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This study investigated the extent to which trained nonprofessional personnel under nursing supervision could effectively conduct health screening of Head Start children. Results of screening by nonprofessionals were compared with results of the traditional pediatric examinations. The nonprofessionals were trained by a pediatrician and a psychologist and used the following instruments to facilitate screening: parent interviews, physical observation forms, a revised Denver Developmental Screening Test, the Ammons Quick Test, and a revised Willoughby-Haggerty Behavior Rating Scale. There was a positive correlation between the results of pediatric examinations and those of the nonprofessionals. Their referrals for intellectual and developmental problems also reflected a low but positive correlation with those of psychologists. The correlation between pediatricians' and psychologists' referrals was even lower. These results suggest that with more training, nonprofessionals could be useful in health screening under proper supervision and thus provide a valuable service to areas short of medical and nursing personnel. (Author/WD)

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Final Report on

Use of Non-Professional Personnel for Health Screening of Head Start Children

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November, 1968

Abstract

This study investigated the extent to which trained non-professional personnel under nursing supervision can effectively conduct health screening of Head Start children. Results of screening by non-professional workers were compared with results of the traditional pediatric examinations given each child.

Non-professional persons trained by a pediatrician and a psychologist used the following instruments to facilitate screening: parent interview and physical observation forms prepared by the authors, a revision of the Denver Developmental Screening Test, the Ammons Quick Test, and a revision of the Willoughby-Haggerty Behavior Rating Scale.

There was a positive correlation between the results of pediatric examinations and those of aides' screening. Aides' referrals for intellectual and developmental problems also reflected a low but positive correlation with those of psychologists. The correlation between pediatricians' and psychologists' referrals was even lower, suggesting considerable underreferral of such problems by pediatricians.

The low correlations, however, are in large part attributable to the lack of comparability of tests used by aides and psychologists.

Results suggest that with more training aides could be useful in doing health screening under supervision by a nurse, and may thus serve to assist in areas where there is an acute shortage of medical and nursing personnel.

Increasing shortages in professional health manpower present a problem of national concern, with the insufficiency of physicians and nurses being regarded as severe (Public Health Service, 1959, Georke, 1965, Folsom, 1966, Gordon, 1965). The American Academy of Pediatrics (School of Health Committee, 1966) states that "if pediatric care is to be adequate in the future, much of the work now done by physicians must be accomplished by allied health personnel." Considerable impetus has thus been given to the training of allied professional health workers, as well as of non-professional personnel, to help alleviate the problem. Encouragement in the direction of employment of the latter was provided with the passage of the Economic Opportunity Act of 1964. It is estimated that 24,000 non-professionals have been hired since its passage (Goldberg, 1966). In the health field, non-professionals have been employed in various capacities, such as in the follow-up of tuberculosis cases (McFadden, 1966), in the motivation of families to use health services (Domke et al, 1966), and in serving as auxiliary staff to nurses (Heath, 1967) or as nurse assistants in the schools (Bryan, 1967).

Richmond (1965) suggests training of aides and greater use of screening devices as another approach to the solution of the manpower shortage. Knobloch and Pasamanick (1966) report that junior medical students, some of whom had had no experience with patients, demonstrate 70% agreement with experienced screeners.

The present study was an effort to investigate the extent to which non-professional personnel could effectively do health screening of Head Start children for detection of physical, intellectual, and behavioral problems. The emphasis here is on screening or identification of possible problems in healthy persons and not on diagnosis. According to the Committee on Chronic Illness (1952), screening is "the presumptive identification of unrecognized disease or defect by the application of tests, examination or other procedures which can be applied rapidly."

Health examinations of Head Start children in Hawaii have been the responsibility of the Department of Health, Child Health Services Division. The practice has been to employ pediatricians on a "fee for service" basis for pediatric examinations, speech and hearing specialists for hearing screening, and optometrists for vision screening, and to use routine laboratory procedures for blood, urine, and tuberculin tests.

This study was designed to examine the same children with specific tools for physical, intellectual, and behavioral screening. Results were compared with those obtained from pediatric examinations. No effort was made to compare our results with those of other examinations performed.

