
The Employee High Blood Pressure Program of the National Institutes of Health

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THE OCCUPATIONAL MEDICAL SERVICE (OMS) of the National Institutes of Health provides services for more than 13,000 employees of the Institutes. The overall responsibility for the individual person's care, however, remains with the private physician. The OMS services include emergency care at the worksite, assistance in obtaining medical care in the community, administration of specific medication prescribed by the private physician, periodic health examinations for those whose work may entail a health risk, health education programs, counseling on personal medical problems, preventive medical services such as hearing and vision tests, and blood pressure checks.

Published epidemiologic and research data clearly show a positive correlation between adequate control of blood pressure and reduction in the incidence of complications involving the cardiac, renal, and cerebrovascular systems (1-4). Accordingly, the OMS staff has been strongly committed to a variety of efforts to detect high blood pressure and assist hypertensive employees to achieve adequate blood pressure control. The NIH Employee High Blood Pressure Program, which includes screening, followup, referral, and moni-

toring, is a free, convenient service for employees and their physicians.

In 1974, the National Heart, Lung, and Blood Institute (NHLBI) implemented a short-term blood pressure screening program for NIH employees at the Bethesda, Md., facility. About 11,000 or 80 percent of the target population were screened; 80 percent of those screened had normal and 20 percent had elevated blood pressures. (Normal was considered to be < 140/90 mm Hg in persons under age 40 and < 160/95 mm Hg in persons 40 years old and over.) Employees with initial blood pressure readings above normal were screened a second time before they were referred to their private physicians. Because of employee unions' concern about the privacy of medical records, no permanent records were kept by NHLBI during this pilot effort. However, the employees were given a written record at the time of the examination and advised to check with their private physicians.

During the next 2 years, the OMS provided high blood pressure screening and monitoring services for employees. Encouraged by the NHLBI program's efforts to control blood pressure at the worksite, the OMS undertook an employee program that set specific training standards for the OMS staff and addressed a broad range of health care activities for NIH employees.

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Methods

The program concept was developed by the Assistant Medical Director and a staff nurse of the OMS. Supplementary funding was requested for additional staff and supplies, and the proposal and budget were submitted to the Directors of the NIH and the Clinical Center for approval. The OMS staff invited nine NIH employees to serve on an advisory committee. These committee members, who were mainly responsible for task development in their particular specialties, were drawn from various functional areas and employee groups—personnel management, nurse training-education, space management, union membership, equal employment opportunity, publicity information, medical staff, and the National High Blood Pressure Education Program (NHBPEP). During 4 months in 1978, the committee members accomplished the following activities:

1. Reviewed and approved the program goals.
2. Formulated a work plan that included a task outline, assignment of responsibilities, and projected time frame. Specific accomplishments included:
 - an inservice education program plan that included lectures, movies, and demonstrations for the 10 nurses who were to work in the program,
 - an education and publicity program for NIH employees that included a desk-to-desk memorandum from the Director of NIH, periodic articles in various publications circulated to NIH employees, and publicity posters with a specially designed logo,
 - a publicity program for the non-NIH medical community to alert physicians to the program and solicit their cooperation in accepting referrals of hypertensive employees; county and State medical societies were notified by letter, and announcements were printed in State and local medical journals,
 - a plan to maximize supervisors' cooperation that included a memorandum of support from high-level NIH management and briefings by the Director of Personnel to management staff,
 - a strategy to encourage a high level of employee participation in the program; specific efforts included union representation on the advisory committee, talks to employee groups about the program, and a policy statement regarding voluntary recordkeeping and strict adherence to the confidentiality requirements of the Privacy Act,
 - a program protocol that included the steps to be followed for screening, followup, referral, monitoring, and education, as well as the specific forms and a recordkeeping system to be designed for the program,
 - a referral list of health care resources in the Wash-

ington, D.C., metropolitan area, including local health departments, private clinics, hospital clinics, and referral services operated by local medical societies,

- selection of literature on high blood pressure for distribution to employees,
- a pilot program to test various components of the program, and
- an evaluation plan to determine whether objectives had been met.

The formal program was initiated in May 1978 to coincide with National High Blood Pressure Month. Between May and November 1978, OMS staff carried out screening and referral activities in 27 worksite locations, including laboratories, offices, and health clinics. Three to 4 days before screening was scheduled at a particular site, the OMS distributed a memorandum desk to desk to remind employees of the program. On the day before the screening, posters were placed in conspicuous locations and arrows pointing to the screening rooms were posted. The nurses and clerks assigned to the one or more rooms in each building set up the equipment and information materials on the day of the screening.

At sites where employee participation lagged, a nurse or a clerk visited individual offices to encourage employees to take advantage of the screening. At the end of each session, the screening cards and other materials were returned to the OMS clinic.

