Objective: To assess the quality of the pharmacological control of hypertension.
Design: A cross-sectional study.
Subjects: Primary health care centers-registered hypertensive patients.
Setting: Primary health care centers in Al-Khobar, Saudi Arabia.
Methods: Data was recorded, using a structured questionnaire, through direct interviewing of patients, and from their medical records. It included demographic characteristics, hypertension related, and doctors’-related variables; and patients’ utilization of other health facilities and whether they had other chronic diseases.
Results: The proportion of patients with controlled hypertension was 37%. It was significantly increased with age below 55 years, with non-Saudis, duration of treatment shorter than 5 years; and with the use of monotherapy.

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Doctors’ care-related variables did not show significant variation with the number of controlled patients which may imply that the quality of follow-up might not be adequate.

**Conclusions:** The proportion of controlled patients cared for in the PHC centers is low. The factors associated with control were age, and the use of a single antihypertensive drug. The study questions the quality of follow-up of patients by the PHC physicians.

**Key Words:** Hypertension control, Primary health care, Saudi Arabia

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**INTRODUCTION**

In accordance with the studies carried out in Saudi Arabia, hypertension seems to affect about one-tenth of the Saudi population. The high prevalence of hypertension in Saudi Arabia necessitates that this disorder be best managed in the primary health care (PHC) centers. The arguments for this concept are: firstly, the follow-up procedure for hypertensive patients does not require sophisticated techniques. Secondly, there is a potential of continuity of care in the PHC centers that could not be afforded for patients in the busy secondary and tertiary care system; and in this regards it has been shown that uncontrolled hypertension may be associated with the patients’ lack of a PHC care physician. Thirdly, the way for the management of hypertension in PHC centers, has already been paved by the expansion in the number of well-equipped and staffed PHC care centers in the Kingdom; and in most of those centers there are lists of hypertensive patients who are registered for long-term care. The aim of this study was to assess the quality of pharmacological control of hypertension among PHC centers care-registered hypertensive patients and the variables associated with it.

**MATERIAL AND METHODS**

This is a cross-sectional study which was carried out on hypertensive patients registered at the PHC centers, in Al-Khobar city, during 1996. The total population of Al-Khobar is approximately 341,024 according to the last national census. Health services in Al-Khobar are offered by nine PHC centers and three government hospitals. In addition, there are a few private hospitals, dispensaries and clinics. The study population was the PHC center-registered hypertensive patients. A two-stage random sampling technique was used. In the first stage, a systematic sampling procedure was used to select five PHC centers out of the nine centers. At the second stage, a systematic sampling was used to select hypertensive patients by means of their records, within each selected PHC center. The total number of PHC centers-registered hypertensive patients in Al-Khobar in 1996 was 1246, 25% of whom was to be the sample. This was achieved by using a one-in-three systematic sampling technique, in the chosen PHC centers (including 919 registered patients), thus obtaining a sample size of 311 patients. This sample was proportionally allocated from the five selected PHC centers. A reserve sample of 5% was also selected in an attempt to overcome possible non-responsiveness.

