

CONTROL OF DISEASE AMONG AMERINDIANS IN CULTURAL TRANSITION¹

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The impact of any given outside measure on newly contacted Amerindian groups is hard to predict. For this reason some classic steps, including health measures, designed to benefit such groups can produce adverse side-effects. This article discusses some of these side-effects and suggests a number of ways in which they may be avoided or overcome.

Introduction

The picture of exuberant health displayed by most Amerindian populations at the time of first contact has been well-documented. Equally well-documented has been the rapid collapse of health under the usual conditions of acculturation.

During the past 12 years my colleagues and I have been involved in the study of Amerindian groups in rapid transition.³ Our interest has been directed primarily at learning more about the important genetic parameters of tribal man; and secondarily at the biomedical pressures shaping some of those parameters as well as the ways in which these pressures change during the process of acculturation. It was inevitable under these circumstances that we would become deeply interested in the problem of Amerindian health, and it is this practical side of our work that I wish to discuss here.

All medical researchers are committed to the truism that the state we call "health" is a fragile thing of many components. As our own studies have progressed, we have made the usual discovery of a complex interplay between these

components. Consideration of this interplay rapidly draws one into a systems-type analysis, with an accompanying effort to identify how the role of specific components in the system may change as the nature of the external forces impinging on the system changes.

Conditions Among a Few Representative Groups

Any single individual's view of primitive man is strongly colored by those representatives of primitive cultures whom he has contacted. For ourselves, much of our thinking has been shaped by contacts with the Xavante, Cayapo, Yanomama, and Yécuana (Makiritare) Indians of the Orinoco and Amazon river basins (all representing tribes now or soon to be in rapid transition) and by the Macushi, Wapishana, Krao, and Piaroa Indians (representing tribes well along in the process). My comments are largely based on first-hand contacts with these groups.

Food Production

The people in these tribal groups lived until recently in villages of 50-250 persons. Their livelihood depended on hunting, gathering, and slash-and-burn (swidden) agriculture; their principal crops were manioc, the cooking banana (plantain), or maize. The location of their gardens shifted constantly, the location of their villages less frequently. Game, while not abundant in comparison with that of temperate grasslands, met the protein needs of a people whose principal cultivated crops were quite starchy. The important disease pressures were

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of the endemic rather than the epidemic type. Evidence of infection with most of the common intestinal parasites could be found in feces, but egg and cyst counts were low. To judge by their antibodies, the people in these groups are exposed to enteric viruses and arboviruses in abundance (1, 2, and unpublished data).

Population Control

It is a common misconception that because of disease pressures, primitive man was reproducing at near-capacity in order to maintain his numbers. In the least acculturated group with which we have worked, the Yanomama Indians,⁴ this is surely not correct (3). There we find the average woman introduces a new child into the culture about every three-and-a-half to four years. This child spacing is accomplished by intercourse taboos for a variable period following childbirth, abortion by crude but effective methods, and, finally, if other measures have failed and a child comes too soon, infanticide, especially in the case of female infants. Some tribes have official village wantons or prostitutes to satisfy the sexual drives of men denied access to their wives because of a recently born child.

Immunity Levels

Infant and childhood mortality from natural causes is some 20 to 30 per cent, high by the standards of contemporary nontropical areas, but low by the standards of tropical nations as little as 60 or 70 years ago. We attribute this to several factors. Gamma globulin levels of these Indians are roughly twice our own, reflecting continuing pressure from endemic diseases (1, 2). Thus, the newborn child presumably has high passive immunity to the local diseases; he

immediately comes into an intimate contact with his environment that would horrify a Western-culture mother; and a relatively smooth transition from passive to active immunity against many of the endemic diseases has been suggested (14). However, the studies on antibody acquisition necessary to sustain this thesis have not been carried out because of certain practical difficulties in obtaining blood from the very young under our field conditions.

Because of the above-mentioned child-spacing, a child will nurse for approximately three years. This not only ensures a generally adequate supply of what still seems to be the best baby food, but may also be important in ameliorating the morbidity usually involved in acquiring immunity to a variety of diseases.

The Impact of Western Culture

Let us now consider the usual effects of contact with Western culture on this system. My argument will be that the important factors in these first contacts have changed dramatically in the past century, and with them the strategy needed to ensure the smoothest possible cultural transition.

