and reevaluation of the data from a medical center. Although the data covers the years 1973-1977, they are the most currently available. Second, this study ensures the preservation of data, which may not be retrievable in the future, because the data source is sensitive to the availability of federal funding. In part, a major reason that more timely data are not available. Third, the data reflect communicative disorders in a minority population. Fourth, it reports, in part, data on preschool children, which is most limited in the literature.

## METHODOLOGY AND PROCEDURES

Specific details of data collection, methodology and procedures were described in an earlier study (Stewart et. al., 1979). The present study was a demographic study of the children diagnosed with communicative disorders from this earlier survey. Research issues germane to the study are discussed subsequently.

**The General Population** :

According to the Population Division of the U. S. Bureau of the Census, Davidson County, including Nashville, had a total population of 447, 877 persons in 1970. Of this number, 80-1, 19-6 and 0-3% were whites, blacks and others, respectively. The 1980 census revealed that the country had increased its population to 477,111. The racial composition from this was 76-8, 22-3 and 0-9% for Whites, blacks and others, respectively.

The health-care facility : The childern and Youth Program at Hubbard Hospital, affiliated with Meharry Medical College iu Nashville, Tennessee, has two major goals. One of its goals was to educate and to provide information on health-related topics. Its other goal was to deliver medical, follow-up, and related services to the indigenous, lower socio-economic communities surrounding Nash-Ville. In part, these communities comprised the 19.6 to 22.3% of the blacks in the population.

It was one of two centers in the State of Tennessee which provided services to children from birth through 18 years. The service included both general and specialized medical, dental, psychological, social, nutritional and speech-language and audiological. The target population was accepted according to the guidelines set by the Department of Human Services for the State. Audiological and speech-language services were provided by certified personnel on a routine, evaluative basis.

**Data Solicitation**:

The records utilized in this survey were for the five-year period dating January 1, 1973 through December 31, 1977. Individuals patient files and speech-language and hearing records were reviewed for specific information.

All children who had been evaluated for speech, language, and hearing disorders were included. Basic demographic data on preschool and school-age children, between the ages 3 through 18 years, were obtained. Based upon previous studies and considering the potential impact on learning, the ranges were partitioned into three groups. These included the age ranges : 3-5 years (preschool), 6-12 years (elementary, and 13-18 years (Junior-seinor high).

**Identification of Disorders** :

**Speech-language** : Children with normal speech and language were categorised under a specific age group by sex. Similarly, children diagnosed with communicative problems were classified and tallied appropriately. In addition, a learning-disabilities category was included.

Instruments for the evaluation of speech included the *Goldman-Fristoe* ***Test*** *of Articulation* (1969) and spontaneous connected speech samples. *The Preschool Language Scale* by Zimmerman, Siteiner and Evatt (1969) and *The Utah Test of Languages Development* by Mecbam, Jex, and Jones (1973) were the two evaluative measures for language. Although articulation and language scores were derived-by following the design of the tests, they were adjusted after considering cultural differences"

**Audiology** : Normal hearing children were categorized according to a specific age group by sex. Children were classified under this category if auditory thresholds appeared within normal limits (0-25 dB, re : ISO 1964) bilaterally. Hearing-impaired children were classified according to Martin (1976) under specific type of loss by age group and sex.

Hearing levels were assessed in a sound-treated room. Each ear was tested at the octave frequencies between 250 through 8,000 Hz. Midfrequencies were tested in cases of precipitious, high-frequency losses. Pure-tone and speech measurements were assessed on a Beltone 200C audiometer. A second audiometer, Beltone 10D, was utilized to test children requiring play audiometry. Calibration standards were ISO 1964.

**Analysis** :

The analysis involved five categories for speech-language. These included normal speech-language, deviant articulation, deviant language, other speech, and learning disabilities; each was divided by sex. They were further evaluted by age; the age range were preschool, elementary and junior-senior high school. These five divisions were mutually exclusive in this study. In the event of multiple speech-language disorders, the children were placed in the more debilitating disorder, that is, the primary disorder.

