Visit Frequency for Controlled Essential Hypertension: General Practitioners' Opinions

Michael J. Lichtenstein, MD, MSc, Peter M. Sweetnam, MSc, and Peter C. Elwood, MD, FFCM
Nashville, Tennessee, and Cardiff, Wales

A survey of 50 randomly selected South Glamorgan general practitioners was undertaken to determine how often they would treat and see patients with uncomplicated controlled essential hypertension. The decision to treat for high blood pressure depended on the level of diastolic pressure, patient age and sex, and interactions between diastolic pressure and age and diastolic pressure and sex. The range of responses for visit frequently was every two weeks to once yearly. On average, patients would be seen every 14.8 weeks (standard deviation, 9.2 weeks). The follow-up interval was significantly affected by level of pretreatment diastolic pressure (16 weeks for pressures 95 to 100 mmHg; 13.6 weeks for pressures greater than 105 mmHg), the patient's age (13.9 weeks for those 40 to 49 years old; 15.6 weeks for those 60 to 65 years old), and the decision to treat for high blood pressure (13.4 weeks for those treated; 17.9 weeks for those not treated).

If the variability of physician opinion observed in this study is reflected in practice patterns, then it is important to know whether these variations affect outcome. Follow-up intervals can be related to physician, patient, illness characteristics, and outcomes. Visit frequency is a useful variable for studying the process of care.

For persons with chronic diseases, physician decisions on when next to see a patient are made at the end of every office visit. The follow-up interval chosen is the result of a complex process weighing factors related to the patient, illness, and the physician. Little attention has been devoted to determinants of visit frequency in general practice.

A follow-up interval of three to four months has been recommended for monitoring persons with controlled essential hypertension.[1] The 1984 Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure[2] recommended following up persons at "reasonable intervals . . . varying from a few weeks to several months depending on clinical judgment, patient adherence, adequacy of blood pressure control and associated medical problems." These recommendations are based on clinical experience with no knowledge of whether visit frequency affects adequacy of blood pressure control or outcome.

An estimated 37.4 million visits involving essential hypertension (as a principal or secondary diagnosis) were made annually in the United States in the mid-1970s.[3] Essential hypertension accounted for 4 percent of office visits and ranked first among visits for all morbidity-related principal diagnoses. Patients with hypertension made an average of 1.4 visits to office-based physicians yearly.[4] A Canadian practice reported high blood pressure accounting for 11 percent of patient visits and ranking fourth among reasons for encounters—each hypertensive patient was seen about three times yearly.[5]

With an estimated prevalence of 5 percent, a physician with a practice of 3,000 persons can expect to have 150 hypertensive patients requiring therapy.[1,5] One hundred twenty of these persons may remain under therapy, and 60 to 70 percent of those (about 80 persons) can be expected to have their hypertension

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TABLE 1. EIGHT CASE HISTORIES IN QUESTIONNAIRE

Case	Age (yr)	Sex	Blood Pressure (mmHg)
1	43	M	184/108
2	46	M	152/98
3	64	M	172/112
4	65	M	148/100
5	48	F	176/110
6	47	F	150/96
7	63	F	182/106
8	62	F	154/98

controlled.[5,6] Thus, physicians spend a substantial portion of their time caring for persons with high blood pressure.

Effective care for hypertension should be given as efficiently as possible. One component of efficient care would be to see persons only as frequently as needed to maintain control of blood pressure, monitor compliance, and monitor complications of treatment. Seen too often, there would be no added benefit from the extra visits, but there would be the attendant costs in patient and physician time. Seen too infrequently, control of blood pressure may be compromised.

Before making recommendations for visit frequency, the variability in physician practice and the factors affecting follow-up interval need to be studied. As a first step, general practitioners were surveyed to determine how frequently they would see persons with controlled essential hypertension and the influence of pretreatment diastolic pressure level, age, and sex of the patient on their responses.

METHODS

Using a factorial design, eight brief case histories were developed from three characteristics that may affect the decision whether to treat and the visit frequency in essential hypertension (Table 1). The factors were age (40 to 49 years vs 60 to 65 years), sex, and diastolic pressure level (95-100 mmHg vs greater than 105 mmHg). For the case histories physicians were told that blood pressure had been measured on several occasions and was representative of the subject's blood pressure level. The subjects were asymptomatic, not obese, married, employed (as store managers), and had no signs associated with high blood pressure.

