

A Scientific Approach to Fetal Wastage In Halifax County, North Carolina

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HALIFAX COUNTY, a rural county in eastern North Carolina, had reason to search for the causes of its high infant mortality rates. The 1952 rate had soared to an all-time high of 72.9 per 1,000 live births. Neonatal and premature death rates had climbed to 42.7 and 21.4 in 1952. Prematurity was the second leading cause of death that same year, outranking cancer and accidents.

Halifax County's population of 60,000 is 58 percent Negro. The birth rate for Negroes in 1952 was 35.2 as compared with 21.5 for white residents. Only 36.2 percent of all deliveries, white and nonwhite, occurred in hospitals. The county has 25 private physicians and 2 hospitals. There are 2 hospitals in the adjacent counties also.

Midwives were called in to attend 79.9 percent of all Negro home deliveries. Patients for midwife delivery are required to be certified either by a physician in private practice or by a clinician in charge of one of the 4 prenatal clinics operated by the county health department. The midwives are licensed by and work under the direct supervision of the health department.

Dr. Young, honored in 1950 with the Reynolds award for outstanding public health performance, is director of the Halifax County (N. C.) Health Department. He has been president of the Halifax County Medical Society and more recently president of the North Carolina Public Health Association, president of the North Carolina Academy of Public Health and Preventive Medicine, and secretary-treasurer of the North Carolina Trudeau Society.

Representatives of the North Carolina State Board of Health, University of North Carolina School of Public Health, North Carolina Medical Society, Halifax County Medical Society, and the Children's Bureau of the Department of Health, Education, and Welfare joined forces with the Halifax County Health Department in seeking answers to that vexing question, "Why does immature as well as defective fruit fall from the tree of life?"

An ambitious and well-designed research project on infant mortality tailored for Halifax County and neighboring counties with high rates failed to obtain supporting funds. The county health department and the allied groups persisted in exploring ways of using available facilities and local personnel in a demonstration program that might favorably influence infant mortality and morbidity rates. During these studies and conferences, three factors seemed to occur again and again:

- The plans for demonstration programs were lacking in adequate analysis and application of pertinent data.
- The diets of prenatal clinic patients were markedly deficient in protein and in other nutrients.
- Certain of these women habitually produced fetal deaths, premature infants, or babies who failed to survive the neonatal period.

Pinpointing the Problem

With the help of statistics and health education consultants, our public health nurses and secretaries undertook to remedy the deficiency in statistical data by preparing accurate tabula-

tions of infant, neonatal, fetal, premature, and maternal deaths, by race, for the 5-year period 1947-51. These statistics, though available in the health department, had not been assembled for maximum effectiveness.

Next, they collected and assembled pertinent details on exact geographic location of the patient's home, cause of the infant or maternal death, type of attendant (whether physician or midwife), and the place of delivery (whether in the hospital or at home). They also compiled complete details about the weight, period of gestation, attendant, place, and date of delivery of premature births. Because an epidemic of infectious diarrhea in one section of the county in 1952 had contributed to the high infant death rate, they made a special study of infant deaths from infectious diarrhea, analyzing the records in a local hospital that had been particularly affected.

After all information had been checked for accuracy with the vital statistics section of the State health department, the consultants were called in to recommend the best way of presenting the material to the health department staff, professional groups in the county, and key civic and voluntary organizations. They agreed that our presentation should be a combination of tables, graphs, and large county maps on which premature births and other associated infant mortality data would be plotted by the public health nurses.

Flip charts were prepared from semitransparent tracing paper. Separate sheets of each 48" x 34" chart were superimposed over a basic map of Halifax County, showing the general outline of townships and local divisions.

It was apparent from the presentation material that most of the infant deaths had occurred in three distinct areas of the county. This epidemiological observation led us to set up a prenatal demonstration clinic in each area.

Concentrating on Diet

Attention was next directed to the nutrition of prenatal patients. Careful review of their clinic records over a 3-year period revealed that the great majority of these patients drank no milk or at best an insufficient amount. Other protein foods in their diets during pregnancy were also inadequate.