Hearing, like speech-language, disorders were divided in five categories. These were normal, conductive, sensorineural, noise-induced, and mixed. They were also separated by sex and the three age ranges. Children with speech-language disorders were not excluded from inclusion with the hearing disordered. Thus, within the five categories, one could find those children who also had a speech-language disorder, including learning disabilities.

Race was a factor to the extent that this study surveyed the records of a health-care institution which catered to minorities, blacks, primarily. Other groups were not excluded from the use of this facility. The records indicated that only blacks were seen for evaluation of communicative disorders during the five-year period under study. It is 1.7 : 1 for elementary school children and 1.4:1 across the three groups. The preschoolers appear more equivalent.

**Other Speech** : These disorders account for 4.7% of the distribution, and are more closely associated with preschool and elementary than junior-senior high school children. Unlike articulation, the male-female ratio is more extreme, overall 1 • 8 : 1. Specifically, for the three groups they are 1.6 :, 2.1 : and 2.0 : 1 for the preschool, elementary, and junior-senior high school children respectively. This general category represents the smallest number of speech-language disorders.

**Language** : At 30.0%, language disorders reflect the second largest parcentage of communicative disorders. Like other speech disorders, language disorders are seen more often in preschool and elementary than junior-senior high school children. The elementary school children reflect the highest male-female ratio at 1-6 : 1. These Ratio at 1.2 : and 1.3:1 for the preschool and junior-senior high children are close to equivalent. The overall sex ratio of 1.4 : 1, across the three groups, is equivalent to the one found for articulation disorders.

**Learning disabilities** : Table 1 shows that learning disabilities reflect 11. 8% of the distribution. Of the four categories it ranks third in prevalance. Males are not seen in the preschool groups. The elementary and junior-senior high groups reveal sex ratios of 1.8: and 2.4 : 1, respectively. Across the three groups, it is 1.8 : 1 ; however, excluding preschoolers, it is 2.1: 1. With the exception of the two

females in the preschool group, the learning disabilities are seen exclusively in the other two groups.

**TABLE 1**

Classification and distribution of children by sex across three age groups for speech and language disorders (N=536) found in 1,638 diagnostic evaluations during 1973 through 1977.

| Disorders Sex | Age Groups | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Perschool (3-5 Years) | | Elementary (6-12 Years) | | Jr./Sr. High (13-18 years) | | Total (3-18 years) | |
| | N | % | N | % | N | % | N | % |
| Articulation | | | | | | | | |
| Males | 107 | 20.0 | 50 | 9.3 | 8 | 1.5 | 165 | 30.8 |
| Females | 90 | 16.8 | 30 | 5.6 | 2 | 0.4 | 122 | 22.8 |
| Total | 197 | 26.8 | 80 | 14.9 | 10 | 1.9 | 287 | 53.5 |
| Other Speech | | | | | | | | |
| Males | 8 | 1.5 | 6 | 1.1 | 2 | 0.4 | 16 | 3.0 |
| Females | 5 | 0.9 | 3 | 0.6 | 1 | 0.2 | 9 | 1.7 |
| Total | 13 | 2.4 | 9 | 1.7 | 3 | 0.6 | 25 | 4.7 |
| Language | | | | | | | | |
| Males | 46 | 8.6 | 38 | 7.1 | 9 | 1.7 | 93 | 17.4 |
| Females | 37 | 6.9 | 24 | 4.5 | 7 | 1.3 | 68 | 12.7 |
| Total | 83 | 15.5 | 62 | 11.6 | 16 | 3.0 | 161 | 30.0 |
| Learning Disabilities | | | | | | | | |
| Males | 0 | 0.0 | 24 | 4.5 | 17 | 3.2 | 41 | 7.6 |
| Females | 2 | 0.4 | 13 | 2.4 | 7 | 1.3 | 22 | 4.1 |
| Total | 2 | 0.4 | 37 | 6.9 | 24 | 4.5 | 65 | 11.8 |
| Grand Total | 161 | 30.0 | 118 | 22.0 | 36 | 6.7 | 315 | 58.8 |
| Males | 134 | 25.0 | 70 | 13.1 | 17 | 3.2 | 221 | 41.2 |
| Females | 295 | 55.0 | 188 | 35.1 | 53 | 9.9 | 536 | 100.0 |

