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Community Change Agents and Health Interventions: Hypertension Screening

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This study explores a community-based approach to health care. Community volunteers were trained and then conducted door-to-door screening for hypertension. Three large apartment complexes were selected for screening. In the two experimental communities, a letter was sent to each household soliciting volunteers who were then trained to measure blood pressure, complete data sheets, gain admittance to houses, and make appropriate recommendations for medical consultation. The residents in the control community received letters informing them of the hours during which they could have their blood pressure checked free of charge in the apartment complex rental office. Chi-square tests on number of apartments screened indicated the experimental door-to-door screening method was significantly more effective than the control central site method. These results demonstrate that the experimental screening project was a highly effective and inexpensive technique for hypertension screening.

The contribution of hypertension and its complications to disability and mortality in the United States is well documented. Randomized clinical trials have also demonstrated the efficacy of antihypertensive drugs in reducing the mortality and morbidity associated with the cardiovascular complications of hypertension (Veterans Administration, 1967; 1970). Yet even though hypertension is widely recognized as a health problem, is easily detected, and can be effectively treated, the National Health Examination Surveys of the early 1960s and 1970s revealed that approximately one-half of all hypertensives were undetected and close to 85% were either undetected, untreated, or inadequately treated (Hypertension Detection and

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Follow-up Program, 1977; National Center for Health Statistics, 1964). These and similar findings generated enthusiasm for mass screening for hypertension.

In spite of the numerous screening programs which have been instituted, there has been only a limited evaluation of their effectiveness, largely because of inadequate knowledge about the size of the target population. This has been especially true of programs which attempt to utilize community centers (e.g., shopping centers, YMCAs, schools, city "fairs"). Such programs screen large numbers of people in relatively short periods of time but have an undefined target population and therefore have not been evaluated for screening effectiveness. Data are available, however, concerning the screening effectiveness of programs which operate out of conveniently located neighborhood clinics. One such program which used mass media publicity and individual letters to households to encourage participation in screening at a convenient neighborhood clinic was able to screen only 10% of the target adult population (Wilber & Barrow, 1972). A more recent study found even less screening effectiveness with a similar neighborhood clinic screening program (Stahl, Lawrie, Neill, & Kelley, 1977). Attempts to increase participation through advertisements and incentives were unsuccessful: there were no significant differences between merely having the convenient neighborhood screening site available (.7% of the target population screened) and either sending a letter (1.7%) or a letter plus a gift offer (2.3%) to each household. One can conclude that neighborhood clinic screening programs have poor screening effectiveness.

Door-to-door screening approaches have also been tested in the effort to develop effective blood pressure screening programs. Although a home screening approach probably has the greatest potential for measuring and following blood pressure in the total at risk population, the costs are large and the screening effectiveness varies tremendouusly across studies, ranging from 17.4% to 89% of the target population (Hypertension Detection, 1977; Stahl et al., 1977; Wilber & Barrow, 1972). In spite of this variability when the screening effectiveness of a door-to-door approach is compared to an advertised neighborhood clinic program, the home screening approach has been shown to be a more effective way to screen a target population for hypertension as well as other screenable health problems such as colorectal cancer (Elwood, Erickson, & Lieberman, 1978; Stahl et al., 1977). This demonstrated effectiveness over central site screening may not be worth the substantial time and financial cost of a door-to-door approach however. Further study is needed to determine if the maximum potential of home screening for detection and follow-up can be approached without prohibitive expense. It was the purpose of the present study to evaluate the feasibility and effectiveness of door-to-door screening conducted by community volunteers within their own communities. It was hoped that

such a program would maintain or improve the screening effectiveness of a door-to-door approach while defraying costs.

METHOD

Subjects

Townhouse apartment complexes in Memphis, Tennessee, were matched on the following variables: average monthly rent, number of bedrooms per apartment, distance from downtown Memphis, regulations regarding children and pets, and complex size. Three apartment complexes, hereafter designated A, B, and C, were then selected for participation in this study. The apartments in all three complexes were two-story townhouses, each with a fence-enclosed patio and a private entrance. Each complex contained approximately 75% two-bedroom dwellings and 25% three-bedroom dwellings. Monthly rents averaged $213 ($195 to $255), $220 ($205 to $265), and $222 ($195 to $265) for Communities A, B, and C, respectively. At all three complexes there were an average of two adults and three residents per dwelling. The resident population was predominantly white with an estimated black population of 10%. All three complexes were located approximately 6 miles from downtown Memphis and all rented to pet-owners and individuals with children. The least well-matched variable was complex-size which varied from 365 to 204 to 468 units for complexes A, B, and C, respectively. Communities A and B were randomly selected to be the experimental communities and Community C was designated the control community.

