## Articles

# The role of primary health care centers in managing hypertension 

## How far are they involved?

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#### Abstract

Objective: Primary health care (PHC) centers are proposed to play a major role in the provision of care for hypertensive patients. However little is known regarding the magnitude of service offered by PHC to hypertensives. The aim of this study is to see how far PHC centers are involved in terms of figures, in the management of hypertension.

Methods: This was a retrospective (cohort) study in PHC centers in Qatif, Kingdom of Saudi Arabia. Half of the adult hypertensives that were followed up in 13 PHC centers were selected, randomly. This study was carried out during the month of September 2000.

Results: Records of 320 patients were reviewed; male: female 1.1:2.1; mean age $\pm$ SD $55.8 \pm 12.4$ years; diagnosed at a mean age of $49.6 \pm 11.9$ years. Diabetes mellitus (DM) was diagnosed in $22.2 \%$ of the sample; $66 \%$ never smoked; $47.7 \%$ had positive family history of hypertension. The median number of visits to PHC was 6 visits in the last 6 months. Number of consultations of hypertensives to PHC physicians constituted $1.1-8.4 \%$ of the total consultations. Primary health care registers document $16-35.9 \%$ of the expected total number of adult hypertensives in the community. Hypertensives following up in PHC constitute $13.8 \%$ and $17 \%$ of the expected number of diagnosed male and female adult hypertensives in the community.

Conclusion: The magnitude of service offered by PHC to diagnosed hypertensives is less than one fifth of the expected number of patients, and its load on general practitioners working in these centers is highly variable.


Saudi Med J 2003; Vol. 24 (5): 460-465

Hypertension (HTN) is a common health problem in Eastern Saudi Arabia. The prevalence, among adult population, has been estimated to range from $4.7 \%$ (systolic blood pressure $(\mathrm{SBP}) \geq 160 \mathrm{~mm} \mathrm{Hg}$ or diastolic blood pressure $(\mathrm{DBP}) \geq 90 \mathrm{~mm} \mathrm{Hg}$ ) to $25.6 \%(\mathrm{SBP} \geq 140$ mm Hg or $\mathrm{DBP} \geq 90 \mathrm{~mm} \mathrm{Hg}$ ). However, diagnosed hypertensives are estimated to range from 5.4-11.3\%.1-9 These patients are believed to receive medical care through different health services including governmental, semi-governmental, and private
institutions. ${ }^{10,11}$ Governmental primary health care (PHC) centers are proposed to play a major role in the provision of continuous, comprehensive care for these patients. ${ }^{12}$ Thus, few local and national protocols have been set to guide the practice of this service. ${ }^{11}$ The commitment of PHC physicians to these guidelines as well as the effect of their practice on the care of hypertensive patients need to be explored. Few documentations have tried to address this issue. ${ }^{8,13-15}$ Such exploration might help in improving the quality of

[^0]care, in utilizing the resources more efficiently, and in minimizing the consequent burden of the disease. ${ }^{11}$ This study aims to explore the practice of PHC centers in managing hypertensive patients in a health district in Eastern Saudi Arabia. Due to the wide and different aspects the study has tackled, it has been discussed among different papers. This paper tries to estimate and discuss the magnitude of share PHC offers in the care of diagnosed hypertensives, and its load on PHC physicians working in these centers. This is of particular value in estimating the impact of any intervention at the level of PHC on the health of the community.

Method. This study has been carried out in Qatif, Eastern Saudi Arabia, an old district with more than 16 villages and towns. Populations of 290020 individuals are served by 26 PHC Centers (PHCCs) in Qatif. ${ }^{16,17}$ A total number of 4145 hypertensive subjects were registered in these centers. ${ }^{17}$ A fraction of these patients were getting their main care in governmental PHCCs. They were followed up, using the protocol of detecting and following up HTN in PHCCs. ${ }^{18}$ A follow through appointment system is implemented for this purpose. ${ }^{18} \mathrm{~A}$ weighted, systematic, random sample of 13 (50\%) PHCCs was chosen after stratification by the total number of hypertensive subjects registered in each center. In each sampled center, registers of HTN were audited for exclusion of hypertensives that died or left the catchment area of the center. Afterwards, $50 \%$ of the registered male hypertensives, as well as $50 \%$ of female hypertensives were selected using systematic random sampling. Individual files of selected subjects were reviewed and data were collected by trained nurses, using a pre-defined spreadsheet containing 44 variables, during September 2000 (mid 1421H.) Cases showing no visits in last 3 months were excluded. One month was allowed for collection of data. The data, collected, included demographic variables, family history, history of smoking, presence of cardiovascular complications, and type of antihypertensive medications used; number of visits to the PHC center and whether health education has been given, as well as compliance during the 6 months preceding the study; documentation of risk factors and annual work-up during the 12 months preceding the study; as well as average blood pressure of the last 3 readings taken within the 3 months preceding the study. For this purpose, nurses and physicians were oriented for collecting data and filling the spreadsheet. Trained physicians working in the same centers reviewed data, first. A pilot study has been carried out in one PHCC. Data collection spreadsheets were modified accordingly. Epi info statistical software version 6.0 was used for data entry, while Statistical Package for Social Sciences version 10 was used for revision and analysis. Data entry was checked by one of the authors. The other author verified missed values, as well as extreme and outlier values. The wrong entries were corrected, accordingly. Data integrity was revised and verified.