Speech-language summary : Table 1 reveals that articulation disorders for the preschool group dominate the speech-language categories. They actually account for 68.6% of the disorders across the three age groups and for 66.8% with in the preschool group. Articulation disorders are diagnosed in 27.9% of the elementary school groups. These two groups account for 95.6% of the articulation disorders. Language is the second most diagnosed disorders for the preschool and elementary school group ; but, it is second to learning disorders for the junior-senior high school group.

Across the age groups the preschoolers account for 55% of the speech-language disorders. Elementary school children account for 35.1%. Thus, these two groups account for slightly more than 90% of the speech-language disorders.

Hearing Disorders :

During the five-year period, there are 2,189 children referred for audiological evaluation. This total comprises, 1,171 males and 1,018 females. From these figures males are referred 1.2 times more often than females.

The data indicate that 57.2% of the total are normal within limits bilaterally. The remaining 45.8% are classified in the four adiological disorders. For conductive, sensorineural, noise-induced, and mixed hearing losses, the population figures are 12.1, 5.9, 2.9 and 1.4%, respectively. Across the four disorders the sex ratio of 1.1:1 indicates that females are seen slightly more often than males.

**TABLE 2**

Classification and distribution of children by sex across three age groups for hearing disorders (N=B936) found in 2,189 diagnostic evaluations during 1973 through 1977.

| .Disorders sex | Age Groups | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Preschool (3-5 Years) | | Elementary (6-12! Years) | | Jr./Sr. High (13-18 Years) | | Total (3-18 Years) | |
| | N | % | N | % | N | % | N | % |
| Conductive | | | | | | | | |
| Males | 150 | 16.0 | 88 | 9.4 | 27 | 2.9 | 265 | 28.3 |
| Females | 102 | 10.9 | 91 | 9.7 | 46 | 4.9 | 239 | 25.5 |
| Total | 252 | 26.9 | 179 | 19.1 | 73 | 7.8 | 504 | 53.8 |
| Sensorineural | | | | | | | | |
| Males | 12 | 1.3 | 79 | 8.4 | 38 | 4.1 | 129 | 13.8 |
| Females | 12 | 1.3 | 87 | 9.3 | 51 | 5.4 | 150 | 16.0 |
| Total | 24 | 2.6 | 166 | 17.7 | 89 | 9.5 | 279 | 29.8 |
| Noise-Induced | | | | | | | | |
| Males | 0 | — | 12 | 1.3 | 52 | 5.6 | 64 | 6.8 |
| Females | 0 | — | 6 | 0.6 | 36 | 3.8 | 42 | 4.5 |
| Total | 0 | — | 18 | 1.9 | 88 | 9.4 | 106 | 11.3 |
| Mixed | | | | | | | | |
| Males | 5 | 0.5 | 15 | 1.6 | 10 | 1.1 | 30 | 3.2 |
| Females | 1 | 0.1 | 8 | 0.9 | 8 | 0.9 | 17 | 1.8 |
| Total | 6 | 0.6 | 23 | 2.5 | 18 | 1.9 | 47 | 5.0 |
| Grand Total | | | | | | | | |
| Males | 167 | 17.8 | 194 | 20.7 | 127 | 13.6 | 488 | 52.1 |
| Females | 115 | 12.3 | 192 | 20.5 | 141 | 15.1 | 448 | 47.9 |
| Total | 282 | 30.1 | 386 | 41.2 | 268 | 28.6 | 936 | 100.0 |

Tables 2 elucidates the findings and distribution for the 936 children or 42.8% diagnosed with hearing losses, including where applicable, those children reflected in Table 1. The table reveals that 30.1, 41.2 and 28.6 are preschool, elementary, and junior-senior high school children, respectively. By further delineating these groups by sex, the male-female ratios are 1.5:, 1.0: respectively. The ratios for the two latter groups indicate that females are seen more often than males: this finding is not seen in the speech-language disorders.