Data collection took place in the period between August 2 and October 30, 1996. An interviewer-administered questionnaire containing open and close-ended questions was used. Interview arrangements were made through telephone calls. The interviews of hypertensive patients were conducted by interviewers in PHC centers using Arabic and other languages when
necessary. Each patient was interviewed in a quiet room after the aim of the study had been explained to him/her. Patients who refused to be interviewed were replaced by the next ones on the list. The medical records of selected patients were also reviewed to record more data as shown below. The questionnaire form was composed of two parts: (i) The first part was about patients demographic data (age, gender, educational level, and nationality). It also included questions related to hypertension and its pharmacological treatment such as duration of hypertension, duration of drug treatment for hypertension, number of antihypertensive drugs used; and the names of those drugs, and presence of hypertensive complications (which were checked from medical records). Drugs’ names were also checked from the records and the response was recorded as correct, or incorrect. The questionnaire also included questions related to doctors’ care such as whether patients were always seen by the same, or different PHC physician at each follow-up visit; and whether health education had been given by their PHC physicians about the name(s) of drug(s) prescribed for hypertension, drugs’ side effects, and about compliance with drugs. Inquiry was also made about whether a patient was utilizing other health care facilities for follow-up of hypertension (such as other health centers, or governmental or private hospital outpatient clinics). Patients were also asked if they were being treated for other chronic diseases, and whether they were receiving drugs for them. (ii) The second part of the questionnaire was recorded from the patients medical records, which included presence and type of hypertensive complications, frequency of follow-up (whether monthly, quarterly, biannually or annually) during the previous year (1995); and the names of the antihypertensive drugs received. A systolic blood pressure (SBP) of 140 mm Hg, or less, a diastolic blood pressure (DBP) of 90 mm Hg or less were considered as representing controlled SBP and DBP, respectively. On the other hand, a patient with both controlled SBP and DBP was considered as having controlled hypertension.7-9

Data was analyzed using an IBM-compatible personal computer. The statistical package for the Social Sciences (SPSS/PC+) version 610 was used for data entry and analysis. Means were calculated and expressed as mean ± 1 standard deviation (M ± 1 SD). Differences between two means and differences between two categories were tested using the students’ t-test for unequal samples; and Chi-squared tests; respectively. A p-value of 0.05 or less (one or two sided as appropriate) was considered to represent statistical significance.

RESULTS

All hypertensive patients in the selected sample (n=311) were interviewed. Twenty percent of the sample were then re-interviewed to check the reliability of the questionnaire. The percentage of agreement between the investigator and the interviewers ranged from 85-100% with an average of 93.5%.

The mean age of sampled cases was 53.2 ± 0.65 years, two-thirds of whom were females. The majority of the sample (81.4%) were of Saudi nationality; and about two-thirds of the sample were illiterate.

The majority of patients (80.4%) were being treated with a single antihypertensive drug. On the other hand, about half of the patients (53.7%) knew the name(s) of antihypertensive drug(s) they were using. Hypertensive complications were present in 16.4% of the patients. About a quarter of patients (27.0%) were always being seen for follow-up by the same PHC center physician. As regards health education received, the proportions of patients who received
health education about drugs’ names, drugs’ side effects, and advice on compliance; were 19.6%, 31.5%, and 46.9% respectively. Forty-three patients (13.8%) had been followed up with a frequency of three months or less, while the rest were followed up every six months or longer than that.

Other chronic diseases (which were diabetes mellitus, coronary heart disease, and renal diseases) were present in about half of the sample, while a similar proportion used drugs for treatment of those diseases. On the other hand, two-fifths of the patients (41.2%) attended other medical facilities, governmental or private, for follow-up of hypertension.

The mean systolic and diastolic blood pressure of the sample was 140.03 ± 1.83, and 84.05 ± 1.05 respectively. The mean duration of hypertension among the sample was 8.5 ± 5.7 years, while the mean duration of treatment was 7.0 ± 5.1 years. Three quarters (75.2%) and about a half (42.4%) of the patients had controlled levels of diastolic or systolic blood pressures, respectively. About one-third of the patients (37.2%) had controlled both systolic and diastolic blood pressure; i.e., DBP ≤ 90 mmHg and SBP ≤ 140 mmHg, and were considered as having controlled hypertension (Table 1).

There was a significantly higher proportion of patient aged 54 years or less who had controlled hypertension than older ones (P < 001). Also there was a significantly higher proportion of patients with controlled hypertension among non-Saudi than Saudi patients (P < 0.01) (Table 2).

On the other hand, there was a significantly higher proportion of patients who had been on treatment for a duration of less than 5 years, who had controlled hypertension, than those who had been hypertensive for a longer duration (P < 0.01). Also, significantly more patients who used one antihypertensive drug had controlled hypertension, than those who were on two, or more drugs (P < 0.04). Table 3.

