Use of Health Services in Relation to the Physical Home Environment of an Indian Population

ASHLEY FOSTER, PhD, MPH, ALICE M. HAGGERTY, RN, MPH, and EDWIN O. GOODMAN, MSSPH

THE GENERAL HEALTH alertness of a community can be measured by a number of indices. These indices include variables such as the number of patient visits, the general nature of such visits (specific illnesses, the result of accidents, or preventive services), the number of hospitalizations, or possibly the general condition of housing and the environment.

In this study we sought to document the relationship between the physical status of a person's home environment and the way he uses the medical services available to him. We examined some patterns in the use of health care services, how the health facilities were used, and the physical home environment of an Indian population on a reservation in the northwestern part of the United States. We also included a few persons on the reservation who did not use the available Indian Health Service clinic facilities. Additionally, we identified those who visited the clinic but did not avail themselves of the preventive health care services, assuming that identifying them would facilitate the development of a program to establish optimum health levels in that population.

In sum, then, we sought answers to the following questions. What are the characteristics of the people in this study? How are the Indian Health Service facilities used and by which people? What is the relationship between the home environment and the use of health services? Which people do not use the available preventive services?

The authors are with the Indian Health Service, Health Services Administration, Department of Health, Education, and Welfare. Tearsheet requests to Dr. Ashley Foster, Office of Program Planning and Evaluation, Portland Area Office, Indian Health Service, 921 SW. Washington, Portland, Oreg. 97205.

Methods

The opportunity to examine the preceding questions arose in 1970 when the Office of Environmental Health of the Portland Area Office, Indian Health Service, made ready a Premise and Home Environmental Health Survey ("2500" Survey) of some 81 randomly selected homes on an Indian reservation. The survey, conducted in 1969–70 by a Public Health Service sanitarian, included more than three-quarters of the homes. The reservation, situated in the Pacific Northwest, has approximately 650 residents who derive their income chiefly from timber, logging, fishing, and

agriculture. The population is English speaking, predominantly Protestant, and is served by public schools. The people live in frame houses varying in size, with a wide range in the degree of modernization.

A part of the "2500" data collected was used to rate each home; it included an evaluation of 0, 1, or 2 for each of these items: sink, range, refrigerator, food storage facilities, bath facilities, adequacy of heating, waste disposal, and area per person. The homes were thus rated on a total scale from 0 to 16; 0 was the highest rating and 16 the lowest.

At the same time, the homes were rated for accident hazards both inside and out. This rate was derived from a list of hazards such as firearms within easy reach, broken or defective windows, deteriorated stairs, circuit loads of electric wiring, location of combustibles, holes in the ground, ponds, and the like. The accident hazard rating, like the home environment rating, indicated a progressively more hazardous environment with increasingly higher numbers; it correlated 0.827 with the home rating, although different indices for evaluation were employed.

Because the homes were listed only by number, it was necessary to identify the residents of each home. This was accomplished by using a map of the area and working with a resident of the reservation who knew the community intimately. We thus obtained a master list of 452 people, who represented a random sample of about three-quarters of the reservation population. The medical records of the sample population that were available at the nearby Indian Health Service Clinic were then examined to determine how this clinic's facilities were being used.

We assumed that the clinic would be the facility of choice since it is conveniently located, the services are provided without cost to the user, and the provision of services is generally considered to be an obligation of the Government rather than charity. Any contract medical and hospital services given through outside sources would have been noted on the medical chart. The cost of any other private medical care is too exhorbitant for most members of the community; 58 percent of the families earn less than $3,000 per year. Also, the nearest non-Indian Health Service medical facility is 45 miles away.

The charts of all 452 persons were reviewed for the period from July 1968 to June 1970, and the reason for each clinic visit or hospitalization was placed into one of 18 major categories and further subdivided by diagnosis. Because men and women make different use of the health facilities, most of the data were separated by gender and compared, chiefly to emphasize some of the unique patterns of clinic attendance for each sex.

One potentially serious bias in this study was that the medical data reflected the activities of only one resident physician at the clinic. To some extent, the data may have reflected his diagnostic biases or a particularly positive or negative response from the patients. It has been our impression, however, that this physician was particularly well liked and that he evoked a more enthusiastic response toward health care than many of his colleagues.