Public health studies have documented the fact that low protein diets among prenatal patients are partly responsible for high maternal, infant, and related mortality and morbidity rates. These observations were emphasized at the 1955 meeting of the American Public Health Association, when Dr. August R. Lindt, the permanent observer of Switzerland to the United Nations, reviewed the benefits of surplus milk for prenatal patients and children in 45 different countries before the National Citizens Committee of the World Health Organization.

To aid study of the nutrition factor in local infant mortality, consultants in obstetrics and nutrition helped us design a special record for appraising the characteristics of the diet of prenatal patients. Because of the large number of new cases admitted to the demonstration clinics and the limited number of personnel, the record had to be simple in form yet adequate for the desired information.

For evaluation of each patient's diet, public health nurses record the food consumed at the three meals preceding the clinic visit as well as the food eaten between meals and at bedtime. This information is entered under separate sections for "breakfast" and "between," "lunch" and "between," "supper" and "bedtime" in a column of the diet record headed "food and amounts." The food items are coded in a second column and scored in a third.

The diet is rated "good" (9-10 points), "fair" (7-9 points), and "poor" (below 7 points) according to the following guide.

<i>Code</i>	<i>Food and amount</i>	<i>Possible score</i>
F & V----	Fruit and vegetables----- ½ cup fruits, vegetables, or juice=1 point	4
M-----	Milk----- 1 cup=1 point 2 cups=2 points 3-4 cups=3 points	3
P-----	Protein food----- 2 servings of 3 oz. lean meat or equivalent	2
B-----	Bread and cereals----- 2 servings	1
	Perfect score-----	10

As soon as these records were completed, the nutrition consultants began holding inservice training sessions for nurses, 2 hours each week

over a period of 6 weeks. Training in nutrition included a careful study of the diet records and diet histories of the demonstration patients; instruction in nutrients, food portions, and food values; and methods of teaching food values to clinic patients.

Knowing that surplus nonfat dry milk was available to public schools and other public institutions in the county, we explored the possibility of obtaining this important protein food for the prenatal patients whose diets were deficient in protein. The surplus commodity food section of the State department of agriculture approved our proposal for issuing free milk to medically indigent patients in the demonstration clinics, and the county welfare department certified their eligibility.

A patient who receives an allotment of 9 pounds of dry milk every 30 days during her pregnancy is provided with the equivalent of 1 quart of fluid milk a day. Clinic classes and individual conferences are held to show prenatal patients how to use dry milk for drinking and cooking. They learn, too, about other protein foods that are locally available.

An inventory showing the amount of milk received and distributed each month is kept for the department of agriculture. Other records include a form on which patients acknowledge receipt of the milk and agree to its use as prescribed by the clinic and a form on which public health nurses determine medical indigency.

During the first 6 months of the demonstration program, a public health nurse visited the patients participating in the milk distribution to assure that dry milk was being used in accordance with the clinic's instructions. (Home visits for this purpose have since become a part of the generalized public health nursing program.) Throughout the country, home economics teachers, home demonstration agents, and 4-H club leaders were alerted to the objectives of the surplus milk program so that they also could emphasize the importance of protein foods in prenatal diets.

Finding the Problem Patients

The third factor in our initial studies had repeated itself with stubborn regularity: Certain women attending the clinics seemed to produce

more than their share of infant deaths and related morbidity and mortality. To find the problem cases on which to concentrate preventive efforts, we designed a screening device that combined a maternity record and a score sheet on which to grade the pregnancy risk of the mother and the survival risk of the fetus.

Maternity Record

The maternity record is still undergoing trial in the prenatal clinics. It is designed so that grades of "good," "fair," or "poor" risk are given in each of seven major sections: (a) mother's previous obstetrical history, (b) her previous medical history, (c) the family history, (d) the mother's diet, (e) physical examination (including pelvic evaluation), (f) laboratory and X-ray findings, and (g) subsequent antepartum visits. The total risk for each patient is based on the grades in each of these respective sections.