**Conductive** : Table 2 reveals that 53.8% of the hearing disorders are conductive. Preschoolers account for 50% of these disorders, followed by elementary School children with slightly more than one-third of the remainder. Together, these two groups account for 85.5% of the conductive losses.

The preschool, elementary, and junior-senior high school ratios for sex are 1.5 :, 1.0 : and 0.6: 1, respectively. Except for the preschoolers, the other two groups reveal ratios which indicate more females than males.

Sensorineural : The table reveals that 29-8% of the hearing losses are sensorineural. Nearly 60% of these disorders are seen in the elementary school group. One of the more salient findings herein is the propensity of females to have this disorder. Across each group, this fact is clear. The overall male-female ratio is 0.9 : 1, again, indicating a higher number of females than males. The individuals ratios are 1.0 :, 0.9 :, and 0.7 : 1 for the preschool, elementary, and junior-senior high groups, respectively.

Noise-induced : The hearing losses in this category reflect 11.3% of the distribution. Although this disorder is third in prevalence, it occurs approximately *2½* times less often than the sensorineural disorders. The junior-senior high group accounts for 83% of these disorders. The remaining 17% occurs in the elementary school group; no disorders are seen in the preschool group. The sex ratios indicate that males are seen more often than females. The largest ratio is seen in the elementary school group at 2.0 : 1, it is 1.4:1 for the junior-senior high group.

Mixed : The disorder accounts for the smallest number of cases at 5%. Most of the disorders are seen in the elementary school group, followed by the junior-senior high group. The male-females ratio is 1.8:1 across the groups, it is 1.9 : and 1.3:1 in the elementary and junior-senior groups, respectively. The sex ratio in the preschoolers is much higher than in the elementary group ; it can be seen, however, that the general occurrences in this group are small.

Audiological Summary: In overviewing Table 2, some other observations are obvious. Preschool children are diagnosed most often with conductive losses. These disorders, for them, dominate all others. Elementary school children are

diagnosed with conductive and sensorineural losses. Junior-senior high children are diagnosed rather equitably across conductive, sensorineural, and noise-induced losses. They do, however, dominate the noise-induced disorders. The mixed losses. are rather close in their occurences for the elementary and junior-senior high groups.

As a variable sex is important. Earlier, it is noted that the male-female referral ratio is 1-2 : 1. The overall sex ratio with hearing losses is 1.1 : 1. These two ratios indicate a slightly higher propensity for females with hearing disorders than males. Additionally, Table 2 reveals that females have a higher propensity

**TABLE 3**

Classification and distribution of children by sex across three age groups for all communicative disorders (N= 1,472) for the five-year calender period 1973-77.