Experimental Communities A and B: Door-to-Door Screening

Recruitment of Community Volunteers. Letters were distributed door-to-door by students volunteers to all of the apartments within Communities A and B to inform the community that a blood pressure screening project was being organized and to invite resident participation as volunteer screeners. Total time required for the distribution of the flyers was 4 hours. In addition, the apartment complex managers were asked to provide lists of residents active in the community. These residents were then contacted personally and asked to participate and/or suggest the names of other residents who might be interested in volunteering. Finally, resident volunteers were asked to provide additional names to contact and/or to recruit other volunteers personally. These methods yielded 11 volunteers from both Community A and Community B. In Community A, eight of the

volunteers were obtained through the letter solicitation and three were obtained through management or volunteer referral. However, only three of the Community B volunteers were letter responders. The remaining eight volunteers were recruited by personally contacting the management and volunteer referrals.

The volunteer group at Community A was composed of nine white females, one black female, and one white male, ranging in age from 23 to 62 with an average age of 34. Educational levels ranged from grade school to graduate school, and 6 of the 11 volunteers were presently employed, 3 in medically related professions. The volunteer group at Community B was composed of five white females and six white males, ranging in age from 19 to 75 with an average age of 31. Educational levels ranged from junior high school to graduate school and seven of the volunteers were presently employed. One volunteer was a student in one of the health professions.

Of the initial 11 volunteers at Community A, 8 completed training, although 1 volunteer (age 62) was then released from further participation because of her inability to take blood pressure accurately and failure to comprehend referral criteria. Of the original 11 volunteers from Community B, 8 completed training. However, of these eight, one volunteer was transferred prior to the beginning of the study and a second volunteer (age 75) was still unable to measure blood pressure accurately at the end of training.

Screening was then begun in Community A with 7 of the original 11 volunteers (64%). This subgroup of volunteers consisted of five white females, one black female, and one white male, ranging in age from 23 to 43 with an average age of 31. Six of the original 11 volunteers at Community B (55%) were available to begin screening. This subgroup of volunteers at Community B was composed of two white females and four white males, ranging in age from 19 to 44 with an average age of 25.

Volunteer Training. Training through instructions, modeling, practice, and feedback was accomplished in three 2-hour sessions over a 2-week period. Training was carried out by two psychology graduate students and one medical student who each volunteered 6 hours of their time for that purpose: 1½ hours of training time were spent discussing the physiology, complications, and treatment of hypertension and explaining the recommendations of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure for screening, rescreening, referral, and follow-up (Report of the Joint National Committee, 1977); 2 hours of training were devoted to the mechanics of taking and recording systolic and fifth-phase diastolic blood pressure measurements with aneroid sphygmomanometers. Volunteers were trained to a criterion of two blood pressure readings that were within five points of the measurements taken by an experienced screener on the same individuals utilizing double-headed

stethoscopes. Another 1½ hours of training were spent discussing the elements of a successful door-to-door approach, practicing a model introduction, and preparing responses to questions, hesitations, and refusals. The remaining hour of training time was spent testing each volunteer's ability to deliver an appropriate introduction, answer questions about hypertension and the screening project, accurately and reliably measure blood pressure, correctly fill out data sheets, and correctly identify those individuals requiring rescreening and/or referral for treatment.

Equipment. Each volunteer was given an identification badge, a stethoscope, and an aneroid sphygmomanometer for the duration of the study. The stethoscopes and sphygmomanometers were loaned to the project free of charge by the Memphis Heart Association and the Shelby County, Tennessee, Health Department.

Screening Procedure. A single experimental manipulation was used for both Communities A and B because of the large differences in their respective volunteer populations with regard to age, sex, method of recruitment, and screening load.

At the completion of training and check-out, each volunteer was asked to provide a list of their friends and acquaintances within the complex and these addresses were then assigned to them for screening. The remaining unassigned apartments were then divided among the volunteers on the basis of proximity to each volunteer's own apartment until an equal screening load per volunteer was achieved. The resultant screening loads were either 52 or 53 apartments per Community A volunteer and 34 apartments per volunteer in Community B.

Notices were then distributed to every apartment in Communities A and B informing residents about the screening project, urging their cooperation, and providing a phone number to call to have their address removed from the screening lists if desired. Again, the distribution of flyers required 2 hours of student volunteer time per apartment complex. The volunteers were then given a 1-month period from mid-November to mid-December to screen their list of addresses by a door-to-door approach. Volunteers were expected to make three visits per address unless they encountered a refusal or until all eligible adults were screened.