(1) The major hypothesis was that findings of screening procedures applied by trained non-professionals would correlate positively with findings from pediatric examinations given by pediatricians. Two additional hypotheses were postulated: (2) With additional specific tools used by the aides, screening of children for intellectual and learning problems may be more effective than the present method, which relies solely on the judgments of pediatricians conducting examinations. (3) Taking into consideration the additional expense of pediatric and psychological training and of nurse supervision, the cost for screening should still be substantially less with use of non-professional personnel than the cost of pediatricians and nurses now doing screening.

Method

Sample

The subjects were 298 Head Start children from 10 preschools, on the island of Oahu, Hawaii, aged 3 to 4½, the majority of whom were between 4 and 4½ years of age. All screening examinations by the aides were scheduled prior to the pediatric examinations to reduce any possibility that mothers might give information to the aides as a result of having conferred with the physician or nurse.

Instruments

Screening tools were a parent interview form that consisted of questions relating to the child's medical and behavioral history and a physical observation form, both of which were developed by the authors; the Denver Developmental Screening Tests (Frankenburg, 1966) revised and simplified according to half-year age levels; Quick Test Form 1 (Ammons and Ammons, 1962); and a behavior inventory (Willoughby et al, 1964).

The parent interview form consisted of 28 questions, to be answered "yes" or "no," which relate to the child's medical and behavioral history. Space was also provided for aides to do narrative recording. The observation form consisted of 11 questions related to measurement of height and weight, and observations and measurements of other parts of the body. Results from these two forms were used for physical screening of the child.

The Quick Test (QT) (Ammons, 1962) was designed in three forms as an individual intelligence test, based on perceptual-verbal performance, and takes 5 to 10 minutes to administer. The reliability estimate based on the mean correlation between forms for 69 preschool children is .78. Reported validity studies primarily involve comparisons of the QT with the Full Range Picture Vocabulary Test (FRPV) (Ammons, in press), which in turn is reported to correlate highly with such tests as the Revised Stanford-Binet and the Wechsler intelligence scales. For a group of 40 preschool-age children, the QT correlated with the FRPV (Forms A and B combined) as follows: Form 1 .76, Form 2 .77, and Form 3 .62. The decision to have the aides use this test was based on its quick administration. A card containing four pictures is shown to the subject. He is asked to point to the one picture that best illustrates the meaning of a particular word taken from a standardized list that is graded in order of difficulty. It has been used by persons other than psychologists, such as pediatricians, for quick screening.

The Denver Developmental Screening Test (DST) (Falkenburg, 1966), standardized on a population of 1,036 normal Denver children between the ages of two weeks and 6.3 years, has been one of the officially approved scales that may be used by teachers in Head Start Programs. It covers four aspects of the child's functioning: gross motor, fine-motor adaptive, language, personal-social. The form was simplified so that all items considered as passing at the 75% level, for each of the age levels studied--3, 3½, 4, 4½--were made into separate forms. Scoring was on a pass-fail basis; the number of items passed was the child's score.

The Behavior Inventory Scale (Willoughby, 1964) is a series of questions related to various behaviors (such as temper tantrums, crying, and shyness) to which mothers were asked to respond by "Yes" or "No" answers, although allowance was also made for narrative recording of less precise responses, which could be subjected later to a nurse's judgment. The form was revised by adding some questions and simplifying others for facilitation of use by aides and comprehension by mothers. The beginning statement used in the Willoughby-Haggerty (WH, 1964) "Are you concerned...?" was changed to "Are you worried...?" inasmuch as it was felt that mothers were less familiar with the word "concern" than with the word "worry."

Training of Aides

The authors were in charge of training, and a period of 2 weeks, with 3 hours each day, was allotted for this purpose. Each form was first discussed and demonstrated to the aides. The aides then had practice sessions with each other for the parent interview and behavior rating forms, and with children for the other forms. The aides also had an opportunity to observe children at the Department of Health's Intensive Treatment Center for Retarded and Multiply Handicapped Children, whereby they could view children with specific handicaps.

Procedure

Arrangements for aides to meet with parents were carefully coordinated with the Head Start program administrator and neighborhood Community

Action Program coordinators. Letters were sent to mothers of Head Start children in advance by CAP directors. Principals and teachers were also notified in advance and dates for examinations agreed upon.

Parents were interviewed at home for from about 45 minutes to an hour. The screening of children at the school took from 20 to 30 minutes per child. All completed forms were scrutinized by the nurse supervisor for missing data or for questionable responses. During the early period of screening, the nurse supervisor also had individual conferences with the aides to go over their forms and to request that they redo those about which there was some question.