For each case physicians were asked whether they would begin therapy for high blood pressure. They were then asked how often they would check the subject's blood pressure once satisfied that it was adequately controlled (with or without therapy). Finally, they were asked to provide for each case the single follow-up interval they were most likely to use rather than a range of intervals.

Questionnaires were mailed to a random sample of 50 general practitioners on the 1983 South Glamorgan Family Practice Committee List (a 20 percent sample of those listed). South Glamorgan is a county in southern Wales that includes the metropolitan area of Cardiff, a city of about 200,000 persons.

The questionnaire was returned by 46 (92 percent) physicians. Thirty-two (70 percent) were men, 22 (48 percent) qualified in medicine before 1961, 42 (91 percent) were in group practice, and 42 (91 percent worked in urban settings.

INTERVIEW

Forty three (93 percent) of the general practitioners returning the questionnaire also participated in a 30-minute semi-structured interview. The interviewer (M.L.) sought the physicians' opinions on the importance of patient, disease, and physician-related factors as possible determinants of visit frequency for controlled essential hypertension. Physicians were asked to rate each factor as unimportant, slightly important, reasonably important, or very important. The interviewer was unaware of the individual practitioner's responses to the mailed questionnaire.

A response was defined as a practitioner's answer to a case history. Each practitioner provided eight responses. The 46 physicians returning the questionnaire provided 368 responses on decisions to treat and 349 responses on follow-up interval.

Analyses of variance were used to examine main effects and interactions between the three factors on the physician's decisions to treat for hypertension and their stated follow-up intervals.[7] The analyses of variance were performed by multiple regression. The proportions treating and mean follow-up intervals with their respective standard errors and standard deviations were then examined for factors having an effect in the analyses of variance.

RESULTS

DECISION TO TREAT ESSENTIAL HYPERTENSION

The three factors in the case histories all had significant effects on the decision to treat essential hypertension (Table 2). Diastolic pressure is by far the most important factor, accounting for 31 percent of the variance. For the cases with diastolic pressure greater than 105 mmHg, 94 percent of the responses indicated they would treat for high blood pressure compared with 42 percent of the responses when diastolic pressure was 95 to 100 mmHg ($P < .001$). Patient age, sex, and interactions between diastolic pressure and age and diastolic pressure and sex each account for about 1 percent of the variance. In general, younger persons would be treated more often than older, men more often than

TABLE 2. PATIENT FACTORS AFFECTING THE DECISION TO TREAT FOR ESSENTIAL HYPERTENSION

Factor	Number of Responses	Percentage Treating (standard error)
Pretreatment diastolic blood pressure*		
95-100 mmHg	184	42 (4)
> 105 mmHg	184	94 (2)
Patient age*		
40-49 years	184	74 (3)
60-65 years	184	63 (4)
Patient sex**		
Male	184	72 (3)
Female	184	64 (4)
Interaction between diastolic blood pressure and age***		
Diastolic blood pressure 95-100 mmHg		
Age 40-49 years	92	53 (5)
Age 60-65 years	92	32 (5)
Diastolic blood pressure > 105 mmHg		
Age 40-49 years	92	95 (2)
Age 60-65 years	92	94 (3)
Interaction between diastolic blood pressure and sex**		
Diastolic blood pressure 95-100 mmHg		
Male	92	50 (5)
Female	92	35 (5)
Diastolic blood pressure > 105 mmHg		
Male	92	95 (2)
Female	92	94 (3)

*$P < .001$
**$P < .05$
***$P < .01$

women. The influence of age and sex on the decision to treat are most evident at the lower level of diastolic pressure; at the higher diastolic level their effects are not apparent (Table 2).