Upon finding someone home, the volunteers displayed their identification as they introduced themselves and offered to screen all persons 18 years or older. Three seated arm blood pressure determinations were made on all consenting adults. If two or more of these determinations equaled or exceeded either a systolic reading of 140 or a fifth-phase diastolic reading of 90, the individual was informed that he or she may have high blood pressure. The volunteer then either recommended that the individual seek treatment or plans were made for rescreening this individual at a later date in accordance with the guidelines established by the Report of the Joint

National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (1977).

Control Community C: Advertised Central-Site Screening

Recruitment of Screeners. Four undergraduate and graduate students, three white females and one black female, with an average age of 24, received research course credit in psychology at Memphis State University for their participation in this study.

Training and Equipment. Procedures and materials were the same as those described for Communities A and B. The number of trainers and the time alloted for training purposes were also the same.

Screening Procedure. During the same 1-month period in November and December, these student screeners manned a screening site at the centrally located apartment complex office at scheduled times on 2 weekdays, 2 weekday evenings, and Saturday and Sunday for a total of 15 hours per week, a time judged to be approximately equal to the screening time per week expended at the experimental communities. Notices were distributed to all of the apartments in Community C on the 1st and 15th day of the screening program to inform the residents of the availability, location, and scheduled times for blood pressure screening. The distribution of this information was carried out by student volunteers and the total time involved was 4 hours. A large sign conveying the same information was placed on the door of the apartment complex office. In addition, the student screeners personally invited all persons entering the office area to have their blood pressure checked. The procedures for determining blood pressure and recommending rescreening versus treatment referral were identical to those previously described for Communities A and B.

RESULTS

Screening results are presented in Table I. Of the 365 apartments in Community A, 118 apartments (32.3%) were either partially or completely screened, 42 apartments (11.5%) refused screening, and 115 apartments (31.5%) were approached at least once but not contacted because they were either vacant or the occupants were not home at the time of the approach. Thus of the 365 apartments in Community A, 275 apartments (75.3%) were approached at least once by a volunteer screener. The target population for screening in Community A was estimated to be 635 adults (number of occupied apartments $\times$ average number of adults per apartment) and a

Table I. Number of Apartments and Residents in Each Community that Were Screened, Contacted, and Not Approached

	Community A		Community B		Community C	
Variable	*n*	Percent	*n*	Percent	*n*	Percent
No. of apartments	365		204		468	
Residents screened	195	30.7	60	16.4	43	4.8
Apartments screened	118	32.3	37	18.1	31	6.6
Apartments refusing screening	42	11.5	24	11.8	31	
Apartments vacant or no one home	115	31.5	46	22.5		
Total apartments contacted	275	75.3	107	52.5		
Apartments not approached	90	24.7	97	47.5		

total of 195 resident adults (30.7%) were screened. A total of 389 approach visits were made and the time expenditure was approximately 49.7 hours.

Of the 204 apartments in Community B, 37 (18.1%) were screened, 24 (11.8%) refused screening, and 46 (22.5%) were approached but not contacted for a total approach rate of 107 apartments (52.5%). Of an estimated target population of 366 adults, 60 residents (16.4%) were screened. A total of 149 approach visits were made at a time expenditure of approximately 19.5 hours.

In control Community C, there were 468 apartments and an estimated target population of 894 adults. Only 31 apartments (6.6%) and 43 residents adults (4.8%) were screened. The total time expenditure for this screening approach was 64 hours.

A chi-square test conducted on the proportion of apartments screened in each of the three communities demonstrated significant differences ($\chi^2(2) = 92.06$, $p < .001$). Further chi-square tests indicated that a significantly higher proportion of apartments was screened in experimental Community A than in experimental Community B ($\chi^2(1) = 13.29$, $p < .001$), and in experimental Community A than in control Community C ($\chi^2(1) = 92.24$, $p < .001$), and in experimental Community B than in control Community C ($\chi^2(1) = 25.84$, $p < .001$).

Chi-square tests were also performed to compare the estimated percentages of residents screened in the three apartment complexes. The

initial test revealed significant differences in estimated percentage of people screened in the three communities ($\chi^2(2) = 188.03, p < .001$). Additional chi-square tests demonstrated significant differences in estimated percentage of residents screened between the two experimental complexes ($\chi^2(1) = 25.06$, $p < .001$), between experimental Community A and control Community C ($\chi^2(1) = 189.5, p < .001$), and between experimental Community B and control Community C ($\chi^2(1) = 46.41, p < .001$).