The nurse tabulated all of the problems or potential problems recorded by the aides from the family history and from the observation forms. She also recorded results from the pediatric examination for each child. Using the pediatric examination results as criteria, the pediatrician on the study made judgments as to under- and over-referrals by the aides.

The nurse supervisor also compiled the results of the Developmental Screening Test and Quick Test. Those below a certain score on each were then referred for additional psychological testing.

The goal was to have the psychologist administer the Stanford-Binet to 50 of the children who scored in the lowest 20% on both the DST and Quick Test and another 50 who scored above the 20th percentile on each test. The children to be tested by the psychologist were randomly selected from two groups (above and below the 20th percentile) and were tested without knowledge on the part of the psychologist as to the DST and Quick Test scores or as to the group in which they belonged.

Results

Table 1 presents a summary of the number of children seen by pediatricians, aides, and psychologists.

Table 1

Numbers of Children from each Area

Seen by Pediatricians, Aides, and Psychologists

School	Pediatrician	Aide	Psychologist
Nanaikapono	58	56	13
Halawa	18	18	6
Kuhio Park Terrace	38	37	9
Aiea	34	31	14
Makaha	19	19	2
Palolo	39	39	17
Kokohead	15	15	3
Pearl City	18	18	9
Harris	29	28	12
Kalihi	37	37	18
Total	305	298	103

Table 2 presents a comparison of aides' and pediatricians' identifications of medical problems. For this purpose the phi coefficient was used as a measure of the relationship between the judgments of aides and pediatricians. The relationship is positive (.56) and significantly different from zero as indicated by a chi-squared test. The categories of over- and under-referrals by the aides are listed in Table 3.

Table 2

Comparison of Referrals by Aides

and by Pediatricians

		Pediatrician	
		Referral	Non-Referral
Aides	Non-Referral	26	168
	Referral	70	34

$\phi = .56$

$\chi^2 = 93.45$

Table 3

Types of Disorders Aides Over- and Under-Referred

Under-referrals		Over-referrals**	
Cardiac	5	Cardiac	2
*Orthopedic	7	*Orthopedic	11
Hernia	4	Seizures	1
Seizures	1	Ear, Nose, Throat	6
Ear, Nose, Throat	1	Weight	7
Skin	3	Worms	3
Weight	1	Allergy	4
Worms	1		
Gastro-Urinary	1		
Bronchitis	1		
Rhinitis	1		
Total	26		34

* Includes knock-kneed, pigeon-toed, flat feet, awkward gait

** Grouped according to most severe disorder (some Ss were over-referred on more than one disorder)

Frequency distributions of the scores and cumulative percentage frequencies of the 4½- and 4-year-old groups on the QT and DST are presented in Tables 4 through 7, along with the corresponding means and standard deviations. Distributions appear reasonably symmetrical for the QT but are negatively skewed for the DST, which suggests that children from this Head Start population did not do so well as the standardization sample, since high scores represent poor standings. The QT scores for the Head Start population generally fall about two points lower than for the standardization sample (Ammons and Ammons, 1962), a finding not contrary to expectations.

Tables 8 and 9 present comparisons of referrals made by aides using the DST and QT with those of the psychologists using the S-B for the two ages combined.

Table 4

Distribution of Scores and Cumulative Percentage Frequencies of $4\frac{1}{2}$-Year-Olds on the Quick Test

Interval	F	Cumulative Percentage
22-23	1	100
20-21	1	99
18-19	7	98
16-17	22	94
14-15	27	81
12-13	34	65
10-11	29	45
8-9	21	28
6-7	11	16
4-5	8	09
2-3	3	05
0-1	5	03
	N = 169	
	$\bar{X}$ = 11.55	
	SD = 4.26	

These comparisons are based only on those children randomly selected for psychological testing, who were seen by both aides and psychologist. Children whose scores the aides found to be below the 20th percentile on the DST and QT were compared with children scoring below IQ 80 on the S-B. Results indicate that the scores obtained by aides on the DST had a statistically significant but low positive correlation with IQ scores obtained by psychologists. The QT scores also correlate positively with IQ scores, but the relation is not significantly different from zero.