FOLLOW-UP FREQUENCY FOR CONTROLLED ESSENTIAL HYPERTENSION

Although the overall average stated follow-up interval for controlled essential hypertension was 14.8 weeks (standard deviation 9.2 weeks), the range of responses was striking, from follow-up visits every two weeks to once yearly. Frequency distributions of follow-up interval for controlled essential hypertension are presented for two of the case histories in Figure 1. The distributions are discontinuous, with more than 90 percent of responses being 1, 2, 3, 6, or 12 months. The range of interval responses for a 43-year-old man with a pretreatment diastolic pressure of 108 mmHg was 2 weeks to 24 weeks. Virtually all (91 percent) physicians said they would treat this case; 54 percent said they would see him every 12 weeks, and 24 percent would see him every 2 to 8 weeks. The range of interval responses for a 62-year-old woman with a pretreatment diastolic pressure of 98 mmHg was 4 weeks to 52 weeks. Most (74 percent) would not treat this case; 43 percent would see her every 12 weeks, 33 percent every 24 weeks.

In the case histories pretreatment diastolic pressure and age significantly affected follow-up interval (Table 3). Physicians stated that they would see persons with high levels of pretreatment diastolic pressure more frequently. Younger persons would be seen more frequently than older, men more frequently than women. After adjusting for diastolic pressure, age, sex, and between physician differences, the decision to treat still has a significant effect on the follow-up interval decision—those persons treated for hypertension would be seen more frequently than those not treated.

Physicians who stated at interview that they considered a factor unimportant or somewhat important said they would see patients less often than those considering the factor reasonably or very important (Table 4). The mean follow-up intervals were significantly different for opinions on the importance of pretreatment diastolic pressure and age, but not for patient sex.

DISCUSSION

This survey reports what physicians say they would do, not what they in fact do. Practitioner's opinions on