Findings

Characteristics of the study population. The 452 people we studied consisted of 228 males and 224 females, who ranged in age from newborn to 82 years and averaged 26.76 years. On this reservation, the infant mortality rate was 33.5 for the 5-year period 1966–70. In 1970, 69 percent of the mothers were under 25 years old.

The 81 homes in which the 452 people lived were primarily of frame construction; the average rating of the homes on the scale discussed earlier was 6.4. There were no significant differences between males and females in age, distribution of age groups, or home ratings. (We use the term "significant" to indicate that the differences would have occurred by chance only 5 times in 100, $P \leqq 0.05$; and the term "very significant" to indicate $P \leqq 0.01$.) The homes without children rated better than those with children. There was no significant relationship between the age or number of children and the rating of the home, except at the extremes, where in the 26 homes rated from 0 to 4 there was an average of 3.38 children, whereas the 5 homes rated from 13 to 16 averaged 6 children. There was also a negative correlation ($r = -0.605$) reported elsewhere between the rating of the home and the performance grades of the children in high school (*1*).

Use of Indian Health Service facilities. Review of the clinic charts indicated that only 4 women and 10 men did not use this facility during the 2 years studied. During this same time, 15 children were born and 4 women and 2 men died. In 1970 this reserva-

tion had the lowest infant mortality among the Indian populations in the 3-State Portland area (Washington, Oregon, and Idaho). Forty-five men and 50 women spent a total of 876 days in the hospital. Excluding maternity hospitalizations, 43 women (average age 32.6 years) spent 8.744 days in hospital and 45 men (average age 30.3 years) spent 10.047 days in hospital. The age differences approach significance, although this does not hold true for days in hospital.

The reasons for the clinic visits ranged from a single diagnostic cause, generally an immunization or a physical examination for employment, to a high of 134 visits made by one person for multiple diagnoses which included diabetes mellitus, anemia, optic atrophy, pericardial effusion, gastrointestinal bleeding, obesity, and urinary tract infections. During this 2-year period, 46 women and 63 men did not seek any of the preventive services offered at the clinic.

Consistent with our subjective impressions and other studies, women attended the clinic very significantly more than men. During the 2 years, women averaged 19.76 visits and men only 13.72. The women were also seen more frequently for the same illness; for example, for upper respiratory infections women averaged 3.814 visits, and the men averaged 2.669 visits. Even in the well-child clinics, boys averaged slightly fewer visits. Although men, perhaps predictably, visited the clinic more often as the result of accidents, women seemed somewhat more sensitive to the need for preventive care even when we excluded visits for prenatal and postnatal care, family planning, and Papanicolaou smears.

Men visited the clinic more often with ailments for which clear-cut diagnoses could be made. Thus, as shown in table 1, they made more visits per diagnosis than women for diabetes, meningitis, peptic ulcer, urinary tract infections, skin infections, lacerations and miscellaneous injuries due to accidents, and various musculoskeletal problems. They made fewer visits than women for upper respiratory infections, otitis media, miscellaneous respiratory problems, and ill-defined conditions.

The age difference between men and women users of health services for the foregoing conditions is slight when we consider that the 2-year difference for the entire group is statistically insignificant. For miscellaneous unclassified visits due to accidents, however, the men were more than 5 years older than the women. The small numbers of men and women in some diagnostic categories precluded the establishment of any statistical significance.

Relationship of home environment and use of services. It has been well established that poverty and under-use of available services frequently go hand in hand. If the quality of housing reflects the poverty status of the homeowner, there should be some relationship between the use of health services and the condition of the home.

As noted earlier, the average house in this study was rated 6.4. A house in poor condition should contribute to ailments that result from a poor environment—chiefly respiratory infections and diseases which reflect poor sanitation—and we found this to be generally true (table 2).