Tables 10 and 11 present comparisons of the pediatricians' referrals for intellectual problems with those of the aides and psychologists. The low correlations obtained indicate that the relation is not significantly different from zero. The small (3%) number of referrals by pediatricians would

Table 5

Distribution of Scores and Cumulative Percentage Frequencies of 4-Year-Olds on the Quick Test

Interval	F	Cumulative Percentage
20-21	1	100
18-19	2	99
16-17	5	97
14-15	9	92
12-13	21	83
10-11	21	63
8-9	16	43
6-7	6	28
4-5	5	22
2-3	10	17
0-1	9	08
	N = 105	
	$\bar{X}$ = 9.25	
	SD = 4.79	

Table 6

Distribution of Scores and Cumulative Percentage Frequencies of 4½-Year-Olds on the Developmental Screening Test

Interval	F	Cumulative Percentage
14-15	21	100
12-13	49	87
10-11	46	58
8-9	18	31
6-7	20	20
4-5	9	08
2-3	4	03
0-1	2	01
	N = 169	
	$\bar{X}$ = 10.23	
	SD = 3.06	

Table 7

Distribution of Scores and Cumulative Percentage Frequencies of 4-Year-Olds on the Developmental Screening Test

Interval	F	Cumulative Percentage
10-11	36	100
8-9	39	73
6-7	17	32
4-5	8	14
2-3	3	05
0-1	2	02
	N = 105	
	$\bar{X}$ = 8.30	
	SD = 2.32	

seem to suggest that in this situation they tend to pay less attention to identification of intellectual problems than they do to physical problems.

Table 8

Comparison of Psychologists' Stanford-Binet Results with Aides' Referrals from DST for 4- and 4½-Year-Olds

		Psychologist	
		Referral	Non-Referral
Aides	Non-Referral	14	50
	Referral	17	16
		ψ = .30	
		χ^2 = 8.73	

Pearson correlation coefficients among age, sex, and scores on DST, QT, the Peabody Picture Vocabulary Test (obtained from the University of Hawaii Evaluation and Research Center) and S-B are presented in Table 12. No significant differences are found between the sexes; the DST scores correlate significantly though not highly with the scores on the Quick Test and the Stanford-Binet; the latter correlates highest (.62) with

the Peabody. The correlation between the QT and Peabody, although relatively low (.25), is significantly different from zero.

Table 9

Comparison of Psychologists' Stanford-Binet Results and Aides' Referrals from QT for 4- and 4½-Year-Olds

		Psychologist	
		Referral	Non-Referral
Aides	Non-Referral	20	44
	Referral	15	18
		ϕ = .14	
		χ^2 = 1.90	

Table 10

Comparison of Psychologists' and Pediatricians' Referrals for Intellectual Problems

		Psychologist	
		Referral	Non-Referral
Pediatrician	Non-Referral	29	62
	Referral	3	3
		ϕ = .09	
		χ^2 = .79	

Table 11

Comparison of Aides' and Pediatricians' Referrals for Intellectual and Developmental Problems

		Aides	
		Referral	Non-Referral
Pediatrician	Non-Referral	26	63
	Referral	6	2
		ϕ = .27	
		χ^2 = 7.07	

Table 12

Correlations Among Age, Sex, QT, DST, Peabody, and S-B

	Age (Months)	Sex	Developmental Screening Test	Quick Test	Peabody
Sex	.03 (296)				
Developmental Screening Test	.25** (301)	-.03 (289)			
Quick Test	.31*** (298)	.09 (286)	.39*** (298)		
Peabody	-.07 (76)	.19 (73)	.17 (75)	.45*** (75)	
Stanford-Binet	-.20* (100)	-.14 (94)	.30** (100)	.25* (99)	.62*** (33)

Numbers in parentheses indicate N's upon which r's were based.

* p<.05

** p<.01

*** p<.001

Analysis of the data from the behavioral rating scale posed some difficulties. As originally used by Willoughby and Haggerty (1964), the authors were interested in two questions: (1) the extent to which such a questionnaire would allow mothers to express their concerns about their children and whether or not they were justified. (Whether concerns were justified was tested by having a child development worker observe each child in the study for approximately 30 minutes in a series of group play sessions); and (2) whether or not such a questionnaire would be helpful to the physician in discussion of behavior problems with the mother.

In this study, the original intent was to determine whether or not this questionnaire would be useful in screening cases that may become potential behavior problems as verified by psychologists' observations. Unfortunately, however, this intent could not be carried out, and a substitute plan was instituted. Teachers were asked to rate the children using a similar scale. They were also asked whether or not they considered the child to be emotionally abnormal.

