THE PHYSICAL HEALTH OF CHILDREN ATTENDING DAY NURSERIES

A REPORT TO THE DAY NURSERIES COMMITTEE OF THE MEDICAL WOMEN'S FEDERATION

BY

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PART II

6. Postural and Foot Conditions

Comparison was made between the home and nursery groups of the incidence of poor posture, genu valgum, and pes valgus in children over 2 years of age. Under 2 years a comparison was felt to be useless owing to the normal variation in time of walking and of development of the arches of the foot. (a) *Poor posture* included lordosis, round shoulders, stooping, and hyperextension or sagging of the knees on standing; (b) *Genu valgum* was recorded where the gap between the internal malleoli was over 1/2 in. (1.25 cm.) in the supine position; (c) *Pes valgus* included not only advanced flat foot but also those cases where the child habitually walked and stood on the inner border of the foot.

Results (Tables VIII, IX, X).—Poor Posture.—A slightly higher incidence was recorded in the nursery group for all ages together (2-5) and in individual age groups, but no difference was significant except in boys of 2-5 years. *Genu valgum.*—At all ages together (2-5), and in all individual age groups, there was a slightly higher incidence in the nurseries, except among boys of 2-3 years, where the home group had a slightly higher rate. No differences were statistically significant except in girls of 2-3 years, where the nursery rate was significantly higher. *Pes valgus.*—The nursery rate was higher throughout, and all differences were significant except among girls and boys of 4-5 years. Pes valgus was about two and a half times more frequent among nursery boys and three times more frequent among nursery girls than in the corresponding home groups.

TABLE VIII.—Percentage of Examinations where Poor Posture was found

Age		Boys	Girls
2-3 years ..	Nursery	4.2	7.4
	Home	4.2	4.9
	Difference	0 ± 2.1	2.5 ± 2.5
3-4 ..	Nursery	16.3	17.0
	Home	11.2	14.4
	Difference	5.1 ± 4.0	2.6 ± 3.9
4-5 ..	Nursery	32.4	18.5
	Home	28.8	14.8
	Difference	3.6 ± 6.2	3.7 ± 4.6
2-5 years ..	Nursery	16.9	13.6
	Home	11.9	11.0
	Difference	5.0 ± 2.4*	2.6 ± 2.1

* Significant difference.

TABLE IX.—Percentage of Examinations where Genu Valgum was found

Age		Boys	Girls
2-3 years ..	Nursery	7.4	14.4
	Home	9.7	7.4
	Difference	-2.3 ± 2.9	7.0 ± 3.3*
3-4 ..	Nursery	27.2	21.1
	Home	19.2	12.0
	Difference	8.0 ± 4.9	9.1 ± 4.0
4-5 ..	Nursery	22.6	12.6
	Home	21.3	12.2
	Difference	1.3 ± 5.6	0.4 ± 4.1
2-5 years ..	Nursery	18.6	13.6
	Home	15.4	10.3
	Difference	3.2 ± 2.5	3.3 ± 2.1

* Significant difference.

TABLE X.—Percentage of Examinations where Pes Valgus was found

Age		Boys	Girls
2-3 years ..	Nursery	13.9	12.1
	Home	5.5	5.6
	Difference	8.4 ± 3.1*	6.5 ± 3.0*
3-4 ..	Nursery	16.8	11.3
	Home	7.2	1.2
	Difference	9.6 ± 3.9*	10.1 ± 2.6*
4-5 ..	Nursery	10.3	1.3
	Home	5.0	0
	Difference	5.3 ± 3.8	1.3
2-5 ..	Nursery	13.7	8.9
	Home	5.9	2.5
	Difference	7.8 ± 2.1*	6.4 ± 1.5*

* Significant differences.

7. Comparison of Weights

Table XI compares the average mean weight of the nursery and home children for every 3-monthly age group

TABLE XI.—Mean Weights in Pounds (1 lb. = 454 g.)