| Disorders Sex | Age Groups | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Preschool (3-5 Years) | | Elementary 16-12I Years) | | Jr./Sr. High (13-18 Years) | | Total (3-18 Years) | |
| | N | % | N | % | N | % | N | % |
| Hearing | | | | | | | | |
| Males | 167 | 11.4 | 194 | 13.2 | 127 | 8.6 | 488 | 33.2 |
| Females | 115 | 7.8 | 192 | 13.0 | 141 | 9.6 | 448 | 30.4 |
| Total | 282 | 19.2 | 386 | 26.2 | 268 | 18.2 | 936 | 63.6 |
| Speech | | | | | | | | |
| Males | 115 | 7.8 | 56 | 3.8 | 10 | 0.7 | 181 | 12.3 |
| Females | 95 | 6.5 | 33 | 2.2 | 3 | 0.2 | 131 | 8.9 |
| Total | 219 | 14.3 | 89 | 6.0 | 13 | 0.9 | 312 | 21.2 |
| Language | | | | | | | | |
| Males | 46 | 3.1 | 38 | 2.6 | 9 | 0.6 | 93 | 6.3 |
| Females | 37 | 2.5 | 24 | 1.6 | 7 | 0.5 | 68 | 4.6 |
| Total | 83 | 5.6 | 62 | 4.2 | 16 | 1.1 | 161 | 10.9 |
| Learning Disabilities | | | | | | | | |
| Males | 0 | 0.0 | 24 | 1.6 | 17 | 1.2 | 41 | 2.8 |
| Females | 2 | 0.1 | 13 | 0.9 | 7 | 0.5 | 22 | 1.5 |
| Total | 2 | 0.1 | 37 | 2.5 | 24 | 1.7 | 63 | 4.3 |
| Grand Total | | | | | | | | |
| Males | 328 | 22.3 | 312 | 21.2 | 163 | 11.1 | 803 | 54.6 |
| Females | 249 | 16.9 | 262 | 17.8 | 158 | 10.7 | 669 | 45.5 |
| Total | 577 | 39.2 | 574 | 39.0 | 321 | 21.8 | 1472 | 100.1 |

for certain types of hearing losses. This can be seen generally with sensorineural losses and specifically with conductive losses in the junior-senior high group. The conductive and mixed losses suggest equivalence for sex in the elementary school and junior-senior high groups, respectively.

The age groups are revealing. The elementary school group, at 41.2% reflects the largest number of hearing losses ; as noted previously, conductive and sensorineural losses are roughly equivalent and dominate this age group. The preschool and junior-senior high group are eomewhat equivalent with respects to their percentages of hearing losses ; however, they differ in type. For the preschool group, better than 89% of their disorders are conductive losses. Except for mixed losses, the junior-senior high group has a rather equitable distribution across the other categories of loss. This is only true with the conductive and mixed losses for the elementary school group.

**Communicative Disorders-Overview** :

Table 3 serves to overview the communicative disorders presented in Tables 1 and 2. In doing so, they are combined in order to reveal a different perspective on speech-language and hearing disorders.

The table shows that 1,472 children are diagnosed with communicative disorders across the three age groups. This figure shows that hearing disorders are diagnosed at the rate of 63.6%. Speech, which includes articulation and other speech, language disorders, and learning disabilities follow at the rates 21.2, 10.9 and 4.3%, respectively. This indicates that hearing disorders are seen 3 times more often than speech disorders. In turn speech disorders are diagnosed twice as often as language disorders. These findings cannot be discerned from Tables 1 and 2, individually.

The percentages on the totals for sex indicate a male-females ratio of 1 .2 : 1. For the total number of children evaluated, 3,827, the ratio is also 1.2:1. This fact indicates that males and females are diagnosed equally as often, in both the normal and disordered populations, since the individual disorders are at variance. The sex ratio for hearing is 1.1 : 1, which indicates a slight propensity for females to be diagnosed this, some children are counted twice. This factor is inflationary. The prevalence figures can, therefore be considered maximums.

## Discussion

The purpose of this study was to determine the types and prevalence of communicative disorders found in a comprehensive health-care facility. The study was intended to add depth and new information to the limited data available on communicative disorders in medical environments and to issues not developed by Stewart et., al. (1979).

The rationales for the study were developed. They included issues considered important, but lacking, by ASHA (1977), Healey et., al. (1981) Bensberg and Sigelman(1976), and Leske (1981 a, b). In considering'the issues relative to rationales, the area overlooked or not considered were addressed in this study. With special emphasis on Healey et., al. the areas or topics were minorities and data from medical facilities. In addition, it was generally acknowledged that data on language disorders were needed. The present study addressed these three areas.

The methodology included a survey of the records of the Children and Youth Program at Hubbard Hospital for the calendar years 1973 through 1977 and data undeveloped by Stewart et., al. (1979). The data were analyzed in terms of frequency of diagnosis and percentage. The variables included disorders, age, and sex ; race was a variable only to the extent that a minority, blacks, utilized the health-care facility.