The mothers' responses indicate that the mean number of concerns per child was 3.63 in the 298 cases studied, with a range of 2 to 19 concerns. This mean does not differ from Willoughby's (1964), 3.5 concerns per child for the total sample of 195 children between the ages of 1½ to 6 years. As noted in Table 13, which shows the ranks of the major concerns of mothers and teachers, the most frequent concern of mothers was stubbornness, which is similar to that found in the Willoughby and Haggerty study. Teachers, however, tend to view high-strung and restless behavior as of more frequent concern.

Table 13

Comparison of Problems Ranked by Mothers and Teachers According to Frequency

Mothers			Teachers		
Rank	Item	Frequency	Rank	Item	Frequency
1	Stubborn	48	1	High-strung	77
2	Crying Easily	40	2	Restless	72
3	Nervous Habits	38	3	Afraid of Strange Groupings	68
4	Restless	34	4	Very Shy	64
5	High-strung; Easily Upset	33	5	Selfish	59
6	Wanting Too Much Attention	30	6	Cries Easily	58
			7	Wanting Too Much Comfort and Support	57
			8	Disobedient	55

Children who were rated by the teacher as possible emotional problems and physicians' referrals for evaluation due to emotional problems were compared with aides' ratings. Only those cases referred by either the physician or the teachers were compared. Aides' referrals which are in agreement with either the physician or teacher are for only those cases in which six or more items on their behavioral rating scales were checked. Results indicate that teachers referred almost twice as many cases as

physicians. They agreed on only 38% of referrals. Comparisons between teachers and aides showed slightly greater agreement, 54%. Physicians and aides' agreement in referrals was 43%.

Intercorrelations to compare items on the Willoughby-Haggerty behavior rating scale (WH) (1964) as rated by teachers with age, DST, QT, Peabody and S-B are presented in Table 14.

Teachers were also asked to respond to two questions which were not in the mothers' questionnaire: namely, whether they believed the child to be abnormal in emotional status, and whether they believed him to be abnormal 'ntellectual status. Those WH items correlating .20 or above with teachers' ratings of abnormal emotional status for both mothers' and teachers' ratings are presented in Table 15. The correlations are also listed for these same items with teachers' rating of the child as being abnormal in intellectual status, but none reach significance. The r of .20 or higher for these items suggest that they seem to enter into the teachers' decisions to rate children as having abnormal emotional behavioral states.

The third hypothesis is related to the cost of using aides to do screening. Included in the costs would be that of training and supervision, which involved the salaries of the pediatrician and psychologist for 2 weeks, 3 hours a day, and the salaries of the nursing supervisor and aides. These were compared with the expenditures of pediatricians employed on a "fee for service" basis of $10.00 per child examined. Included in this expense should be the time of the public health nurses of the State Department of Health utilized for screening in each district. For the 1968 Head Start physical examination program, the CAP contract, awarded to Children's Hospital, involves not only allotment of funds for physicians' time but also the employment of two full-time nurses and a coordinator. Because a large part of the nurses' time is to be spent in follow-up cases, one-fourth of the time of each nurse was regarded as feasible for screening. A fourth of the coordinator's time was

Table 14

Teacher Rating Variables Correlating Above .20 ($p<.05$) with Age, DST, QT, Peabody, and S-B

(N's represented by numbers in parentheses)

	Age	DST	QT	Peabody	S-B
Stammering/Stuttering		-.21 (245)			
High Strung/Easily Upset				.21 (71)	
Too Restless		-.24 (244)			-.20 (81)
Afraid of Strange Grownups	-.25 (252)	-.22 (245)			
Afraid of Strange Children	-.27 (251)	-.25 (244)			
Very Shy		-.20 (245)	-.27 (244)		
Doesn't Want to Play With Other Children		-.25 (245)	-.25 (244)		-.30 (82)
Cries Easily	-.22 (251)			.27 (71)	
Too Friendly With Others				.21 (71)	
Disobedient					-.23 (81)
Requires Frequent Punishment					-.20 (81)
Lying				.26 (71)	
Selfish					-.20 (81)
Destructive					-.22 (82)
Poor Table Habits	-.21 (242)		-.27 (71)		
Abnormal Emotional/Behavioral Status					-.24 (79)

also included. Table 16 presents the estimated costs for the respective projects. Costs for follow-up psychological tests, done by the psycholo-