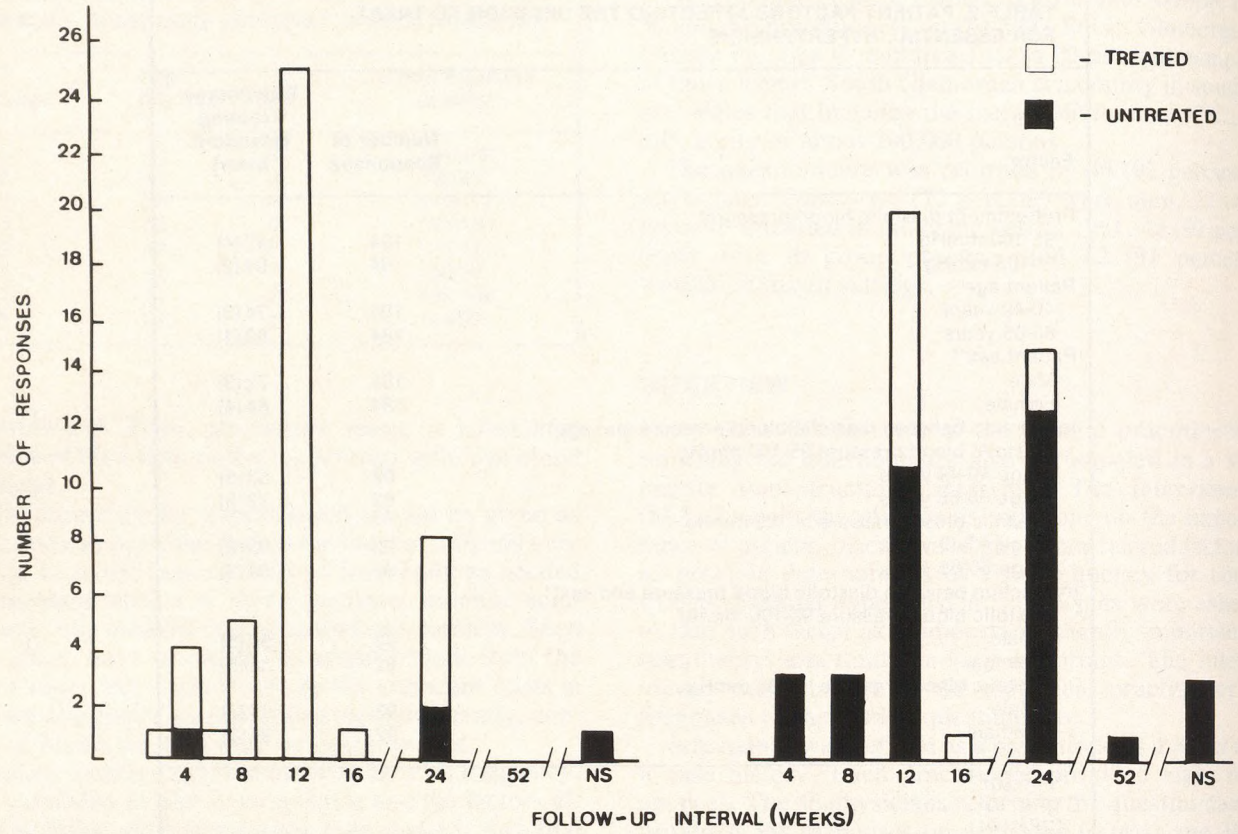

Figure 1. Frequency distribution of follow-up intervals for two of the case histories (43-year-old man: blood pressure 184/108 mmHg, left, and 62-year-old woman: blood pressure 154/98 mmHg, right). NS—not stated

the importance of the factors as determinants of visit frequency, however, do provide some internal validation. Opinions were obtained independently from completion of the questionnaire. That physicians considering factors unimportant had previously indicated they would see such patients less frequently than those considering factors important provides evidence that their reactions are consistent. Whether this consistency is also reflected in practice behavior could best be answered by examining prospectively collected information.

These findings on decisions to treat persons with essential hypertension agree with those from previous surveys.[8-10] Practitioners said they would initiate treatment in younger persons more often than in older persons, but the influence of age disappeared at higher levels of blood pressure.[8-10] Two prior studies have suggested that 35 percent to 57 percent of physicians would consider the sex of the patient a factor in initiating therapy.[8,11] Findings in this study show that the patient's sex was a factor in deciding to treat persons but that sex as a factor also disappeared at higher levels of diastolic pressure. The only survey of a

TABLE 3. PATIENT FACTORS AFFECTING FOLLOW-UP INTERVAL FOR CONTROLLED ESSENTIAL HYPERTENSION

Factor	Number of Responses	Follow-Up Interval Weeks Mean (SD)
Pretreatment diastolic blood pressure*		
95-100 mmHg	171	16.0 (9.8)
> 105 mmHg	178	13.6 (8.2)
Patient age**		
40-49 years	174	13.9 (8.1)
60-65 years	175	15.6 (10.0)
Patient sex***		
Male	177	14.1 (8.6)
Female	172	15.4 (9.6)
Decision to treat**		
Yes	244	13.4 (6.7)
No	105	17.9 (12.9)

*$P < .001$
**$P < .05$
***$P < .10$

TABLE 4. FOLLOW-UP INTERVAL BY PHYSICIANS' OPINIONS REGARDING THE IMPORTANCE OF EACH FACTOR

Factor	Physicians' Opinions: Unimportant and Somewhat Important — Number of Responses	Unimportant and Somewhat Important — Interval in Weeks Mean (SD)	Reasonably and Very Important — Number of Responses	Reasonably and Very Important — Interval in Weeks Mean (SD)
Pretreatment diastolic blood pressure*	32	21.1 (12.2)	297	14.2 (8.7)
Patient age**	48	17.3 (7.9)	281	14.5 (9.5)
Patient sex	264	15.2 (9.1)	65	13.8 (10.0)

*$P < .01$
**$P < .05$

representative sample of practitioner's records[12] showed that the higher the pressure, the more likely the patient was to be treated and that age and sex appeared to make little difference in the recognition of hypertension.

The range of responses for follow-up intervals (once essential hypertension was controlled) was every two weeks to once yearly. A similar range has been reported in another survey of British practitioners.[10] Parkin et al[13] have suggested that 47 percent of hypertension patients saw their physician monthly, but these investigators reviewed only the records of patients that were selected by practitioners (these would not be representative of hypertension care in the practices, being those patients known to the physicians because they were seen more often). A Canadian study reported that patients were seen an average of once every four months.[5] The survey reported here shows an average follow-up interval similar to the Canadian study, but demonstrates the tremendous variation in physician opinion. The variability is all the more striking because there is no financial incentive within the British National Health Service for frequently seeing persons with controlled hypertension. If opinion reflects practice patterns, then this variability places different demands (at least in terms of number of visits) on patients consulting practitioners for similar problems.