The survey revealed a number of findings. First, the results indicated that the majority of children referred for speech-language and hearing evaluations were normal. The percentages for the communicatively handicapped were 32.7 and 42.8% for speech-language and hearing disorders, respectively. Second, the referral race was higher for males than females, but the same for those children with communicative disorders; this ratio was 1.2:1. This indicated no difference on sex for the population and handicapped children. This generalization was true relative to communicative disorders in general. Generally, the results indicated that males were seen more often than females for speech-language disorders and females more often than males for hearing disorders. Practically, sex ratios differed, -depending on the specific type of communicative disorder.

Third, the data indicated that the biggest problem in the referrals was hearing disorders. Hearing disorders accounted for 63.6% of all communicative disorders. They were diagnosed 3 and nearly 6 times more often than speech and language disorders, respectively. Fourth, within the hearing disorders 53.8% were conductive and 41.1% were sensorineural,including noise-induced. Sensorineural losses were diagnosed more in the other groups. Noise-induced losses were diagnosed most in the junior-senior high group; they occurred nearly 5 times more often in this .group than in the elementary group.

Fifth the preschool and elementary groups were equivalent with respects to the percentage of communicative impairments. This equivalence was accounted for by the number of hearing losses, primarily conductive, and speech disorders in the preschool group and the number of hearing disorders in elementary school group. Sixth, the distribution by age group was in close agreement between the population and the communicatively handicapped. Although these two findings were general frue, they must be considered with reference to the specific types of disorders.

Seventh, based on the population across the five years the average prevalence of communicative disorders was 7.7%. Of this percentum hearing, speech, language, and learning disabilities accounted for 4.89, 1.63, 0.84 and 0.33%, respectively. This finding was important not only because it provided specific prevalence figures, but because it yielded a prevalence rate for language disorders independent of speech. This percentage was 0.84%.

The validity and reliability associated with this study were both problematic to varying degrees, but affected the results, herein, minimally. Validity was an issue in terms of both general and specific assessment for communicative disorders. For example, Taylor (1980) noted that " there is an international standard for measuring hearing " (p. 68). In this study hearing was measured in reference to the international standard ; there was no issue here. This was not the case with speech-language disorders.

There were no valid norms for cultural minorities. This issue was applicable in this study. Speech-language was measured with evaluative tools normalized on white, middle-class children. In this study, children were evaluated as per the standard Instructions; afterwards, where applicable, adjustments for cultural differences were made. In addition, during this five-year period, the speech-language pathologists and audiologist were members of the same cultural minority as the populations ; their academic training in cultural differences were minimal. However, they were able to recognize the dialectal variations of the community.

There were strengths and weaknesses associated with the reliability of the data. The major strength lay in the availability of statistics which reflect current, realistic prevalence estimates. And, in doing so, these statistics were derived with considerations for the problems outlined earlier by ASHA (1977), Healey, et., al. (1981), Leske (1981a), and others. There were also several important weaknesses. First, the 7.7% prevalence estimate contained a duplicated count for hearing dirorders ; some of the children had multiple problems, which were included under speech-language. The investigator had not considered this important enough initialy to code this data. This point was not inteded to imply that there were many cases herein, just important data could have been obtained and utilized. Although this data could not be retrieved because of administrative reasons, the duplicated count was felt to be negligible. This was based on the findings of Stewart and Spells (1982) who found 0.1% of the public school population in Nashville with communicative disorders as related handicaps for communicative disorders. The broader, more comprehensive issues on duplicated versus unduplicated counts were presented by McDermott (1981).