As regards doctors’-related variables there was no significant variation of numbers of patients with controlled hypertension as regards whether they are seen by one or more doctors, offered health education about drug names, drug side effects, and on compliance; nor whether they were followed up every three months or less or longer than three months (Table 4).

Similarly, there was no significant variation of number of patients with controlled hypertension regarding the presence of other chronic diseases, having other drugs (for treatment of other unrelated diseases), nor whether they were utilizing other health facilities, such as hospitals or private clinics (Table 5).

**DISCUSSION**

The sample of patients involved in this study is composed of middle-aged, and predominantly female patients with low or no level of education, and with a relatively long duration of hypertension. This finding supports that shown by a previous study in the same area.11 Thus, hypertensive patients in our sample are not expected to know much about their disease and aspects of its control. Moreover, they might have had some misconceptions arising from the native cultural beliefs.11 This emphasizes the importance of efficient doctor/patient communication by the PHC physician12 in a background of the continuity of care provided by the PHC system. But unfortunately, in this regards, our findings showed that a minority of the sample has enjoyed continuity of care in their follow-up; a matter that needs much consideration and correction.
Table 1: Blood pressure status of hypertensive cases in PHC centers, Al-Khobar 1996

| Characteristic                        | Mean ± 1 SE | Patients (n = 311) |
|---------------------------------------|-------------|--------------------|
|                                       |             | No.                |
|                                       |             | %                  |
| SBP                                   | 140.03 ± 1.83 mmHg | 234                |
| DBP                                   | 84.05 ± 1.05 mmHg | 77                 |
| Duration of hypertension              | 8.5 ± 5.7 years | 132                |
| Duration of treatment                 | 7.0 ± 5.1 years | 179                |
| DBP ≤ 90 mmHg controlled              | 234         | 75.2               |
| DBP ≤ 90 mmHg uncontrolled            | 77          | 24.8               |
| SBP ≤ 140 mmHg controlled             | 132         | 42.4               |
| SBP ≤ 140 mmHg uncontrolled           | 179         | 57.6               |
| SBP ≤ mmHg and DBP ≤ 90 mmHg controlled| 117         | 37.6               |
| SBP ≤ mmHg and DBP ≤ 90 mmHg uncontrolled| 194         | 62.4               |

Table 2: Effects of demographic variables on blood pressure control among PHC centers-registered hypertensive patients

| Variable                        | Total | Controlled (%) | p-value |
|---------------------------------|-------|----------------|---------|
| Age in years                    |       |                |         |
| < 55                            | 160   | 76 (47.5)      | < 0.001 |
| ≥ 55                            | 151   | 41 (27.2)      |         |
| Gender                          |       |                |         |
| Males                           | 111   | 40 (36.0)      | NS      |
| Females                         | 200   | 77 (38.5)      | NS      |
| Nationality                     |       |                |         |
| Saudis                          | 253   | 87 (34.4)      | < 0.01  |
| non-Saudis                      | 58    | 30 (51.7)      |         |
| Education                       |       |                |         |
| Any education                   | 31    | 16 (51.6)      | NS      |
| Drug name not known             | 280   | 101 (36.1)     |         |

NS = Not significant

Table 3: Effects of disease-related variables on blood pressure control among PHC centers-registered hypertensive patients

| Variable                          | Total | Controlled (%) | p-value |
|-----------------------------------|-------|----------------|---------|
| Duration of hypertension          |       |                |         |
| < 5 years                         | 80    | 37 (46.3)      | NS      |
| ≥ 5 years                         | 231   | 80 (34.6)      |         |
| Duration of treatment             |       |                |         |
| < 5 years                         | 130   | 60 (46.2)      | < 0.01  |
| ≥ 5 years                         | 181   | 57 (31.5)      |         |
| Number of drugs                   |       |                |         |
| One                               | 250   | 101 (40.4)     | < 0.04  |
| Two or more                       | 61    | 16 (26.2)      |         |
| Knowledge of drugs’ name          |       |                |         |
| Drug name known                   | 167   | 61 (36.5)      | NS      |
| Drug name not known               | 144   | 56 (38.9)      |         |
| Complications                     |       |                |         |
| Present                           | 51    | 14 (27.5)      | NS      |
| Not present                       | 260   | 103 (39.6)     |         |