Age in Months	Nurseries		Home Group		Differences (N-H)
	No.	Mean	No.	Mean	
Boys					
0- 3	1	10.8	6	12.0	-1.2
3- 6	20	13.4	23	14.8	-1.4 ± 0.85
6- 9	24	17.2	33	18.5	-1.3 ± 0.57*
9-12	46	20.1	44	21.8	-1.7 ± 0.50*
12-15	40	22.0	53	23.1	-1.1 ± 0.67
15-18	50	23.0	63	24.6	-1.6 ± 0.45*
18-21	40	24.8	66	26.1	-1.3 ± 0.48*
21-24	43	26.7	52	27.2	-0.5 ± 0.54
24-27	47	28.1	44	27.6	0.5 ± 0.58
27-30	50	30.4	43	28.4	2.0 ± 0.66*
30-33	49	31.4	33	29.0	2.4 ± 0.72*
33-36	44	32.1	31	30.1	2.0 ± 0.69*
36-39	36	31.8	27	30.5	1.3 ± 0.86
39-42	34	32.8	35	32.0	0.8 ± 0.80
42-45	45	34.2	34	32.9	1.3 ± 0.92
45-48	45	35.6	30	34.8	0.8 ± 0.91
48-51	32	36.4	22	36.1	0.3 ± 1.1
51-54	34	37.2	28	36.6	0.6 ± 0.85
54-57	44	37.3	26	36.6	0.7 ± 0.62
57-60	42	38.4	11	37.6	0.8
Girls					
0- 3	2	11.1	2	9.7	2.4
3- 6	22	12.6	30	15.0	-2.4 ± 0.50*
6- 9	22	15.9	50	17.9	-2.0 ± 0.71*
9-12	48	18.4	55	20.4	-2.0 ± 0.50*
12-15	42	20.5	45	23.0	-2.5 ± 0.60*
15-18	52	22.5	51	22.8	-0.3 ± 0.48
18-21	66	24.2	63	24.1	0.1 ± 0.45
21-24	53	25.1	60	25.4	-0.3 ± 0.53
24-27	53	26.7	47	26.3	0.4 ± 0.67
27-30	43	28.3	41	28.3	0.0 ± 0.76
30-33	56	29.3	37	28.9	0.4 ± 0.73
33-36	51	30.1	46	30.3	-0.2 ± 0.65
36-39	37	31.5	38	30.4	1.1 ± 0.81
39-42	39	32.2	44	31.4	0.8 ± 0.72
42-45	41	33.4	39	32.7	0.7 ± 0.86
45-48	55	34.4	39	33.6	0.8 ± 0.53
48-51	39	35.3	27	34.9	0.4 ± 0.89
51-54	40	36.7	33	35.7	1.0 ± 0.73
54-57	32	37.2	33	36.4	0.8 ± 0.97
57-60	26	37.8	18	35.6	2.2

* Significant differences.

from 0 to 5 years of age. The results for boys and girls are given separately.

Results.—(a) Boys.—The mean weight of boys in the home group was greater than in the nursery group up to 2 years old, the difference being significant in four out of seven groups. Over 2 years the nursery boys had a greater mean weight in every age group, the difference being significant in three out of 12 groups (between 2 and 3 years). (b) *Girls.*—Among the girls under 2 years the mean weight was greater in the home group in six out of eight age groups, the difference being significant in four of these groups (all under 18 months). Over 2 years the nursery girls had a greater mean weight in 11 out of 12 age groups, the differences not being significant in any age group.

The children in the nursery group therefore were on an average lighter under 2 years and heavier over 2 years than those in the home group. The nursery children

gained weight more rapidly between 1½ and 3 years, but up to 1½ years and over 3 years the rate of weight gain was closely similar in both groups.

Sex Differences

At all ages over 6 months in both groups the boys showed a slightly greater mean weight than the girls. The general condition of boys was also on the whole very slightly better than that of girls, though this was not found in every age group. This finding was the same for nursery and home groups. In every other physical finding relating to tonsils, cervical glands, respiratory infections, and postural conditions in both groups the girls had a slightly better record. The difference between boys and girls was not more marked in one group than in the other.