A century or two ago the most immediately devastating impacts of the Western World on cultures of this type were those due to epidemic and venereal diseases: smallpox, measles, pertussis, tuberculosis, syphilis, and gonorrhoea (we found no evidence of syphilis in recently-contacted Indians). Those who survived these diseases were often introduced to large quantities of alcohol by unscrupulous traders. Besides the problem of alcoholism created in this way, the practice must have caused a very considerable amount of traumatic death. Finally, although it is impossible to evaluate in any quantitative way, the fact that many Indian groups were defeated, harassed, and often forcibly displaced from traditional lands by representatives of an alien culture must have created a mental attitude contrasting sharply with the positive outlook that is of such value in resisting and overcoming serious disease.

⁴For additional material on the health status of the Yanomamas, see M.A.P. Moraes, *et al.*, Onchocerciasis in Brazil, *PAHO Bulletin*, Volume VII, No. 4, 1973 (pp. 50-56) and M.A.P. Moraes and G.M. Chaves, Onchocerciasis in Brazil: New findings among the Yanomama Indians, *PAHO Bulletin*, Volume VIII, No. 2, 1974, pp. 95-99.



A Yanomama Indian about 20 years old awaiting venipuncture. His black lines and monkey-fur arm bands are characteristic of Yanomama culture.



Above: Male Xavante Indians about to receive physical examinations at the Pimentel Barbosa Post of the Indian Protective Service of Brazil. The post is situated on the Rio das Mortes in the central part of Mato Grosso State.

Below: This temporary building on Venezuela's Erebató river served as a headquarters for medical researchers providing physical examinations and obtaining blood samples from native groups. A stretch of rapids rendered the river impassable above this point.



Classic Remedial Measures

These problems are no longer—or should no longer be—the chief problems of early contact. Many of the diseases I have mentioned are being countered by effective immunization programs actively implemented by missionary and government groups; and where such programs are lacking (as in the cases of syphilis and gonorrhea) effective therapeutic measures exist. And in highly susceptible groups attacked by measles or pertussis prior to immunization, antibiotics can effectively overcome the pneumonia which is their primary complication.

Incidentally, our own experience with measles in a “virgin soil” population (the Yanomama Indians) has convinced us that the primary responses of the Indian to measles vaccine (Edmonston B strain) and to measles itself are not very different from our own (5). The relatively high mortality results from secondary features of the epidemic, which incapacitates nearly all members of the village simultaneously, including both mothers and their nursing children, in cultures where food and water must be gathered every day. Stated more pointedly, one cannot attribute poor therapeutic results in a measles epidemic to some mysterious, innate, constitutional susceptibility; given the same level of care, measles mortality among Indian children should not differ greatly from that among Caucasian children.

Furthermore, all the government programs I am in any way familiar with are making strenuous efforts to limit introduction of the Indian to alcohol. Although this clearly is a temporary measure—one cannot speak of full citizenship and then impose special restrictions—it is surely a wise move during the years of initial contact.

Finally, the groups now entering into permanent contact have not been defeated and displaced, but confront the situation with their culture intact.

Other Urgent Problems

These are excellent developments, even

though they unfortunately come too late for most indigenous peoples of the Americas. Where conscientiously applied, they will benefit the Indian greatly. But the very success of these measures in counteracting the initial thinning out of the population which formerly occurred may be creating a new set of problems. It is precisely these problems that I should now like to examine.

The chief contacts of villages just embarking on cultural transition are generally missionaries or government agents. Both tend to encourage nomadic Indian groups to abandon their way of life, often to afford them a measure of protection; in addition, the government agent usually wants to avoid the complications nomadic groups create in opening up an area for settlement and economic exploitation, and the missionary wants to increase his opportunity to teach the Gospel. All this is entirely understandable. However, Indian sanitation being what it is, there will inevitably be a greater accumulation of worm eggs and protozoan cysts in the soil around the village when it is permanent than when its location is shifted frequently; and this situation will be followed by an increase in the average villager's body burden of parasites. Also, with or without population growth, sustained settlement increases the likelihood of water contamination and with it the incidence of transmissible diarrheas.