Missed medical files and inconsistent medical file numbers were treated as non-responders. They have not been replaced. Categorical data were cross tabulated, while continuous data were recoded into groups of interval. Data were tested for normality using kurtosis and skewness standard error. Normally distributed data were tested for significance, using Pearson Chi Square $x^{2}$, Fisher's exact test, likelihood Chi Square test, t-test and Pearson's correlation test, where applicable. Nonparametric data were tested using Mann-Whitney test, Kruskal-wallis test, and Spearman's rho correlation, where appropriate. Confidence interval (CI) of 0.95 was calculated for different variables. A p-value of $<0.05$ was considered statistically significant.

Results. Out of 1949 adult hypertensives registered in the sampled PHCCs a sample of 337 adult hypertensives following up in PHC was selected, and medical records were reviewed. Sixteen cases showed no visits in last 3 months. Relatives of 4 of them were coming to PHCCs for refill of medicine. Five files were missed. All of them, except one, were traced, later. A net of 320 medical records were included in the study Table 1 Male: Female ratio is $1.1: 2.1$ ( $\mathrm{p}<.0001 \mathrm{x}^{2}$ test.) Age of patients ranged from 22-94 years; mean $55.8 \pm 12.4$ years; CI 54.5-57.2; Median 56 years Figure 1. Years since HTN diagnosed ranged from less than one year up to 21 years; mean $6.2 \pm 4.7$ years; CI 5.7-6.7; median 5.5 years Figure 2. Age at Diagnosis of patients ranged from 20-85 years (mean=49.6 $\pm 11.9$ years; CI 48.3-50.9; median=48 years) with insignificant difference between both sexes, year of diagnosis, family history of high blood pressure, nor place of follow up.

Diabetes mellitus (DM) was found in $22.2 \%$ of the sample. Diabetes mellitus was diagnosed since a mean of $5.9 \pm 4.85$ years; CI 4.8-7.1; median 5 years. No significant difference was noted in prevalence of DM between different groups of sex and year of diagnosis, but they significantly differ in terms of place of follow up ( $\mathrm{p}<.05$ Chi-Square test). Mean age of both diabetics and non-diabetics was $57.7 \pm 11.9$ and $55.3 \pm 12.5$. They were not significantly different. While years since hypertension was diagnosed in both diabetics and non-diabetics were $7.0 \pm 4.6$ and $6.0 \pm 4.7$. No significant difference was noted. Diabetes mellitus was diagnosed in $33.8 \%$, at the same year of diagnosis of HTN. The lag between year of diagnosis of DM and that of HTN was a mean of $0 \pm 5.4$ years; CI- 0.17 to 2.37; median 0 year; ranging from 14 years before to 12 years after diagnosis of HTN Figure 3. Sixty-six point three percent of hypertensives followed up in PHCC have never smoked; $6.6 \%$ ex-smokers; $14.7 \%$ current smokers; while $12.5 \%$ showed no documentation in their records regarding their smoking status. There was no significant difference between males and females Table 2, age group, or age at time of diagnosis of HTN. However, status of smoking differs significantly among PHCCs ( $\mathrm{p}=0.001$ Pearson Chi-Square.) Current smoking tends to be more in

Table 1 - Number of selected hypertensives followed up in selected primary health care centers (PHCCs) in Qatif, Kingdom of Saudi Arabia.