Table 15

Variables Correlating Above .20 ($p<.05$) with Rated Abnormal Emotional Status

Variable	r With Rated Abnormal Emotional Status	r With Rated Abnormal Intellectual Status
Stanford-Binet	-.24	-.17
Nail-Biting (TR)	.20	.06
Other Nervous Habits (TR)	.20	.09
High Strung, Easily Upset (TR)	.26	-.06
Restless (TR)	.32	.11
Always Wants To Be Near Teacher (TR)	.22	.02
Glum and Sulky (TR)	.21	.02
Wanting Too Much Attention (TR)	.24	.13
Wanting Too Much Comfort and Support (TR)	.27	.06
Contrary (TR)	.29	.16
Disobedient (TR)	.29	.09
Requires Frequent Punishment (TR)	.32	.14
Fighting (TR)	.23	.12
Poor Table Habits (TR)	.22	.12
Temper Tantrums (TR)	.31	.03
Abnormal Intellectual Status (TR)	.35	
Afraid of Strange Grownups (MR)	.26	.17

TR - Teacher Rating

MR - Mother's Rating

gist and the graduate assistant, were not included inasmuch as follow-up costs are not involved in the psychological evaluation in the comparison project. The cost for supplies and transportation funds are also omitted from both projects. Other costs related to the conduct of this study, such as data analysis and computer time, are not relevant.

Although the results suggest that costs for pediatric examinations are higher than that of a program using aides, a more defensible analysis should be based on cost effectiveness. Ideally, such complex factors as the dollar value of missed cases, of over-referrals, of follow-up costs, etc., would be considered. This was an analysis that the authors could not make; thus, perhaps all that can be said here is that aides can be trained to participate in screening and be utilized in areas where physician and nurse shortages are acute.

Table 16

Comparison of Estimates of Costs

Utilizing Non-Professional Personnel and Physicians

	Non-Professional Personnel
Training costs-- Pediatrician and Psychologist 3 hours for 2 weeks	$ 460
Nurse Supervisor	2428
Aides	1091
Total	$3979

	Medical Personnel
Pediatrician-- fee for service $10 per case	$2980
Nurses-- ¼ time	3500
Coordinator-- ½ time	2000
Total	$8480

Discussion

Results indicate that aides' referrals from health screening correlate positively with pediatricians' referrals. Reasons for the discrepancies in referrals will be considered. While over-referrals should not be of major concern so long as they do not reach sizeable numbers, a source of significant gravity would be the number of cases missed. The five "missed" children with suspected cardiac abnormalities were therefore followed in detail. One of these children was a known congenital cardiac case; the mother either did not know about the condition or did not understand the aide's question, or the latter misunderstood her answer. After study, three of the cases referred by a pediatrician were judged to have no evidence of organic heart disease, and one is still being followed as suspicious although no certain diagnosis has been made. Therefore, concern would be focused on only one child.

Considerable work has been done on screening children for cardiac abnormalities (Durnin et al, 1965) using analog-digital circuitry for heart sound screening for children 3 to 17 years of age, with some of the children selected because they were known cardiacs; 5.9% false positives and 1% false-negative cases were found.

In a study by Miller et al (1965) heart sounds were recorded by tape recordings for 97.9% of students in a Michigan city. The tapes were read by experts, and those children considered to have abnormal recordings were examined by a team of cardiologists. The validity rate was 83%. There were 17% false-negatives, and 26% false-positives. It was felt that the tape-recording method had an acceptable rate of validity for screening large groups of children.

These studies suggest that screening for heart disease may be a reasonable method for finding children with undetected heart disease. Because of the involvement of physicians in interpreting the screening data, however, the cost would be appreciably more than that of screening by questionnaire alone.

Of the other cases "missed," the follow-up findings were as follows:

Children With Possible Orthopedic Handicaps:

2 needed special shoes

2 referred for orthopedic consultation and no treatment was recommended

1 referred for orthopedic consultation--did not keep appointment

1 to be observed by nurse

1 no consultation necessary (administrative decision)*

1 already known to orthopedic clinic

Results here suggest that important "misses" were the two cases that needed special shoes.