Seasonal Variations in Physical Condition

The seasonal variations in physical condition were closely similar in nursery and home groups, but throughout the year the incidence of all cervical gland enlargements, of tonsillar enlargement, and of chronic nasopharyngeal infections was about 2 to 4 times greater in the nursery group.

Incidence of Specific Infectious Fevers

At each examination a full history was taken of any infection contracted since the previous examination of that child. Only definite accounts of infections were recorded, doubtful instances where evidence was insufficient being excluded. It is probable, therefore, that the figures given below represent somewhat less than the actual total occurrence. Accounts of "diarrhoea," "pneumonia," and certain other infections have been omitted, since these terms cover such a wide range of variable illnesses. In the case of pneumonia particularly, the early use of sulphonamides has made it unlikely that a record of pneumonia on hearsay account would be reliable. For similar reasons accounts of infections of the respiratory tract have been excluded, unless seen also at the time of examination. The incidence of measles, pertussis, varicella, and mumps has been compared, and of these only measles developed often enough for a detailed study of the incidence.

It will be clear that the total incidence of infectious diseases refers to a period of rather less than 11 months, since no account could be taken of infections occurring at the extreme beginning or end of the survey, before a child's first visit or after the last visit. Likewise the figures are based only on those children attending more than once—432 in the nursery group and 409 in the home group.

(a) *The total incidence of varicella, mumps, and pertussis* (Table XII) was very low in both groups, varicella and

TABLE XIII.—Percentage Incidence of Measles
(All recorded cases during survey)

Measles	No. under Observation	Previous Attack		Presumed Susceptibles		Total Incidence of Measles	Incidence in Total Population	Incidence among Presumed Susceptibles
		No.	%	No.	%			
Nursery group	432	158	36.6	274	63.4	111	25.7	40.5
Home group	409	81	19.8	328	80.2	33	8.1	10.0
Differences ..		16.8 ± 3.1*		16.8 ± 3.1*			17.6 ± 8.2*	30.5 ± 3.4*

* Significant differences.

TABLE XIV.—Age Distribution of Measles (Percentage distribution of all cases recorded during survey)

		All Ages 0-5 yrs.	Under 18 mths.	18 mths. -3 yrs.	3-5 yrs.
(a) Age Distribution based on Total Population Observed					
Nursery group	No. under observation ..	432	123	152	157
	Cases of measles ..	111	36	45	30
	% developing measles ..	25.7%	29.2%	29.6%	19.2%
Home group	No. under observation ..	409	148	150	111
	Cases of measles ..	33	7	17	9
	% developing measles ..	8.1%	4.7%	11.3%	8.1%
(b) Age Distribution based on "Presumed Susceptibles" only					
Nursery group	No. of presumed susceptibles ..	274	107	94	73
	Cases of measles ..	111	36	45	30
	% developing measles ..	40.5%	33.6%	47.9%	41.0%
Home group	No. of presumed susceptibles ..	328	139	120	69
	Cases of measles ..	33	7	17	9
	% developing measles ..	10.0%	5.0%	14.2%	13.0%

was considerably higher than in the home group—33 out of 409—the difference being statistically significant. The percentage incidence during the period was 25.7 in the nursery group and 8.1 in the home group. There was a marked difference in the percentage of those who had already had measles, the proportion being significantly higher in the nursery group. These may be termed "presumably immune," and the others who had not had measles before the survey began may be termed "presumably susceptible." The presumably susceptible were 63.4% in the nursery group and 80.2% in the home group. If the total incidence be expressed as a percentage of the presumed susceptible, then 40.5% developed measles in the nursery group during the survey compared with 10% in the home group. These differences are statistically significant and are striking. The closer daily contact of children in nurseries naturally encourages greater spread of infection, and probably accounts in large measure for this difference in incidence.