At the same time, government agents and missionaries tend to discourage the crude methods by which population size was previously controlled. Again, given the dominant Christian ethic, this is completely understandable. However, to the extent these efforts are successful the birth rate increases and the nursing period shrinks. Unfortunately, in the inhospitable environment of the jungle or the Mato Grosso a three-year-old is much more ready for the transition to solid food than a child of one-and-a-half or two. Thus a predictable result of a higher birth rate is increased malnutrition and a higher incidence of infantile and childhood diarrheas.

As the local population grows, game be-

comes less abundant and good garden sites are harder to find. This leads to a general decline in nutrition at the very time that an increased parasite burden demands improved nutrition.

Since national governments are making very real efforts to extend medical services to newly contacted groups, one can partly offset this rather pessimistic scenario by assuming that some of the adverse effects will be overcome by application of vermicides, vermifuges, and broad-spectrum antibiotics. This leads to my final point: it is a widely held belief that erratic administration of antibiotics encourages the appearance of drug-resistant strains of bacteria; and the fitful manner in which the unaccustomed Amerindian recipient observes an antibiotic schedule seems guaranteed to encourage the emergence of drug-resistant organisms—especially with reference to the broad-spectrum antibiotics commonly used in treating diarrhea. One day he takes the prescribed medicine, or gives it to his child, but if the next day there is no improvement he turns to folk medicine, only to return to the antibiotic on day 3 if there is still no improvement. Only in the case of injectables can one be sure the patient is receiving a full therapeutic dose.

Conclusions

These observations lead to some relatively simple recommendations designed to supplement the now standard ones concerning immunization programs, control of alcohol, etc. Incidentally, no great expenditure of money is called for by any of these new recommendations, which are as follow:

- 1) Do not encourage groups to settle down permanently or amalgamate into larger groups without an accompanying major effort to introduce rudimentary concepts of sanitation.

- 2) Introduce supplementary crops and domesticated animals as soon as possible. Chief among the former should be the new strains of maize, rice, and beans, and among the latter chickens and pigs. The emphasis should of course be on plant protein, since animal protein is becoming more and more of a luxury; but

chickens and pigs are scavengers which will utilize the little that goes to waste in an Indian village.

- 3) Withhold oral antibiotics unless the recipient makes the most binding commitment obtainable under the circumstances to a full course of therapy. It is difficult to do this with a sick child—one is tempted to gamble that the parents will bring it back the next day—but I am convinced that in the long run the former course is the wise one.

- 4) Finally, do not disturb native customs which have limited the population and kept population numbers attuned to available resources until adequate provisions (such as those suggested in recommendation two) have been made for population growth. To do otherwise is inhumane.

In closing, I must first emphasize that nothing I have said should be interpreted as being critical of public health activities undertaken to serve the culturally isolated Indians of this Hemisphere. Nor can there be any doubt that special tribute is due the many fine people laboring to help these Indian populations.

Secondly, I realize that I am focusing on a relatively few people. I submit, however, that these people pose a special challenge to our conscience, and as symbols of past violation of the brotherhood of man call for a particular effort on our part. So rapidly are the remaining isolated groups being contacted these days that within another generation the opportunity to smooth their transition will for all practical purposes have been lost. Their treatment should of course be dictated by humane considerations, but the investigator in me cannot resist commenting on the unique research resource they constitute—our last chance to revisit ourselves evolving. Furthermore, as a geneticist I come to you with a long tradition of focusing on special groups, because of the insights they can provide. Last year dozens of papers were written about galactosemia, or I-cell disease, or type I Lesch-Nyhan syndrome or oroticaciduria. The contribution to the gene pool of the Americas represented by the Indian far outweighs the contribution of all these rare diseases combined, and the problems of the Indian are no less pressing—only more remote.

SUMMARY

Immunization campaigns, medical treatment programs, and other health efforts are among the classic steps taken to reduce the damaging impact of Western culture upon newly contacted Amerindian groups. While they have usually been highly beneficial, at least in the short run, mounting evidence suggests a need to supplement them with other measures. These latter, which are discussed in detail in the text, include the following:

1) Do not encourage establishment of permanent settlements or amalgamation of popula-

tion groups unless rudimentary concepts of sanitation are introduced.

2) Introduce supplementary crops and domesticated animals as soon as possible.

3) Withhold oral antibiotics unless the recipient makes the most binding commitment obtainable under the circumstances to a full course of therapy.

4) Do not disturb native customs limiting population size until adequate provision has been made for population growth; to do otherwise is inhumane.

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