Although the numbers were too small for a meaningful evaluation of significance, the homes

Table 1. Average home rating, age, and number of clinic visits, by diagnosis, of an Indian population, 1968–70

Diagnosis	Number		Average age		Average number of visits		Average home rating	
	Male	Female	Male	Female	Male	Female	Male	Female
Diabetes	3	7	.....	56.286	19.330	12.000	.....	.....
Meningitis	11	15	29.455	31.000	1.273	1.000	6.909	5.000
Otitis media	37	65	19.730	18.200	2.054	3.154	6.459	6.815
Upper respiratory infection	118	141	27.153	24.511	2.669	3.184	6.763	6.496
Miscellaneous respiratory infections	9	7	38.778	.....	12.333	17.429	3.222	.....
Peptic disease (gastritis, ulcer)	21	7	42.333	39.857	10.429	7.286	7.667	7.286
Urinary tract infection	11	47	34.364	32.447	3.273	2.553	5.909	6.511
Skin infection	37	39	22.919	18.165	2.027	1.897	7.135	7.846
Miscellaneous musculoskeletal diseases	29	25	33.000	34.240	2.241	1.440	6.103	5.040
Ill-defined conditions	37	68	26.919	24.368	1.946	8.838	7.216	5.809
Laceration and open wounds	61	41	22.279	20.780	2.197	2.000	7.574	6.829
Miscellaneous accidents	72	57	23.250	17.596	2.194	1.579	6.986	6.930

of 33 males with streptococcal throat infection were rated 8.100 and those of 9 females with hepatitis were rated 9.000. All patients with lower respiratory infections were from homes significantly worse than the majority; their homes were also significantly worse than those of the patients with the more common upper respiratory infections. The smaller number with other respiratory problems were from homes very significantly better than the average. For reasons not easily explainable, the patients with the traditional "poor environment" diseases, diarrhea and tuberculosis, came from homes that were rated only slightly worse than average. A ubiquitous "poor environment" may be average on an Indian reservation. On the other hand, women who had pelvic examinations were from very significantly better homes, which were rated at 3.571. Perhaps the women who can overcome the ordinary sensitivity to a pelvic examination are not only more sophisticated in health matters but may be better educated and more well to do.

Predictably, people with skin infections came from poorly rated homes (table 1). Persons who visited the clinic because of accidents came from worse than average homes, although in no single category is this difference significant. Even when all the visits for accidents were combined—and this would duplicate some entries—the differences were still insignificant (table 3).

We associate sophistication in health matters with better housing, an association that is reinforced by the home ratings of the women who came for pelvic examinations. We would, therefore, expect that people who visited the clinic for all preventive health care would come from superior homes; however, this was not the case. Their homes were only average or worse. The boys who were brought to the clinic for well-child care, however, came from homes significantly worse than average. Those who came for prophylaxis against hepatitis (there had been an outbreak of moderately serious proportions) also came from significantly worse than average homes. For whatever reason, however, the "right" people, that is the people who were in greater need of the service, seemed to come to the clinic. We believe that this reflected an extensive outreach effort by the clinic, as well as a rapport between the physician and his community (table 4).

When we compared the women in the 15–44 age group who used the family planning services of the clinic with those who did not, there were no significant differences in age, visits for accidents, home hazard rating, or home rating. These women, however, visited the clinic significantly more often, and for reasons different from those who did not. This difference was possibly the result of counseling women who were already in the clinic for other reasons.

Nonusers of preventive services. Any comprehensive health program ultimately must be judged by the effectiveness of its preventive component. Without an effective preventive program, any health scheme must deteriorate into a series of

Table 2. Average home rating compared with certain diagnoses in an Indian population, 1968–70

Condition	Number		Home rating	
	Males	Females	Males	Females
Respiratory:				
Upper infection ..	118	141	6.763	6.946
Lower infection ..	54	53	8.352	8.000
Infectious:				
Diarrheas, all forms	35	26	6.500	6.710
Tuberculosis, all forms, including patients on prophylaxis ...	25	31	6.419	5.640
Streptococcal throat infection.	33	30	8.100	6.150
Hepatitis	7	9	7.286	9.000

Table 3. Average home rating compared with accidental injuries and poisonings of an Indian population, 1968–70

Diagnosis	Number		Average age		Average number of visits		Average home rating	
	Male	Female	Male	Female	Male	Female	Male	Female
Fractures.....	18	11	24.222	25.727	2.833	4.455	5.000	6.182
Lacerations and open wounds.....	61	41	22.279	20.780	2.197	2.000	7.574	6.829
Burns.....	15	11	14.867	25.636	2.667	1.636	8.600	7.909
Miscellaneous accidents and poisoning.....	72	57	23.250	17.596	2.194	1.579	6.986	6.930