2. *The Age Distribution of Measles.*—At all ages (0-5 years) the recorded percentage incidence of measles was markedly higher in the nurseries group than in the home group. Among all children from 0-18 months old the percentage incidence of measles was more than 6 times greater in the nurseries group than in the home group. Between 18 months and 3 years of age and between 3 and 5 years the percentage incidence of measles was about two and a half times heavier in the nursery group than in the home group. In the nurseries group the percentage of children under 18 months old who developed measles during the survey (29.2%) was greater than the percentage incidence for all ages (25.7%); whereas in the home group the percentage of children under 18 months old who developed measles during the survey (4.7%) was little over half the percentage incidence for all ages (8.1%). Among those children who had no previous history of an attack of measles—the "presumed susceptibles" in each group—the proportion who developed measles during the survey in the nurseries group was 40.5% and in the home group only 10%, for all ages (0-5 years). Of those under 18 months old, 33.6% of the presumed susceptibles in the nurseries group developed measles during the survey, compared with 5% in the home group. These results show that the higher incidence of measles in the nursery group affected children of all ages up to 5 years, but especially those under 18 months old. Thus the nursery children not only were much more likely to develop measles but tended to develop it at an earlier age than the home

TABLE XII.—Total Incidence of Infectious Fevers during Survey
(November-October)

	No. under Observation	Measles	Pertussis	Varicella	Mumps
Nursery group ..	432	111	11	14	9
Home group ..	409	33	18	7	2

mumps being slightly more numerous in the nursery group and pertussis in the home group. Over 80% of the children in both groups gave no history of a previous attack of any of these three fevers. Some children in the nursery group had received prophylactic injections against pertussis; this was extremely rare in the home group.

(b) *Measles* (Tables XIII and XIV).—Measles was present in epidemic form in Birmingham during the winter period of the investigation.

1. *The total recorded incidence of measles* in the nursery group during the survey was 111 out of 432 children. This

children. This is particularly important in view of the greater mortality rate of measles in young infants and the greater risk of serious complications.

3. *Seasonal Variations.*—In each of the six winter months of the survey (November–April) an average of 8.9% of the mean population under observation per month developed measles in the nursery group, compared with 2.5% in the home group. In the six summer months (May to October), the incidence of measles per month in the nursery group was 0.05% of the mean population under observation in each month, compared with 0.2% in the home group. Thus measles was more evenly spread over the year in the home group, whereas the nursery group had a higher epidemic incidence in the winter, followed by a very low summer rate—a noteworthy difference when the increased mortality rate of measles during epidemics is considered.

Conclusions and Discussion

The main results of the survey may be summarized as follows:

1. *The average weight of children under 2 years of age attending day nurseries was consistently less than that of the children living in their own homes, but from 2 years onwards the average weight of nursery children increased more rapidly and finally exceeded that of the home group of children.*

2. *The general condition, as recorded from the clinical impression, was inferior in nursery children under 2 years old to that of children of the same age living in their own homes.*

3. *The incidence of respiratory tract infections, including acute and subacute infections present at examination and chronic conditions such as mouth-breathing and chronic tonsillar and cervical gland enlargements, was from two to eight times greater in the nursery children than among those living at home. This excess was manifest at all ages and in every season.*

4. *A significantly higher incidence of specific infectious fevers occurred in the nursery group, and the epidemic occurrence of measles was more marked than in the home group. Among those children "presumed susceptible" in the nursery group, the incidence of measles was four times greater than in those "presumed susceptible" in the home group.*

5. *Poor posture, genu valgum, and pes valgus occurred more often in the nursery group than in the home group.*

Before conclusions are drawn from the above findings it must be stated that this survey was confined to an investigation only of the physical health of the children, and no attempt has been made to assess the effect of nursery life on the child's psychological development or well-being.

The above findings are closely similar as regards respiratory tract infections and weights to those of the recent report of the Day Nurseries Committee of the Medical Women's Federation on the health of children in day nurseries. That report was based on the results of a single restricted examination of a large number of children (4,587) by many workers in many parts of the country, thus attaining a "cross-section" result; whereas the results of the present survey have been obtained by repeated, more detailed examinations over a period of one year by a single worker of a small group of children (1,198) in a single town, and these results include also data on specific infections, fevers, postural conditions, etc.