| Selected PHCC <br> Qudeih | Registered HTN* <br> 255 | Selected HTN follow up in PHCCs* |  |
| :---: | :---: | :---: | :---: |
|  |  | 57 | (17.8) |
| Qatif-3 | 263 | 42 | (13.1) |
| Awamia | 234 | 41 | (12.8) |
| D.Mahdood | 202 | 32 | (10) |
| Nasira | 141 | 28 | (8.8) |
| Qatif-1 | 108 | 25 | (7.8) |
| Tarout | 148 | 21 | (6.6) |
| Sanabis | 136 | 21 | (6.6) |
| Nabia | 85 | 15 | (4.7) |
| Aljesh | 101 | 14 | (4.4) |
| Dareen | 116 | 13 | (4.1) |
| Saihat-3 | 125 | 6 | (1.9) |
| H.Meheish | 35 | 5 | (1.6) |
| Total | 1949 | 320 | (100) |
| * before excluding deaths and transferred individuals p-value $<0.001$ <br> HTN - hypertension |  |  |  |



Figure 1 - Age of hypertensive patients followed up in Qatif, primary health care center (PHCC).

Figure 2 - Number of hypertensives followed up in Qatif, primary health care center (PHCC) categorized upon their year of diagnosis.


Figure 3 - Years from when diabetes mellitus (DM) was diagnosed in DM hypertension (HTN) followed up in Qatif primary health care centers (PHCC).


Table 2 - Average number of years since hypertension was diagnosed.

| Smoking status | Sex* |  |  |  | Average years since hypertension diagnosed $\pm \mathbf{S D}^{* *}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Male |  | Female |  |  |
| Never smoked | 76 | (69.7) | 136 | (64.5) | $6.8 \pm 4.9$ |
| Ex-smoker | 8 | (7.3) | 13 | (6.2) | $8.4 \pm 5.4$ |
| Current smoker | 15 | (13.8) | 32 | (15.2) | $4.2 \pm 3.2$ |
| Total | 99 |  | 181 |  | $6.4 \pm 4.8$ |
|  | gnif | $\begin{aligned} & \text { cant diff } \\ & .0001 \mathrm{Kr} \end{aligned}$ | ence kal W | etween allis tes |  |

Table 3 - Documentation of family history of hypertension in medical records of hypertensives followed up in primary health care (PHC).

| Characteristics | Documentation of F.Hx |  | p-value |  |  |
| :--- | ---: | ---: | ---: | ---: | ---: |
|  | Yes |  | No |  |  |
| Diabetic | 57 | $(80.3)$ | 14 | $(19.7)$ | 0.431 |
| Non-diabetic | 186 | $(74.7)$ | 63 | $(25.3)$ |  |
| Male | 88 | $(80.7)$ | 21 | $(19.3)$ | 0.169 |
| Female | 155 | $(73.5)$ | 56 | $(26.5)$ |  |
| Mean age $\pm$ SD | $57.2 \pm 1.6$ | $59.9 \pm 3.3$ | 0.192 |  |  |
| Mean years since diagnosis <br> of hypertension $\pm$ SD | $7.4 \pm 0.6$ | $5.6 \pm 1.1$ | $<0.0001$ |  |  |
| Mean age at diagnoisis $\pm$ <br> SD | $49.9 \pm 1.6$ | $54.3 \pm 3.3$ | 0.578 |  |  |
| Total | $\mathbf{2 4 3}$ | (75.9) | $\mathbf{7 7}$ | $(\mathbf{2 4 . 1})$ |  |
|  | F.Hx - family history |  |  |  |  |

Table 4- Family history of hypertension in medical records of hypertensives followed up in primary health care (PHC).

| Characteristic | Family history of hypertension <br> Positive |  | p-value |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  | 35 | $(61.4)$ | 22 | $(38.6)$ |  |
| Diabetic | 81 | $(43.5)$ | 105 | $(56.5)$ | 0.023 |
| Non-diabetic | 43 | $(48.9)$ | 45 | $(51.1)$ |  |
| Male | 73 | $(47.1)$ | 82 | $(52.9)$ | 0.894 |
| Female | $54.6 \pm 11.7$ | $57.9 \pm 12.9$ | 0.034 |  |  |
| Mean age $\pm$ SD | $7.0 \pm 4.5$ | $6.8 \pm 5$ | 0.459 |  |  |
| Mean years since diagnosis <br> of hypertension $\pm$ SD | $47.5 \pm 1.0$ | $51.1 \pm 1.1$ | 0.013 |  |  |
| Mean age at diagnoisis $\pm$ SD |  |  |  |  |  |
| Total | $\mathbf{1 1 6}$ | $(\mathbf{4 7 . 7})$ | $\mathbf{1 2 7}$ | $(\mathbf{5 2 . 3})$ |  |

recently diagnosed hypertensives ( $\mathrm{p}<0.0001$ Kruskal Wallis test). Twenty-four point one percent of the records showed no data determining the family history. There is significant difference in documentation between place of follow up and years since diagnosis of HTN, but no significant difference was noted between sexes and age groups Table 3. The family history of high blood pressure is positive in $47.7 \%$ of documentation with significant difference between place of follow up and correlates negatively with age of the hypertensive at diagnosis Table 4. The number of visits in the last 6