Children With Hernia & Hydrocele:

1 was seen in 1965 when an M.D. in an out-patient clinic indicated that consultation was not necessary for an umbilical hernia; in the 1967 CAP examination, the patient was referred for follow-up and surgery was performed

1 referred for a hernia consultation (no further notation)

1 to be followed; no treatment recommended at present

1 referred for "hernia"; a hydrocele was found by the consultant and surgery recommended

Although there was disagreement among physicians relative to diagnosis and/or treatment, two surgical cases were "missed" in the aides' screening.

Children Suspected of Having Other Conditions:

3 conditions were reported for which no follow-up was recommended

4 conditions needed follow-up and treatment

1 needed follow-up at adolescence

None of these appear to be crucial.

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*It should be noted that the recommendations for referrals by a pediatrician were screened by a public health officer, and nine referrals were deemed unwarranted.

The total, then, of true misses for which treatment has been provided or was expected to be provided includes 10 cases or 3.3% of the total number of cases seen. If these 10 cases were regarded as the only "misses" instead of the 26 cases, the ϕ coefficient would be .67, with χ^2 of 133.77.

Of the over-referrals, most fell in the orthopedic, weight, and ear, nose, and throat (ENT) groupings. In the screening process for orthopedic problems, the aides had been instructed not only to observe the walking behavior of the children but also to measure the width between the knees; apparently they were over-zealous.

With regard to weight, the pediatrician judge, comparing the results of pediatric examinations with those of aides' screening, utilized a standard height-weight percentile table based on repeated measurements of children by the Harvard School of Public Health staff (Nelson, 1964). Thus the 7 cases were regarded as overweight by the pediatrician judge for the measurements obtained, using the table as the guide. Measurements, however, should not necessarily be regarded as inaccurate, since they were randomly checked. The discrepancy arises from the fact that the pediatrician in the study used the table, which was not necessarily used by the pediatricians who examined the children.

Of the six ENT over-referrals, most were cases of drainage in the ear canal, which may have been evident at the time aides examined the children and no longer evident during pediatricians' examinations. Based on the figure of 34 cases, it appears that 11% were over-referrals.

Results compare fairly favorably with that reported by Knobloch and Pasamanick (1966) in a study involving medical students who used a developmental inventory for examining patients between the ages of 16 and 52 weeks. Of 48 patients seen, none of the 20 called abnormal by experienced raters were called normal; thus no under-screening occurred. Over-screening, however, was evident in 18% of the cases.

In other comparisons, particularly related to aides' findings of children with possible developmental or intellectual immaturity whom they would refer for psychological testing, correlations were positive but low. Despite the low correlations, it appears that the DST does serve as a very rough screening device for developmental problems, while the QT, at least for our population, would be of little if any value. If, instead of the S-B, psychologists had used the Peabody or the verbal items of the S-B, the correlations with the QT might have been somewhat higher. Pless (1965) reports a correlation of .84 between the WISC administered by a psychologist and the QT by a physician for 50 children age 6 - 16 years; however, the very wide age range for his sample as compared with ours could account for the difference.

The advantages of screening instruments for systematic observations not only for use by aides or auxiliary personnel but also for use by physicians and psychologists are advocated by the professions themselves (Knobloch, 1965, Pless, 1965). According to Korsch (1961), estimates of cognitive abilities made by physicians on the basis of experience predict test scores only "25% better than a random guess." Indeed, referral can always be made to a trained clinical psychologist, but in the interest of total patient care and reduction of costs to the patient, and because of scarcity of personnel, a quick screening device could be extremely useful.

Another major aspect of comprehensive pediatrics is concerned with problems in the behavioral and emotional spheres. While the behavioral inventory was not systematically treated in this study, Willoughby-Haggerty (1964) report that mothers discussed behavioral problems of their children in greater detail when they had a check list such as the behavioral rating scale than without it.

In contrast to teachers whose observation of children may make them more cognizant of behavioral problems, physicians disagreed with them in 62% of the referrals. The test would be to follow up on these cases to assess whether these children essentially do present behavior problems.

Teachers' responses to the WH rating scale suggest that behavior seen as immature, dependent, and suggestive of tension and nervousness influences their selection of children to categorize as emotionally unstable. These results are consistent with the summary of research by Beilin (1959), who states that since 1927, when teachers rated aggressive behaviors as most serious, there has been a shift so that they now regard withdrawing, emotional, and depressed behavior as more serious.