A Second problem with the reliability of the data lay in its possible statistical redundancy. Many, if not most, of the children were eligible for services for

the communicatively handicapped in their local schools, whether public or private, or other agencies such as Head Start Programs or day care facilities. Children; identified and receiving these services or even referred from other agencies could! not be ascertained. Thus, in the broader perspective on prevalence estimates, it was possible that some of these children were already indentified as communicatively impaired. This meant that they have been statistically acounted for and, therefore, would create an inflated estimate in the general population. This issue was related, but different from the issue on duplicated versus unduplicated counts

The more serious problem with reliability was the uncertainty associated with the total number of children seen by all of the referral units within the hospital. From this perspective it appears that the prevalence estimates would be less, since many children were not referred for evaluation and/or over looked. How much less was at issue. This problem indicated that the prevalence estimate in this study was at a maximum. The problem with realiability was also a strength in the study from another perspective ; by its nature, it established an upper limit as a prevalence estimate on commnnicative disorders. This upper limit had not been established previously.

Although prevalence estimates at hospital facilities and on minorities are most limited, there were some studies available for comparison. One of these studies was Haller and Thompson (1975). They evaluated the prevalence of commuicative disorders at the Harlem Hospital Center in New York City. They found in their screening of children 3 through 17 years a prevalence of 9.1% in the 979 children screened for speech and 17.7% in the 990 children screened for hearing. The combined prevalence was 13.4%. The prevalence of communicative disorders in their study was much higher than the 7.7% in this study.

Their specific findings were also at variance with this study. They found that : (a) communicative disorders were not less common with age, (b) the male-female ratios were 7.0 : 1 and 2.0 : 1 for speech-language and hearing disorders, respectively, (c) articulation, other speech and language disorders accounted for 62.9, 27.8 and 2.9% of the distribution, respectively; and (d) their multiple disorders accounted for 6.3%. The limited areas of agreement between this and the present study were general in nature. They were that hearing disorders had a prevalence than speech disorders and articulation was more prevalent than other speech-language disorders.

There were appropriate reasons for the differing results between the Haller and Thompson study and this one. First, their results were an artifact ; their study operated for 5 months. This study operated over a five year period and conducted full evaluations rather than screenings. With specific reference to hearing criteria were more conservative than the evaluation criteria in this, meaning a

higher failure rate. Based on these facts, it appears that their results would have been more in alignment with this study had they used "The full range of hospital facilities .. in the comprehensive evaluation,." (p. 299).

Because Taylor (1980) attached major significance to the world wide status to communicative disorders in blanks, one other study is worth mentioning. Lumba, Oduori and Singh (1977) evaluated speech-language disorders at Kenyatta National Hospital in the East African Nation of Kenya. They evaluated 320 children between the ages of 2 through 15 years, during the two-year period 1974-1976. Each of these children had some type of communicative disorder. Since there was no population referent, this study cannot be evaluated with this one. Its value lay in its availability for consideration and in its relating communicative disorders to other factors such as mental and physical handicaps.

Another study which is valuable for comparision was Fay et,, al. (1970). They found hearing impairments in 19.8% of the 461 "extremely disadvantage inner-city population" remanded to the care of The New York City Department of Social Services Children's Center. These children ranged in age from 2 through 16 years. Like Haller and Thompson (1975), these children were screened for hearing. Their figure was slightly higher than Haller and Thompson's 17.7%, but their findings to a limited extent were consistent on age. By comparison this study was at variance, like Haller and Thompson, with Fay et., al. In speculation Haller and Thompson (1975) and Fay et., al. (1970) were studies conducted in New York City ; it may stem from the different geographical areas and noise levels. On the other hand, the present studs' found equivalency for the preschool and elementary school groups. Because of the greater numbers in these groups than the junior-senior high group, the generalization on age would be true for communication disorders, but the trends with age must consider the specific disorders.

Practically, the major reason for the discrepancy between these two studies and the present one was in screenings for the former and complete diagnostic evaluations in the latter. The diagnostics yielded more accurate data. An excellent example of this consideration was Melnick, Eagles, and Levine (1964). They showed that 29% of children failing on the initial screenings passed the threshold test. This reduction of false positives changed the failure rate downward from 20 to 14%. The 19-8% prevalence found by Fay et., al. (1970) was the adjusted estimate after the false positivse.