In the report referred to above the physical condition of children seen within one week of admission to a nursery was assessed separately, in order to determine whether there were any significant physical differences between welfare-centre children and nursery children at the start of nursery life. Statistical interpretation of these findings showed that the high rate of respiratory tract infections in day-nursery children could not be accounted for on these grounds. The inference that there were no significant physical differences at the start of nursery life between day-nursery children and

those living at home may reasonably be assumed to apply also to the present survey.

Only Ministry of Health wartime day nurseries were included in this survey; comparable results would, however, be likely in any similar aggregation of young children such as in nursery schools and classes, though it must be remembered that children of the youngest age groups do not attend nursery schools.

It was hoped to include in this survey a comparison of the incidence of infections in those nurseries housed in adapted private or other dwellings and those in specially constructed one-story buildings, the children of which spent a considerable amount of time out of doors. However, the numbers available for comparison between these two types of nurseries in similar social and economic areas were too small to be of statistical value. Conflicting opinions exist on this point, but the impression gained during the survey was that in the one-story "Maycrete"-type of nursery buildings there was a lower incidence of respiratory and other epidemic infections, associated probably with the free ventilation and the extra time spent by the children in the open air.

The superiority in weight of the older day-nursery children over the home group may be correlated with the more generous diet available to them under wartime arrangements. In this survey the nursery children under 1½ years showed a rise in average weight equal to that in the home group, and a more rapid rise in average weight than the home group from 1½ years of age. This more rapid rise in the nursery group continued until 3 years, and after this the rate of weight gain was practically the same in each group, with the nursery group having a higher average weight than the home group, although under 1½ years it had been lower. Nursery children were in fact gaining weight more rapidly from the age of 1½ years. This is roughly equivalent to the time at which the more liberal diet available to children attending day nurseries might be expected to begin to take effect. The improvement in general condition as recorded from clinical impressions followed a similar pattern, though differences between the older nursery and the home children were not statistically significant. It would be interesting to study the effect on both weight and general condition of allowing a similar extra amount of rationed food to children living in their own homes.

The increased weight and better physique of the older day-nursery children did not apparently influence their liability to infections of the respiratory tract. The findings in this investigation endorse the view that when children under 5 years of age are congregated together indoors for long periods a great increase in respiratory and other infections will occur, in spite of careful measures taken in the management of the day nurseries to minimize the spread of infection. It is realized, of course, that wartime staff shortages and use of adapted premises have created difficulties, and that under ideal conditions with generous staffing with trained personnel and ideal buildings the infection rate might be considerably less; but these conditions are not likely to be achieved on a large scale.

The signs of fatigue noted in the nursery group in the higher incidence of pes valgus may be associated with the long hours kept by the nursery children, who were frequently and inevitably up for 13 to 14 hours daily while their mothers were on full-time work. These long hours were a special feature of an emergency period and should not continue.

The much higher incidence of respiratory and other infections and the increased liability to epidemic infections which, according to the evidence, is associated with nursery

life must be an important factor when a large-scale future provision of day nurseries is considered. Short of ideal conditions (and the economic possibility of attaining these is remote), a large amount of respiratory infection, with the usual aftermath of ill-health and complications, may be expected, and must be balanced against the possible advantages of communal life for young children. The possibility exists that the risk of respiratory infections might be reduced considerably by part-time attendance at day nurseries, and the incidence of respiratory infections in children attending nurseries for two or three half-days a week is a question worthy of investigation.

Reference must be made to other work on this subject published since this survey was begun. The report by the Day Nurseries Committee of the Medical Women's Federation (1946) on the health of children in day nurseries revealed a higher rate of respiratory infections in children attending day nurseries than in those living at home, and showed evidence that "for children under 2 years old nursery life had an adverse effect on physical health."