The clerk at each site daily filed employees' records and summarized data compiled during the screening. Both the clerks and the nurses participated in the followup of employees who had elevated blood pressure readings during their first or second screening. Referral, monitoring, and education activities were done by the nurses at the screening sites or in the OMS clinics. Hypertensive employees screened initially in the OMS clinics or already being monitored regularly were also invited to enroll in a formal monitoring-counseling program. The evaluation plan was started during the building-to-building screening program and completed 6 months after the screening ended.

Results

The data presented here are drawn primarily from the specific evaluation activities designed to test whether the program's objectives were met. Each evaluation activity is cited, and the appropriate data follow.

Effectiveness of building-to-building screening effort. During the 6-month building-to-building screening effort, 5,781 or 43 percent of the 13,488 NIH employees were screened at 27 sites in the metropolitan area (see table). About two-thirds of all hypertensive employees

Results of primary screening of National Institutes of Health employees for high blood pressure at 27 worksites

Result	Total screened		Employees on treatment ¹		Percent of all screened employees on treatment
	Number	Percent	Number	Percent	
Normal	4,932	85.3	286	53.5	5.0
Borderline	453	7.8	101	18.9	1.7
High	396	6.9	148	27.7	2.6
Total	5,781	...	535	...	9.3

¹ 248 hypertensive employees (31.7 percent) were not on treatment at the time of screening; this number corresponds to 4.3 percent of the total number of employees screened.

who participated in the screening already had a diagnosis of high blood pressure and were receiving treatment. Among this group, slightly more than half had normal blood pressure readings at the time of screening. Of all the employees screened, 13.6 percent had a diagnosis of high blood pressure.

Need for two screenings. Of 338 employees reporting for a second blood pressure screening because of an elevated reading at the first screening, 46.5 percent had persistently high blood pressure readings, 19.5 percent were borderline, and 13.2 percent were normal; 20.8 percent did not return for the second screening. Thus, 32.7 percent of the employees tested a second time had either normal or borderline blood pressure. These data are consistent with those reported earlier (5); that is, approximately one-third of the screenees evaluated a second time do not have persistently high blood pressure.

Effectiveness of referral and followup efforts. All employees with high blood pressure were referred to their private physicians or a health services facility for further evaluation and treatment. If the employee did not return the completed information sheet to OMS, specific followups—including telephone calls and a letter—were initiated. Of 338 employees, 88 percent returned for a second screening, and 73 percent of 263 employees consulted with their private physicians as a result of an OMS referral.

Assessment of employees under adequate control. To evaluate the effectiveness of the NIH program, 96 health records of employees seen for blood pressure examination at the OMS clinics between 1977 and 1980 were selected at random from a computerized printout. Blood pressure readings taken in 1977, before the program started, were compared with readings taken between 1978 and 1980, after the program was

underway. Adequate control was defined as an average diastolic pressure < 90 mm Hg. Charts were included in the analysis if at least 2 blood pressure readings were recorded in 1977 and 5 in the period 1977–80; 52 charts met these criteria.

The 52 charts showed that 19 employees (37 percent) were under adequate blood pressure control for the entire period, and another 19 (37 percent) were brought under adequate control after the program was underway. On the other hand, the blood pressures of 10 employees (19 percent) were not adequately controlled for the entire period, and 4 employees (7 percent) had reverted to inadequate control after the program started.

Monitoring and education of hypertensive employees. Based on the data obtained from the NIH program in January 1979, 292 of 410 known hypertensive employees were being monitored in the OMS clinics. Thus, more than 70 percent of the known hypertensives were participating in the program.

Discussion

The development, implementation, and evaluation of a worksite high blood pressure program has proved valuable from a number of perspectives. As a preventive health measure, high blood pressure screening and monitoring is one of the small number of medical interventions which clearly demonstrates that maintaining adequate control results in improved quality of life and longevity. Furthermore, the program has proved beneficial to both employees and management because (a) the free service to employees is a low-cost fringe benefit provided by management and (b) employees lose less time from work since they require fewer visits to their physicians.

The program also has provided an excellent opportunity for the OMS nursing staff to participate in the delivery of an important health service to employees. For example, the nurses see a group of hypertensives regularly and thus have continuity in the primary care and management of these employees. Some OMS nurses have also created and presented special high blood pressure education programs to selected employees at the worksite. These important efforts have been received enthusiastically by the employees who see the OMS as a concerned organization that tries to meet specific health needs of employees.

In terms of program development, the use of an advisory committee was beneficial for several reasons. The limited staff resources of the OMS were enhanced significantly by the advisory committee members who donated their time and talents in a variety of critical

areas not within the purview of an occupational medical staff. Thus, committee help was invaluable in identifying and securing space for the building-to-building program activities, as well as devising and producing publicity items, educational materials, and special forms for the program. Moreover, the participation of the Director of the Division of Personnel Management on the committee provided additional credibility and legitimacy to the program's activities, since a great deal of cooperation was required at all managerial levels while the program was being planned and implemented.