NS = not significant
**Table 4: Effects of doctors’-related variables on blood pressure control among PHC centers-registered hypertensive patients**

| Variable                  | Total | Controlled (%) | p-value |
|---------------------------|-------|----------------|---------|
| Continuity of care        |       |                |         |
| Available                 | 84    | 30 (35.7)      | NS      |
| Not available             | 227   | 87 (38.3)      |         |
| Drug names                |       |                |         |
| Told to patient           | 61    | 22 (36.1)      | NS      |
| Not told                  | 250   | 95 (38.0)      |         |
| Drugs’ side effects       |       |                |         |
| Explained to patient      | 98    | 38 (38.8)      | NS      |
| Not explained             | 213   | 79 (37.1)      |         |
| Advice on compliance      |       |                |         |
| Offered                   | 146   | 58 (39.7)      | NS      |
| Not offered               | 156   | 59 (35.8)      |         |
| Follow-up                 |       |                |         |
| 1-3 monthly               | 43    | 16 (37.2)      | NS      |
| More than 3-monthly       | 268   | 101 (37.7)     |         |

NS = not significant

**Table 5: Effects of demographic variables on blood pressure control among PHC centers-registered hypertensive patients**

| Variable                  | Total | Controlled (%) | p-value |
|---------------------------|-------|----------------|---------|
| Other chronic diseases    |       |                |         |
| Present                   | 164   | 56 (34.1)      | NS      |
| Not present               | 146   | 61 (41.5)      |         |
| Use of other drugs        |       |                |         |
| Yes                       | 143   | 45 (31.5)      | NS      |
| No                        | 168   | 72 (42.9)      |         |
| Other health facilities   |       |                |         |
| Utilized                  | 128   | 51 (39.8)      | NS      |
| Not utilized              | 183   | 66 (36.1)      |         |

NS = not significant

Our results showed that 37% of the sample had controlled hypertension. This figure is better than that found previously by Dharrab, but still seems to be low by international standards. The study revealed that there were significantly more patients with controlled hypertension among those younger than 55 years of age. It has been shown by other studies that patients older than 60 years had poor compliance with therapy for hypertension. This finding calls for more attention to older patients especially since, from an epidemiological point of view, the prevalence of hypertension tends to increase with age and thus the numbers of such patients would be large in the community.

Our findings also revealed that there were significantly more patients with controlled hypertension among non-Saudis. This could not be solely explained by racial differences, as non-Saudis who represent an expatriate work-force tend to be younger than the proportion of Saudi patients in the sample. A similar age-related explanation could be put forward for our finding that there were significantly more patients with controlled hypertension among those who had treatment for a shorter duration.

On the other hand, the study has clearly shown that there were significantly more patients with controlled hypertension among those who were being treated with a single
antihypertensive drug. This is an expected finding since monotherapy is usually associated with better compliance with drugs, and hence better control.\textsuperscript{16,18}

Our study has revealed that all doctor care-related variables did not show any significant variation with numbers of patients with controlled hypertension. This is an important finding as it may imply that the quality of follow-up of patients, including aspects of doctors’/patient communication, such as health education, may need reconsideration. This finding has already been documented by Al-Dharrab.\textsuperscript{19} Poor doctors’/patient communication has been cited as one of the barriers to effective therapeutic adherence,\textsuperscript{20} and it was specially so in case of elderly hypertensive patients.\textsuperscript{21}

CONCLUSION

The study has revealed that the proportion of controlled patients cared for in the PHC centers is low. The factors associated with control were age, and the use of a single antihypertensive drug. The study also questions the quality of follow-up of patients by the PHC physicians.

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