In a study of infections in wartime day nurseries in Oxford (Allen-Williams, 1945) routine health records of children in day nurseries and attending welfare centres were analysed, and it was deduced that there was a greater liability to infections among nursery children, and that these infections occurred at an earlier age, than among children living at home. The records of infections and other details were, however, admittedly incomplete.

A study of the progress of children under 2 years of age in day nurseries in Leyton (Menzies, 1946) concluded that "a substantial proportion of children under 2 years old do not make satisfactory progress on admission to a nursery, as judged by the weight gain . . .", in spite of the very liberal diet in the nurseries, and drew attention to the importance of including in a survey of the health of children in day nurseries those who leave after a relatively short time of attendance because of "fretting" or contracting an infection.

Summary

An investigation in the health of children attending wartime day nurseries was carried out in Birmingham in 1944-5. During a period of one year repeated examinations were made by a single examiner of 557 children attending day nurseries and of a control group of 641 children living at home.

The results are based on a total of 3,250 examinations of children from 0-5 years old.

1. Respiratory tract infections were from two to eight times more frequent among nursery children than among the home group. This excess was manifest at all ages and at every season.

2. The incidence of measles was significantly higher in the day-nursery group, and was four times greater among those presumed susceptible in the day nurseries than in the home group. This excess was marked at all ages, but affected particularly those under 18 months old. The epidemic occurrence of measles was more pronounced in the nursery group than in the home group. These findings are important in view of the increased mortality from measles under 18 months of age and during an epidemic.

3. Pes valgus was more than twice as common among day-nursery children as in those living at home. The significance of this as a sign of fatigue is discussed.

4. Children over 2 years of age attending day nurseries were heavier than the children living at home, and they gained weight more rapidly between 1½ and 3 years of age. This may be correlated with the extra allowances of rationed foods (meat, bacon, cheese, eggs, etc.) available under the rationing system to children in day nurseries.

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DE MORGAN'S SPOTS

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The minute round ruby-coloured macules known as De Morgan's spots are of common occurrence in adults. They are most often seen in the skin of the abdominal wall. They vary in size up to a diameter of about 5 mm. and in number up to 20 or occasionally more. Microscopically they have the character of simple hæmangiomas.

The spots are named after Campbell De Morgan, surgeon to the Middlesex Hospital from 1842 to 1875. Tradition holds that De Morgan believed the spots to indicate or presage malignant disease, particularly of the stomach. If this was his view he did not (so far as we have been able to discover) commit it to paper. In his book *On the Origin of Cancer* (1872) he does indeed mention the spots, but only as the merest aside. In the course of developing the argument that cancer is not due to an infective agent he says (p. 16): "I have noticed, and it has been verified by the observation of others, that concurrently with, or following on, the development of cancer, small outgrowths of warty or vascular or dermoid structure are frequent. Now one would imagine that, if there were a cancer-poison in the blood, these or one of them would become the seat of the disease. But . . ." And he makes no further reference to the spots which are now known by his name.

The literature on the ruby spots is extremely meagre, and the only paper of note is Sampson Handley's in 1909. He points out that the spots are found in atrophic skin, and begin as small nodules of connective tissue under the epidermis. As the spots enlarge, wide blood channels make their appearance and by their bulk elevate the epidermis, causing further atrophy. He draws attention to the common belief that the spots occur more often in patients affected with cancer, but emphasizes that this belief lacks corroboration. From this brief review of previous work it will be clear that, although the ruby spots by virtue of their brilliant appearance often arouse comment and keen though transitory interest, there is an entire absence of precise information on their significance. Accordingly, it seemed to us useful to collect data over a series of cases large enough to demonstrate their frequency and incidence.

Frequency and Incidence of Spots

Method of Investigation.—The greater part of this paper is based on observations made on 1,300 patients at three Glasgow hospitals—the Western Infirmary, Stobhill Hospital, and the Radium Institute. The routine adopted was to visit in turn each of the general medical and surgical wards and to make observations on every patient available for examination. The area of skin examined for spots extended from the nipple line to the pubis, and laterally as far as the mid-axillary lines. This area was chosen for