Table 5- Number of consultations of hypertensive patients followed up in Qatif, primary health care (PHC).

| Primary health <br> care centers | Average number of <br> visits to PHCC in 6 <br> months $\pm$ SD | Total <br> consultation to <br> PHCC | Hypertension <br> consultation/ <br> PHCC <br> n (\%) |  |
| :--- | :---: | :---: | ---: | :---: |
| Sheon | $5.5 \pm 2.2$ | $\mathbf{5 5 3 0}$ | 464 | $(8.4)$ |
| Tarout | $11.6 \pm 3.6$ | $\mathbf{7 3 0 1}$ | 488 | $(6.7)$ |
| Qatif-1 | $5.4 \pm 1.9$ | $\mathbf{5 6 2 1}$ | 270 | $(4.8)$ |
| Dareen | $7.1 \pm 2.3$ | $\mathbf{3 9 2 1}$ | 184 | $(4.7)$ |
| Qudaih | $7.2 \pm 2.6$ | $\mathbf{1 7 4 9 5}$ | 818 | $(4.7)$ |
| Sanabis | $6.3 \pm 2.4$ | $\mathbf{5 8 0 7}$ | 264 | $(4.5)$ |
| Nasira | $5.9 \pm 2.2$ | $\mathbf{7 5 7 1}$ | 332 | $(4.4)$ |
| Awamia | $6.0 \pm 2.3$ | $\mathbf{1 2 1 6 8}$ | 494 | $(4.1)$ |
| D.Mahdood | $6.3 \pm 2.5$ | $\mathbf{1 4 9 4 5}$ | 404 | $(2.7)$ |
| Jish | $6.1 \pm 1.4$ | $\mathbf{7 5 0 2}$ | 170 | $(2.3)$ |
| Saihat-3 | $7.5 \pm 3.2$ | $\mathbf{6 4 8 1}$ | 90 | $(1.4)$ |
| Nabia | $6.1 \pm 2.1$ | $\mathbf{1 3 2 3 7}$ | 182 | $(1.4)$ |
| H.Maheesh | $6.2 \pm 1.5$ | $\mathbf{5 6 0 1}$ | 62 | $(1.1)$ |
| Total | $\mathbf{6 . 6} \pm 2.8$ | $\mathbf{6 5 4 8 8}$ | $\mathbf{2 4 8 2}$ | $(3.8)$ |

months per patient Table 5 accumulated to an average of $6.6 \pm 2.8$ times; CI 6.3-6.9; median 6 times). There was no significant difference between sexes, age groups, smokers and non-smokers, nor diabetics and non-diabetics. However the number differs significantly upon the place of follow up ( $\mathrm{p}<0.0001$ Kruskal Wallis test); most PHCCs showed median of 5-7 visits. Tarout PHCC, Kingdom of Saudi Arabia (KSA), showed an exception of a median of 12 visits. Sum of consultations to doctors in the sampled PHCC's in Qatif, was 65488 as per census report of Qatif PHC. ${ }^{16}$ Hypertensive patients, cited by this study, constituted $3.8 \%$ (2482) of the total patients attending the sampled PHCCs, varying from $1.1 \%$ in H. Maheish, KSA to $8.4 \%$ in Qatif ${ }^{3}$ PHCC Table 5.

Discussion. The estimated male and female populations at age of 15 years and above, in Qatif are 72025 and 76254 individuals. ${ }^{16}$ Thus, the expected number of hypertensives is 10,057 (considering SBP $\geq$ 160 or DBP $\geq 95$ ), ${ }^{4}$ or 22,519 (considering SBP $\geq 140$ or DBP $\geq 90$ ). ${ }^{2}$ However, the expected numbers of diagnosed (aware of being hypertensives) adult male and female hypertensives are estimated to be 3169 and 4557. ${ }^{13}$ Out of these figures, the number of hypertensives registered in Qatif PHC as cited by this study is 3608 (902 in sampled PHCCs constitute $25 \%$ of total
registered hypertensives as per our methodology), which constitute $42.6 \%$ of the expected total number of aware (diagnosed)hypertensives $35.9 \%$ of the expected total number of adult hypertensives (considering SBP $\geq 160$ or DBP $\geq 95$ ) 4 , or $16 \%$ (considering $\mathrm{SBP} \geq 140$ or $\mathrm{DBP} \geq$ 90). This percentage is higher than that cited in Al-Khobar, KSA PHC, 30 km away from Qatif, by Al-Shahri and his colleagues. ${ }^{19}$ This might be related to the dominance of Saudi citizens in Qatif, and less prevalence of private health services.