The survey shows that level of pretreatment diastolic pressure, patient age, and the decision to treat could significantly affect follow-up intervals for persons with controlled essential hypertension. Multiple other factors may also enter into determining visit frequency. For example, evidence of hypertension complications, coexisting illnesses, practice size,[14] or distance the patient lives from the office[15] may all have an affect.

If follow-up levels for controlled essential hypertension vary between practices, it is important to learn whether this variation makes a difference in outcome. Do physicians who see patients frequently do a better job of controlling the disease and preventing complications than those who see them less frequently? Are outcomes such as drug reactions and compliance affected by visit frequency?

If visit frequency does not affect outcome, lengthening the follow-up interval from every three months to every four months would be clinically important. For the patient, it means one less visit to the physician yearly. For the practitioner with 150 hypertensive patients (assuming 80 were controlled on therapy), such scheduling could potentially result in 80 fewer visits yearly for this group without sacrificing quality of care. In a fee-for-service health care system reduction of visit frequency by this amount might result in substantial savings in visit costs for the payer.

Visit frequency is a useful variable for studying the process of care. It can be measured easily, and differences in visit intervals may be related to physician and patient characteristics. If visit frequency can be related to outcomes (drug reactions, compliance, service utilization, disease control, morbidity, or mortality), then guidelines can be recommended for efficient provision of care. These guidelines would be most important for education and training of physicians. The concept of follow-up intervals being based on knowledge of determinants and outcomes is applicable not only to the problem of hypertension but to any chronic illness as well.

References

1. Hart JT: Organization of follow-up, compliance and education. In Hypertension. London, Churchill Livingstone, 1980, pp 206-23
2. The 1984 Report of the Joint National Committee on Detec-

tion, Evaluation, and Treatment of High Blood Pressure. DHHS publication No. (NIH) 84-1088. Government Printing Office, 1984
3. Cypress BK: Office visits for diseases of the circulatory system: The national ambulatory medical care survey, 1975-1976. In National Center for Health Statistics (Hyattsville, Md): Vital and Health Statistics, series 13, Data from the National Health Survey, No. 40. DHEW publication No. (PHS) 79-1791, Government Printing Office, 1979
4. Cypress BK: Office visits for hypertension: National ambulatory medical care survey: United States, January 1975-December 1976. In National Center for Health Statistics (Hyattsville, Md): Advance Data from Vital and Health Statistics, No. 28. Government Printing Office, 1978, pp 1-8
5. Rudnick KV, Sackett DL, Hirst S, Holmes C: Hypertension in a family practice. Can Med Assoc J 1977; 117:492-497
6. Stamler R, Gosch F, Stamler J, Ticho S, et al: Adherence and blood-pressure response to hypertension treatment. Lancet 1975; 4:1227-1230
7. Armitage P: Statistical Methods in Medical Research. Oxford, Blackwell Scientific, 1971
8. Hodes C, Rogers PA, Everitt MG: High blood pressure: Detection and treatment by general practitioners. Br Med J 1975; 2:674-677
9. Fulton M, Kellett RJ, MacLean DW, et al: The management of hypertension—A survey of opinions among general practitioners. J R Coll Gen Pract 1979; 29:583-587
10. Dunn E, Hilditch J, Chipman M, et al: Diagnosis and management of hypertension: The stated practices of family physicians. Can Med Assoc J 1984; 130:985-988
11. Thomson GE, Alderman MH, Wassertheil-Smoller S, et al: High blood pressure diagnosis and treatment: Concensus recommendations vs actual practice. Am J Public Health 1981; 71:413-415
12. Heller RF, Rose G: Current management of hypertension in general practice. Br Med J 1977; 1:1442-1444
13. Parkin DM, Kellett RJ, MacLean DW, et al: The management of hypertension—A study of records in general practice. J R Coll Gen Pract 1979; 29:590-594
14. Wilkin D, Metcalfe DHH: List size and patient contact in general medical practice. Br Med J 1984; 289:1501-1505
15. Whitehouse CR: Effect of distance from surgery on consultation rates in an urban practice. Br Med J 1985; 290:359-362