

THE PLANNING AND EXECUTION OF THE 1962 PRETORIA NUTRITION SURVEY*

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One of the primary objects of the National Nutrition Research Institute of the Council for Scientific and Industrial Research is to acquire an effective knowledge of the nutrition status of the South African population by means of nutrition surveys. For the purpose of planning and executing nutrition surveys, the Division of Field Studies was therefore established under the leadership of a sociologist assisted by a statistician and various professional and technical helpers.

It was soon realized that the evaluation and standardization of survey methods and field and laboratory techniques would be an important aspect of the activities of this Division. The first large-scale survey undertaken by the Institute was therefore planned with 2 objects in mind, namely to study and evaluate survey techniques and to obtain as representative and complete a picture as possible of the nutritional status of a particular section of the population. This picture would consist of data on body measurements, biochemical constituents of the blood and urine, food intake, etc. The distribution curves for these variables would constitute 'norms' for the population concerned at the time of survey, and would provide a needed basis for comparative study.

SELECTION OF AREA OF SURVEY

Since the study of survey methods and laboratory techniques was to form an important part of the first survey, it was considered advisable to execute this survey in the vicinity of the Institute's headquarters and central laboratories at Pretoria, the administrative capital of South Africa.

Pretoria, South Africa's fourth largest city, has a population of 221,200 Whites, 219,300 Bantu, 8,000 Coloured and 8,500 Asiatics, totalling 457,000. It is the centre of the Government's executive activities and the seat of the Transvaal Provincial Government. It has 2 universities, 2 teachers' training colleges, 3 technical colleges and about 170 primary and secondary schools. It is an important industrial centre and the country's major centre for scientific research. Its population is therefore extremely varied as regards race, occupation, income and educational level, and as such lends itself to research in the biological and social sciences.

SELECTION OF POPULATION GROUP

The choice of a suitable population group was influenced by a number of factors.

Malnutrition is much more common among non-Whites than among Whites, and particularly affects infants and young children. To carry out a dietary survey on children of this age would, however, be extremely difficult, and to draw a representative sample from among them would be almost impossible, particularly in the case of non-Whites. Moreover, since any information obtained would be useless until it could be evaluated against comparable data for other population groups, nothing would be gained by commencing with a non-White group. If a White group were chosen, on the other hand, advantage could be taken of the absence of a language barrier to study techniques

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requiring cooperation on the part of the subjects tested, such as the taking of a dietary history from mother or child.

With these considerations in mind, it was decided to commence our survey work on White children in the youngest age group that was feasible, i.e. primary school children of 6-11 years. Representative sampling would be made possible by the existence of school registers, and the fact that schooling is compulsory for White children would mean that our sample for each age group would be representative of the ambulant White child population of that age. With norms established for White children, a survey on Bantu, Coloured and Asiatic children would be carried out in the ensuing 2-year period.

SCOPE OF THE SURVEY

After a thorough study of the literature, it was decided to include the following investigations:

1. A medical history.
2. A somatometric study involving 13 body measurements.
3. A clinical examination of each child with special emphasis on the visual examination of epithelial structures.
4. Radiological examination of the wrist bones to determine degree of bone development.
5. Haematological examination of the blood.
6. Biochemical examination of the blood and urine to determine constituents which might yield information on nutritional status.
7. A dietary survey to determine actual food intake. It was decided to combine a dietary history with the weighing of 1 day's portions in the case of every child, and to apply an intensive 7-day weighing method on a sub-sample of 7-year-olds. Nutrient intake would be calculated from food tables, or, where this was not possible, food samples would be submitted to the Division of Food Chemistry for analysis.
8. A full socio-economic survey which would permit the subdivision of the sample according to socio-economic status.

These 8 separate approaches embody an extremely large number of investigations and observations and it was clear that they would require the full-time services of 3 entire divisions—field studies, biochemistry and food chemistry—and several temporary assistants for a considerable period of time. However, our survey was intended to be partly experimental in nature, and it was anticipated that analysis of the data by means of the electronic computer at our disposal would serve to indicate which of the investigations could be eliminated in future as being of no practical value.