Table 4. Average home ratings compared with reasons for preventive visits to clinic of an Indian population, 1968–70

Reason for visit	Number		Average age		Average number of visits		Average home rating	
	Male	Female	Male	Female	Male	Female	Male	Female
Prenatal		27		23.444		2.815		6.259
Postpartum		13				1.615		6.769
Family planning		36		25.889		3.722		6.944
Well child	19	26	4.316	4.896	2.579	2.769	8.947	7.346
Immunizations	27	44	18.037	26.114	1.741	2.409	7.667	5.955
Tuberculosis screening	118	108	30.644	27.648	1.169	1.148	7.339	6.343
Papanicolaou test		33		34.545		1.061		6.121
Routine physical examination	22	17	30.545	25.765	1.091	1.118	6.636	5.059
Prophylaxis for hepatitis	52	72	23.250	23.917	1.096	1.014	8.096	8.042

visits for medical care, most of which will bear little relationship to one another. We wanted to identify the nonusers of preventive services so that particular programs could be developed to stress the desirability of preventive health care.

There were no significant differences between men and women in the percentages who did and who did not make preventive visits; 20.9 percent of the women (46) and 28.4 percent of the men (63) made no visits for preventive care. Nor were there major differences between men and women in the general pattern of clinic visits for preventive care except that women in the later childbearing years visited chiefly for family planning services and the Papanicolaou test.

The men who did not visit the clinic for preventive health care came from homes very significantly better than the homes of those who did. The men and women who did not seek preventive care also visited the clinic significantly less. There were no significant differences by age between those who came for preventive care and those who did not.

Discussion and Conclusions

This study was undertaken to examine the relationship between housing and use of medical services. It was expected that the positive and negative aspects of this relationship that were uncovered could help to pinpoint areas in which health efforts could most effectively be applied. Several important factors must be kept in mind. First, of course, is the popularity of the particular physician at the clinic during the study period. Second is that the ratings of homes, despite a uniform scoring scheme throughout the Indian Health Service, is a relative score in the sense that the zero-rated house is by no means a mansion. It has an installed sink and range, an inside toilet, a refrigerator, and hot and cold water, and these appliances are all effective but, at best, the house is most likely minimal by ordinary suburban standards.

From our results, it appeared that there was more than a chance relationship between relative housing conditions and some diseases. Expectedly, lower respiratory infections occurred significantly more often in homes that were in worse than average condition. Except for burn accidents, there was relatively little deviation from the reservation norm for housing among those who had had accidental injuries. The significant age difference between males and females in the burn category suggests at least that it is the mothers and male children who suffer the most burns. Perhaps this high proportion was simply the result of excessive exposure to a hazard.

The relative proportion of preventive visits was considerably higher than that seen either in the Portland area or in the entire Indian Health Service. A signficant chance factor in the large number of screenings for tuberculosis in our sample was that a tuberculosis survey was conducted on this reservation during the period studied.

It is our impression that the primacy of preventive visits for 1968 to 1970 was no longer true by fiscal year 1971. It would be interesting to observe any changes in morbidity or mortality for the subsequent years, but our numbers are small. The infant death rate during 1966–70 was lower than the average for the Portland Area; of 328 total live births, there were only 11 infant deaths. Much of the morbidity, however, would appear to be amenable to intervention by a well-coordinated and comprehensive health scheme.

A casual review of the data indicated that the comprehensive health scheme has not yet achieved the goal of elevating health to the highest possible level if "highest possible" is compared with that of the general U.S. population. The high incidence of lower respiratory infections, skin infections, injuries from accidents, and the like suggested that if the diagnoses are accurate, this population had not made optimum use of the available ancillary health services to remain in good health.

The Indian people and those who work with them have long held that personal relationships are a most significant, if not the most significant, aspect of Indian life. To some extent this study reinforces that belief. The data, we believe, reflect in large measure the personal relationship between a most sympathetic physician and the Indian people in one locale. Another physician and other locations frequently point to different patterns of patient attendance at clinics. The personal characteristics of the physician may be critical in the development of any plans for health care among the Indian people.

A population which leads an economically marginal existence is likely to give health care a lower priority than, say, its land and water rights—rights which bear in an immediate sense upon the quality of its existence. The presence of a health maintenance type of organization is, of course, no assurance that health needs of a population will be satisfied or even that the population will be able to recognize the existence of those needs.