Of the 13 volunteer screeners in the two experimental communities, only one volunteer failed to make any door-to-door approaches and three volunteers approached 100% of their assigned apartments. The screening effectiveness of the three volunteers with 100% approach rates was as follows: apartments screened (66.7%, 58.0%, and 52.9%), apartments refusing (3.9%, 20.0%, and 3.9%), and apartments approached but not contacted (29.4%, 34.0%, and 43.1%) in 88, 103, and 67 approach visits, respectively.

The large variability in approach rates and door-to-door effectiveness between volunteers could not be explained by age, sex, or race differences. Size of screening load, method of volunteer selection, and Rathus Assertion Inventory (Rathus, 1973) scores also failed to correlate with approach rates and door-to-door effectiveness.

DISCUSSION

Health screening based on community volunteer participation was successful in terms of both effectiveness and cost. In the experimental communities, door-to-door screening by neighborhood volunteers resulted in the screening of 18.1% of the target apartments in one complex and 32.3% of the designated apartments in the other complex. In the control community, where screening was available at one central location, only 6.6% of the apartments in that community were screened. These percentages compare quite favorably with those obtained by studies utilizing considerably greater expenditures of time and money. For example, Stahl et al. (1977) employing paid door-to-door screeners, screened just 17% of their at risk population with their most successful techniques (1977). Wilber and Barrow (1972) in a similar project using paid screeners were able to gain entrance to only 9% of their target households, and subjects in 18% of those households refused screening.

While door-to-door screening appears to be the most thorough method of screening for a variety of health problems, the expense of such screening has been considered sufficiently prohibitive to prevent extensive implementation. The present project, however, was carried out with a minimum of expense. All equipment was borrowed but purchase costs

would have amounted to approximately $300 for 10 sets of stethoscopes and sphygmomanometers. Paper costs for flyers and data sheets were approximately $100. Time commitments for noncommunity volunteers were 60 hours at the central screening location, 16 hours spent in the distribution of notices in the three communities, and 18 hours spent in training volunteers.

The wide difference in percentage of apartments screened in the two experimental communities may be the result of different recruitment processes. In Community A, only 3 of the 11 volunteers were obtained as a result of referral by others while in Community B, 8 of the 11 volunteers were obtained by referral. It is likely that volunteers contacted by referral may have had less interest in the project than those who volunteered in response to flyers soliciting their help. This same group of volunteers was composed of six males and five females while the more successful group of volunteers included only one male. Feedback from volunteers indicated that residents may have been more reluctant to allow male screeners into their apartments.

The large variability in screening effectiveness among screeners within each community was also examined. Age, educational level, marital status, and degree of assertiveness were considered as potential predictors of successful screeners but none were correlated with either number of apartments approached or number of apartments screened. The characteristics of successful screeners and the most effective method of recruiting those screeners are areas that warrant additional investigation.

Perhaps the most promising aspect of community screening lies in the potential for follow-up of those individuals identified as hypertensive. There is a pressing need for effective ways to assure adequate blood pressure control once hypertension has been detected. Although mass screening efforts and increased awareness by physicians has decreased the percentage of undetected hypertensives from approximately 50% to between 25% and 30%, there has not been a corresponding increase in the number of hypertensives whose blood pressure is adequately controlled (Foote & Erfurt, 1977; Hypertension Detection, 1977; Stamler, Stamler, Riedlinger, Algera, & Roberts, 1976). There are two reasons for this: many of those detected do not seek treatment and many of those being treated do not comply with the prescribed medical regimen (Foote & Erfurt, 1977). Regular follow-up of hypertensives is one approach which has been shown to increase successful control of hypertension (Wilber & Barrow, 1969). While follow-up of the widely scattered population of individuals who are screened at central locations such as shopping centers is quite difficult, door-to-door screening by neighbors in a designated community offers an alternative approach which may facilitate follow-up and maximize successful blood pressure control.

Several other modifications of this project should be considered. Alternative methods of soliciting volunteers, e.g., by means of already existing community organizations, may increase the number of those donating their time. The rate of refusal to be screened might be decreased if the community were better prepared to accept the screening project and the volunteers were more skilled in convincing residents of the importance of the screening. It is also urged that the techniques found to be effective in this program be utilized with a wider variety of socioeconomic groups to explore the optimal screening techniques for use in diverse communities.

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