The present study can also be evaluated against somewhat current national and local prevalence studies. In a national speech and hearing survey Hull, Mielke, Willeford, and Timmons (1976) found a prevalence for speech disorders

at 5.7% in 38,802 school-age children in grades 1 through 12 and a prvealence of 2.60% for hearing disorders in 38,568 of these childern. The combined prevalence was8.3 %. This percentum was only slightly higher than the 7.7% in the present study. It must be noted that they did not evaluate language and also did not consider multiple handicaps. Taken together, however, the 8.3% appears accurate.

In terms of specific findings, some other observations were important. Hull et., al. also found speech and hearing disorders decreased with grade. The agreement between their study and this one was clear, indicating some additional variable operating on the children seen by Haller and Thompson (1975) and Fay et., al. (1970), With specific reference to hearing disorders the present study was in agreement with the later studies in that hearing disorders were much more problematic than speech-language disorders. In spectulating then, it would appear that minorities have a greater problem with hearing disorders than speech disorders or, minimally, culturally deprived, that is, lower socioeconomic minorities have more problems with hearing than speech. This speculative ascertion appears reasonable when considering some local studies on the public school system of Nashville.

Stewart (1981) found a prevalence of 4.02% for primary and related communicative disorders in school-age children in Nashville for the academic year 1978-1979. Of the primary disorders hearing, speech, and language accounted for 0.14, 2.48 and 0.26%, respectively. Later during the academic year 1979-1980, Stewart and Spells (1982) found a prevalence of 4.01%. Of the primary handicaps hearing, speech and language accounted for 0.18, 2.35 and 0.30%, respectively.

In both studies, even with the inclusion of related handicaps, the prevalence in this study was higher than the interracial population of the public school system. The hearing disorders were much greater and language disorders were approximately 3 times greater in this study than in the two just cited. On the other hand the public schools reflected a larger number of speech disorders. With specific reference to the black population within the school system, language disorders were 2 times greater in this study than they occurred in the school system.

One last source of data for comparison was the Head Start Bureau (1981) For their full-year 1979-1980 they diagnosed a total of 7.85% of the 364,400 children enrolled ; these children were preschoolers, ranging in age from 3 through 5 years. Of the percentum hearing, speech and language disorders accounted for 0.47, 3.70 and 3.00%, respectively. The overall percentum was in good agreement with the present study, the specific disorders varied greatly. The age ranges were very much different, howevr. Since the children in the Head Start Programs

received full diagnostic evaluations, there was credence to the factor of socioeconomic status affecting the prevalence of communicative disorders. Given the validity of this assertion. The Head Start data and the present study were in agreement.

In general the results of the present study were compatible with other studies considered related and relevant. Variances between studies were generally explainable. For example, in methodology, screenings versus diagnostics indicated gross differences in prevalence estimates or differences in criteria. More importantly, the results indicated the importance of studying the medical population relative to other reported data sources. Although the populations were different, the 8.3 and 7.85% found by Haller and Thompson ;1975) and The Head Start Bureau (1981), respectively, approximated the 7.7% in this study. The specific types of disdorders which reflected these statistics manifested themselves in different proportions ; this is yet to be explained, possibly socioeconomic factors. The results indicated further that Healey et., al. (1981) were not a thorough as they indicated.

The prevalence of communicative disorders was 7.7%; the male-female ratio was 1.2 : 1. The hearing, speech and learning disabilities manifested in the population 4.89, 1.63 and 0.33%, respectively. The population percentage for preschool, elementary, and junior-senior high school children were 3.02, 3.00 and 1.56% respectively. Language disorders in this population occurred 2 times more often than in the public schools ; they occurred 3.6 times in The Head Start population, which can be attributed, in part, to age and socioeconomic considerations. Considering this fact, the general and specific purposes of this survey were accomplished.

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