The total cost for the 6-month building-to-building screening and followup efforts was approximately \$9,900 or \$1.70 per employee screened. The cost covered the hiring and training of additional nurses and clerks as well as clerical and medical supplies and publicity materials. Subsequently, the program was conducted within the existing OMS clinics or by special arrangement at selected worksite locations by the regular staff. Therefore, the program costs were on a one-time basis, but the program benefits to employees are continuing.

Because the objective of screening 80–90 percent of NIH employees for high blood pressure during the 6 months was achieved only in part, several programmatic changes could be considered toward increasing the percentage of employees screened by use of the building-to-building approach. Such changes might include:

- Preparing alternative publicity efforts.
- Using a mobile screening team that goes to individual offices rather than relying exclusively on the employees' coming to a set location in a building. The program of the NHLBI, mentioned earlier, used the mobile screening team approach extensively in 1974; an impressive 80 percent of the NIH employee population was evaluated.
- Identifying time during the workday when employees are relatively free to participate in the screening. For example, the laboratory researchers generally did not participate because they were involved with their experiments. Consideration should be given to determining convenient times for such groups to be screened—perhaps during the lunch hour or a staff meeting might be feasible.
- Generating competition among employees in various buildings by publicizing the percentage of blood pressure checks done in each building. This approach has been used successfully in bond drives and charity campaigns.

In addition to the detection and referral of hyper-

tensive employees, other important benefits were gained by the screening program. Because an easily deliverable, relatively inexpensive preventive medical service was brought to employees in buildings distant from the OMS clinics, "healthy" employees who might not travel to a clinic for a blood pressure check were more easily reached. Such contacts should also encourage employees to take advantage of other services offered by the OMS. Another benefit arising from the staff's going to the various sites is that they gain firsthand knowledge of employees' work environment and the extent to which it may affect their health.

Finally, the observation that fully one-third of the persons who are hypertensive at the time of the first screening do not have a sustained elevated blood pressure on second screening strongly supports the two-step concept. Use of this two-step procedure reduces the excessive numbers of referrals that generate unnecessary expense and anxiety and strain limited health resources. Although some employees with elevated pressures only on the first screening might indeed be labile hypertensives, the OMS nurses advise those with normal readings on the second screening to have a blood pressure check annually. In this way, the OMS hopes to assure adequate followup within a reasonable time for persons who manifest elevated blood pressure occasionally.

To increase the likelihood of a successful referral, the OMS gave all persons who did not name a private physician on the screening form a list of local health care facilities. The provision of several alternatives for obtaining further evaluation and treatment is a critical and necessary component in any medical screening program.

Each referred employee was followed according to a prescribed plan. To improve the effectiveness of the referral and followup efforts, several programmatic changes were made in the first 6 months, based on the evaluation results as well as staff input. For example, greater success in followup efforts was observed if a nurse telephoned an employee to arrange an appointment at an OMS clinic for a blood pressure check. As a result, a nurse was assigned this duty in addition to her regular duties of examining and counseling employees. This personal contact by a nurse seemed to increase employee compliance because 40 of 60 employees previously unresponsive to telephone calls by other staff members and followup letters returned to see the nurse.

A review of employees' records for a 3-year period that included blood pressure observations before and after the program was started indicated that more than one-third of the employees achieved adequate

control of their blood pressure. In fact, the same percentage showed adequate control during the entire 3 years. These data suggest that the NIH Employee High Blood Pressure Program has increased the number of employees who are under adequate control of their blood pressure.

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SYNOPSIS

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Adequate control of high blood pressure remains a significant problem for many hypertensives detected through screening programs. The worksite is an ideal place in which to help workers control their high blood pressure. The Occupational Medical Service (OMS) at the National Institutes of Health developed and implemented a protocol to screen, refer,

follow up, and monitor hypertensive employees.

Approximately one-half of the workers were screened at a cost of \$1.70 per employee. Alternative approaches to improving the effectiveness of a building-to-building screening program were suggested. Of the employees screened, 85.3 percent had normal blood pressure, 7.8 percent had borderline blood pressure, and 6.9 percent had high blood pressure. The two-step screening process reduced by one-third the number of persons referred for evaluation of persistently high blood pressure. Among the hypertensive employees on treatment, 53.7 percent had nor-

mal readings. Of the 263 newly diagnosed and poorly controlled hypertensives who were referred to their private physicians for care, 73 percent were actually evaluated.

Measures to increase the likelihood of a successful referral and followup included providing a list of medical resources in the community and assigning a nurse rather than a clerk to contact employees for a repeat blood pressure check. Monitoring and education services are being provided to 70 percent of the known hypertensives. Adequate blood pressure control in NIH employees has improved by one-third as a result of the program.