The Indian population that we studied lives largely below the poverty level. It is likely that the most serious impediment to the development of a comprehensive health maintenance program has been the failure to recognize any relationship between the good life and good health.

REFERENCE

(*1*) Foster, A.: Home environment and performance in school. School and Society 100: 236–237, April 1972.

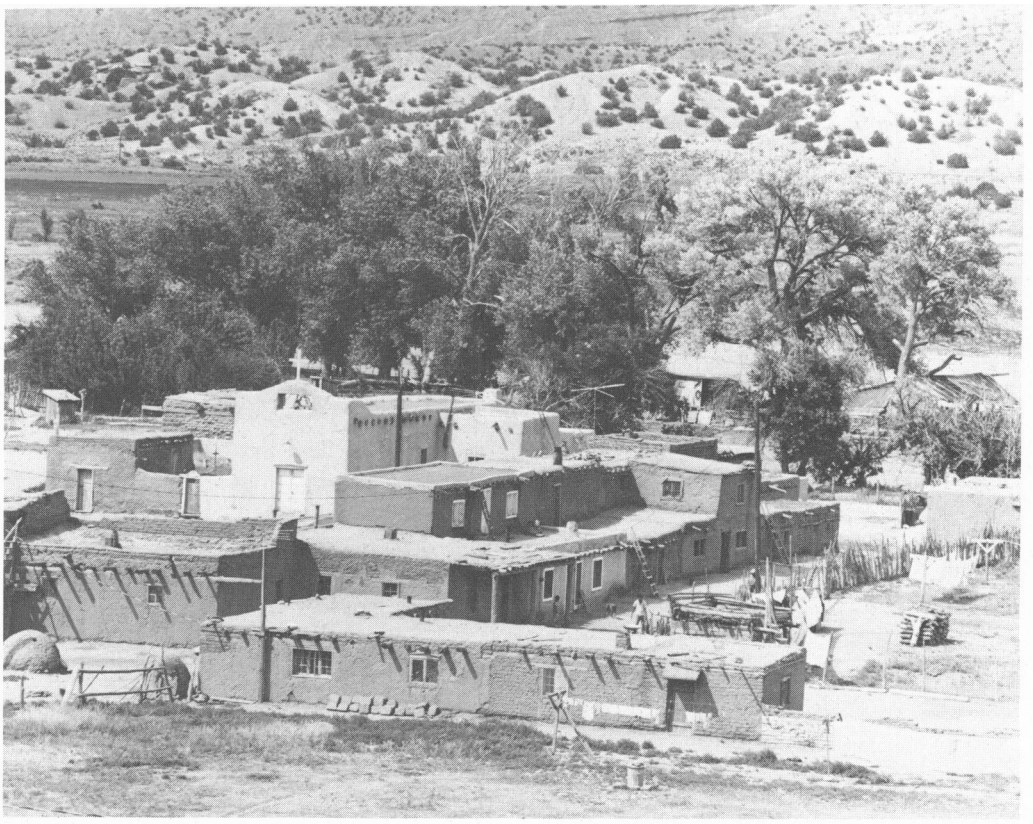
FOSTER, ASHLEY (Indian Health Service, Portland, Oreg.), HAGGERTY, ALICE M., and GOODMAN, EDWIN O.: ***Use of health services in relation to the physical home environment of an Indian population. Health Services Reports, Vol. 88, October 1973, pp. 715–720.***

In an examination of the relationship between the use of health resources and the physical home environment of an Indian population, the health records of 224 females and 288 males on a reservation were paired with an environmental survey of their homes.

The health services at the Indian Health Service clinic were used differently by males and females. Females made more visits for preventive care and more visits for every category of ailments except accidents.

Patients who visited the clinic for upper and lower respiratory infections and infectious diseases and attended well-child clinics came from poor home environments. Women who came for pelvic examinations were from significantly better homes.

The men who did not seek preventive health care at the clinic came from better homes than those who did. Both males and females who did not seek preventive care also made fewer total visits to the clinic. Age, however, was not a factor.



Indian pueblo in Taos, N. Mex., housing typical of Pueblo Indians of the Southwest. Below, *Indian employees of the Indian Health Service's environmental program lay pipes for a clean water supply on a Federal reservation.*