This discussion would not be complete without some comment on the perception of aides' behavior and attitudes by the nurse supervisor who was with them daily, and on reactions of the aides themselves to their work experience.

A summary by the nurse supervisor who kept a daily account of impressions follows:

1. Aides were initially overwhelmed with the amount of paperwork they felt they had to do; but as each task was discussed separately and demonstrated, they seemed to accept the work as less burdensome than anticipated.

2. When given instructions about how to approach families and how to make appointments by telephone, they showed considerable assurance and felt that they would have no difficulty here, indicating that they experienced little anxiety about making contacts with people in the same socio-economic group.

3. Most of their questions, many of which were repeated daily, seemed to suggest need for reassurance. Although they felt quite secure about approaching mothers and children, such tasks as recording information, scoring, figuring out ages of children, and measuring seemed to require the most practice and reassurance.

4. While we may speak of aides as "indigenous workers," each is an individual with a unique personality. For example, among the four, it was soon evident that one worked more rapidly than another, one was more impatient, one worked better with parents than with children, and one grasped the tasks more quickly than others.

5. It was also observed that despite their overt compliance and cooperativeness, they harbored certain fears about the "Establishment," which they initially expressed not to any of the study staff but to the CAP coordinator. They were afraid that they would not get paid at all (Bureaucratic establishments have a way of prolonging the first pay period), or would not get paid when they found that families were not at home. They were also anxious as to whether or not they would be paid for waiting, traveling, and non-interview time and as to whether or not they would have to rush to complete assigned tasks, thus reducing the hours of work.

The CAP coordinator communicated these fears to the senior author, who met with the aides. They were assured not only that their fears were groundless, but also that they could continue to communicate with anyone they wished about any complaints or dissatisfaction. Subsequent complaints were made to the nurse supervisor, with whom as days passed they felt more secure.

Another aspect of the aides who participated in this project was that each of them missed numbers of days of work because of personal or family problems. These included minor surgery, baby-sitting problems, illness among family members, and court appearances. While frequent absence may not be so common among workers from the general population, it may be fairly typical for workers among the poor to have family problems resulting in a high absence rate. Provision should be made for such situations.

Individual terminal interviews were also held with each aide to obtain their impressions of their experiences. Results were as follows:

1. Only one mother of the total of 298 families seen was regarded as uncooperative.

2. Approximately 15 children were regarded as difficult or frightened, shy, or crying.

3. Two reported that nothing in the work experience was difficult or unsatisfactory. The other two were a little more honest, stating that

they had to wait too long to get paid, that they had to return to interview families because of absence of mothers, and that they had to make a return trip to school to see absent children.

4. All felt that the training period was adequate and that if it had been any longer, it would have been confusing.

5. All also felt that supervision was adequate; that they could complain to the nursing supervisor; and that she was "okay because they ate lunch together." At the outset they felt that they would be watched over.

6. With regard to satisfaction from the experience, they seemed to feel that its most valuable aspect was that they learned from using the tools and being able to apply them to their own children.

7. With regard to qualifications to do such a job as this, they emphasized interest in people, patience, "willingness to lend their ears," and ability to speak the language of the people concerned.

8. Some comments related to whether it may be easier to go into homes of strangers rather than those of neighbors, a question frequently raised in relation to utilization of indigenous personnel.

9. When asked whether they or professionals could work better with mothers of Head Start children, the replies were to the effect that they could do equally well after training, that perhaps they could talk to such mothers more easily.

10. When asked what educational background they thought necessary, all said that a high-school diploma was not necessary but that it was rather a "matter of competence" of individuals. However, they felt that high-school education was helpful for writing, arithmetic, and spelling.

11. All indicated that they would like to do such work again and that now they could think of other positions that they could fill in their communities, such as teachers' aides, nurses' aides, and community aides.

12. In discussing improvement of any features of the job, they suggested more regular time schedules and steadier hours.

13. All were interested in additional work and longer hours. They felt that preference for employment should be for those with children of school age and older rather than with children below school age.

14. All felt that pay was adequate. One said that now that she had some experience she may ask for more money in future positions.

In summary, it would seem that this small sample of mothers--like most people, professional and otherwise--are interested in work, want regular hours, experience satisfaction with a job when it provides a learning experience, and think of themselves as possibly more effective than professionals in working with their own people.

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