On the other hand, The study population of adult hypertensives followed up in the sampled PHCC's is 320; Male: Female ratio is $1.1: 2.1$. This extrapolates to 1280 adult hypertensives in all Qatif PHCCs, which constitute $13.8 \%$ and $17 \%$ of the expected number of diagnosed male and female adult hypertensives. ${ }^{13}$ These figures were below expectation, especially if we consider the presumed dominance of permanent Saudi citizens, low prevalence of private services in Qatif, and dominance (almost $80 \%$ of health encounters) of PHCC as source of health care. ${ }^{14,20}$ Adding to this, equal number of hypertensives might be receiving their care in hospitals. ${ }^{21}$ Thus the percentage of adult hypertensives receiving health care would be, almost, $34 \%$ of those aware hypertensives. This is, by far, lower than that reported, in Tabuk, KSA (76\%) and in Riyadh, KSA (84\%). $)^{8,22}$ Internationally, reports showed higher rates in Korea (79\%), United States of America (78\%), and Seychelles Islands ( $68 \%$ ). However, comparable reports have been shown in South Africa (39-55\%) and England (32\%). ${ }^{23-28}$ Community-based studies might be needed to address this discrepancy and to identify, as well, vulnerable social groups lacking the care. The higher representation of females, in comparison to males, might be attributed to the higher number of diagnosed female hypertensives, as per Khoja and Samir ${ }^{15}$ and the well documented higher attendance of females to PHC services in Qatif, KSA. ${ }^{13,29,30}$ The high variation in number of hypertensives seen in different PHCCs might be attributed to many factors including the higher population of the catchment area of some centers (as in Qudaih and Awamia KSA), ${ }^{16}$ the possible higher prevalence of the disease (as in Qatif-3 and Dareen, KSA), ${ }^{17}$ the absence of other health service provider (as in Awamia), the presence of chronic disease clinic (as in Qatif-3, KSA), and the recently-populated catchment areas (as in Saihat-3, KSA.)

This variation needs to be considered in planning and assignment of resources. Hypertensives' consultations piled up to an average of $3.8 \%$ of the total number of consultations in PHCCs. This is, relatively, equal to that reported, internationally, which showed $2.5 \%$ to $4.12 \%,{ }^{31-33}$ but, clearly, higher than that reported in Riyadh (1.8\%) by Al-Faris and Al-Taweel, KSA. ${ }^{30}$ This put a heavy demand on human, as well as, non-human resources of such centers. This was clear enough in one center, where the fraction raised up to $8.4 \%$ of the total consultations.

In conclusion, the magnitude of share PHC offers for diagnosed hypertensives is less than one fifth of the expected number of diagnosed male and female adult hypertensives. The load of this share on general practitioners working in PHC is highly variable. These facts must be considered in planning and assignment of resources for PHC, as well as, in planning for management of hypertension on the scale of the community. Whether all other hypertensives are receiving care and where they get it, remain questions which need to be answered. A community-based study is suggested to address these questions and to identify groups at risk of being unattended.

Acknowledgment. We would like to thank doctors and chronic disease nurses working in the sampled centers for their valuable contribution in the collection of data.

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Blood pressure ( BP ) is measured as part of a screening physical examination at the time of opening a family health record file in the primary health care centres (PHCC) of Al-Medina Al-Mounawarah. We selectively screened saudis in the 'high risk' age group (50-60 years). The total number of the study sample was 1713: 1021 males, 692 females ( $24.3 \%$ of the target population). They were recalled and had their BP measured again using standard methods. On the basis of a single reading, the BP was known in 1495 ( $20.8 \%$ of the target population! Eight hundred and eighty [186.2\%] of males 615 [88.8\%] of females). Hypertension, defined as receiving antihypertensive drug treatment or BP> $160 / 95$ or both, was present in $10 \%, 6.8 \%$ and $14.6 \%$ of the total male and female populations. The percent period prevalence in subjects who had second BP readings was almost identical, there being an equal number of subjects with increased and decreased pressures. From the evidence we gathered, the prevalence of hypertension in Al-Medina Al-Mounawarah is far less than that reported in British and American surveys. It is unknown whether other parts of the Kingdom have similar rates. Also it will be of great interest to evaluate, in future, the effects of a changing life-style, brought about by affluence on the prevalence of hypertension.


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