SEASON OF THE SURVEY

Because of seasonal variations in health and in food intake, it was clearly necessary to examine all subjects *within as short a period as possible*. A transition period would have been avoided if possible, but the school terms are so spaced in South Africa that each of the 4 seasons is interrupted midway by a school holiday. The autumn/winter term, i.e. April-June, was finally chosen as the most suitable, the intention being that future surveys on children of the other racial groups would be conducted at the same time of year so that comparisons would not be invalidated by seasonal differences.

SAMPLING AND STATISTICAL PLANNING

The White primary school children of 6-11 years on the Pretoria school registers numbered 24,260. Stratification was considered on every basis which seemed likely to give cells or subgroups with a reduced degree of variation. However, except in the case of age and sex, the information essential for stratification would be forthcoming only after the survey was completed. It was decided, therefore, to have only the 12 cells representing the 6 age groups for each sex.

On the basis of available data in regard to physiological variation plus information obtained by means of a pilot dietary survey, a cell size of 30 was decided upon. It was considered probable that a cell of this size would allow of subdivision into 2 further subgroups if desired. A sample size of 30 (15 boys and 15 girls) was decided on for the intensive dietary surveys.

Allowance had to be made for a percentage of children who would fall out through illness, non-cooperation or other causes. This 'non-response' was arbitrarily estimated at 50%; the maximum size of the sample being thereby increased from 360 to 720. In actual fact the non-response proved to be only 21%, and 561 children were surveyed.

Various sampling methods were considered for drawing the sample of 720 children. It was finally decided to draw a simple random sample, stratified according to age and sex and embodying a sequential technique, the schools also being drawn in random order. The advantage of this procedure was that if the order of sampling was adhered to in carrying out the survey, the children already dealt with at any given moment would always constitute a random sample of the whole. The survey could therefore be terminated at any stage if the sample size was found to be adequate.

ORGANIZATION AND EXECUTION

In organizing the survey every effort was made to secure the interest and cooperation of all persons concerned, so as to ensure the highest possible response. Ample use was made of the local press and the radio to bring the importance of the survey to public notice. Several discussions took place with senior government officials, e.g. the Director of Education, the Chief Inspector of Schools and Municipal Chief Medical Officer.

Repeated visits were paid to the school principals to secure their cooperation. The registers were examined and

the sample drawn, and the parents of each child drawn then received a formal notification. A week before the commencement of the clinical survey a team of 6 sociologists started interviewing parents to request their written consent and obtain the information required with regard to socio-economic status. Working full-time for 10 weeks, these interviewers managed to keep just ahead of the clinical survey team, so that by the time each of the schools was visited the parents of the children concerned had already been interviewed.

A period of about 45 working days was available for the clinical survey of the children, necessitating a minimum quota of 12 children a day. Visits to the schools had to be arranged in advance so that accommodation could be prepared. The blood and urine specimens taken had to reach the biochemical laboratories by midday if the investigations were to be completed that day—a difficult feat if 2 schools had to be visited in the morning, particularly if they were far apart. Of the 2 medical officers included in the team, one performed the clinical examinations and the other took the blood specimens. Recourse was had to the neck veins when those of the arms proved unsuitable, and in this way less than 1% was excluded through failure to obtain the requisite amount of blood (about 12 ml.).

The dietary survey was commenced a week after the clinical survey and was confined to children who had already passed through the hands of the sociologists and the clinical survey team. The field work for the actual dietary survey, i.e. the determination of food intake, took 5 dietitians 18 weeks to complete. For a considerable period thereafter it was necessary to collect specimens of various foods for analysis by the Food Chemistry Division. This analysis is still in progress, a fact which helps to demonstrate the time-consuming nature of a detailed dietary survey.

The penultimate step in the survey will consist of the preparation of a series of reports on each category of findings. Some headway will have been made at that stage towards achieving the original objects of the survey, namely the evaluation of the methods employed and the definition of the nutritional status of the population surveyed. However, only when the ultimate task of coordinating the findings in all categories has been completed will it be known whether this project has helped to point the way to a simpler and more effective approach in the evaluation of nutritional status.