At the close of each clinic session, nurses review and grade each patient on the major sections of the record. Patients graded "fair" or "poor" are selected for more frequent visits to the prenatal clinics and for intensive followup through home visits by the nurses.

The following outlines from two sections of the trial maternity record illustrate the grading system.

Previous Obstetrical History. A grade of "good" is given to the patient whose previous obstetrical history is essentially negative. A grade of "fair" is based on any one or a combination of the following factors:

1. Seven or more deliveries.
2. One abortion.
3. A history of any single complication other than toxemia; for example, hemorrhage (antepartum) or mild hypertension.
4. One premature child living or dead, 1 fetal death, or 1 infant death.

A grade of "poor" is based on any one or a combination of the following criteria:

1. Cesarean section.
2. Two or more abortions.
3. History of toxemia.
4. History of 2 or more other complications.
5. Two or more premature children living or dead, 2 or more fetal deaths, or 2 or more infant deaths.

6. A combination of 2 or more abortions, premature births, fetal deaths, or infant deaths.

Physical Examination. A grade of "good" is given to the patient in good general condition with essentially negative findings on her physical examination. A grade of "fair" is given when the physical examination reveals the following conditions:

1. More than 20 percent overweight.
2. Blood pressure 140/90 or above.
3. Edema of the feet.
4. Inactive tuberculosis.
5. Any other condition or combination of conditions that, in the examining physician's judgment, would grade the patient's physical condition as fair.

A grade of "poor" is justified when these conditions are present:

1. A combination of elevated blood pressure, increased weight, and edema.
2. Hypertension 150/100 or above.
3. Active pulmonary tuberculosis or syphilis.
4. Edema of the feet and hands, or edema of the face, or both.
5. Organic heart disease.
6. Marked deformity of the spine.
7. Breech presentation.
8. Serious change in the fetal heart rate such as inability to hear the fetal heart sounds.
9. Contracted pelvis or any other serious deficiency in the pelvic measurements.
10. Any other condition or combination of conditions that, in the examining physician's judgment, would grade the patient's physical condition as poor.

Grade of Risk

The final calculation of the grade of risk for each patient is based on these criteria for "good," "fair," and "poor." It must be emphasized that the grading is influenced by local conditions.

Good. A patient whose maternity record is essentially negative in all seven sections is graded a good risk.

Fair. Grades of "fair" for the sections on previous obstetrical history and physical examination or the section on laboratory and X-ray findings would automatically grade the patient as a fair risk. A grade of "fair" in two or more of the remaining sections, namely, pre-

vious medical history, family history, and diet, would give the patient a grade of risk of "fair."

Poor. A grade of "poor" for the section on previous obstetrical history and the section on physical examination or the section on laboratory and X-ray findings would automatically give the patient a grade of risk of "poor." A rating of "poor" in two or more of the other sections would give the patient a grade of "poor."

A sudden increase in weight or blood pressure, the appearance of significant edema, bleeding, any other significant findings, or a combination of conditions might warrant, of course, a change in the grade of risk under the section on antepartum visits.

Although from a first glance the grading system might appear cumbersome and complicated, I hasten to add that, after a relatively short period of working with the record, nurses and clinicians are able to evaluate the patients with speed and accuracy. The record serves not only to select patients of special risk but also to emphasize to our clinic personnel those factors which are of major significance in the prognosis of the prenatal patient.

Evidence of Decline

My purpose has been to review a purely local approach to a specific local public health program. I have attempted to suggest that even when outside help is not available on a grand scale and the local resources and facilities are limited there is still a great deal that can be accomplished by applying the fundamental tools of public health.

Although there has been a decline in pertinent rates, we feel that the program should be continued for a longer period of time before attempting an analysis of these data.

Lest I may have given the impression that Halifax County's approach to the problem of fetal wastage is a final solution, I wish to emphasize that our experience underlines the need for more intensive investigation of the unknown factors.

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Samples of the forms described are available from the Halifax County Health Department.