

# Self-Monitoring of Blood Pressure and the Role of Community Pharmacists in Kuwait

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## Key Words

Blood pressure monitoring devices · Sphygmomanometer · Validation

## Abstract

**Objective:** To determine the types of devices for self-monitoring of blood pressure available to consumers in Kuwait and the pharmacists' knowledge and level of information provided to consumers when purchasing such devices. **Materials and Methods:** It was possible to contact 196 of the 230 eligible pharmacies from five governorates in Kuwait. Ten of these were used to pretest the questionnaire and six declined to participate. Another six did not carry any blood pressure monitoring devices and hence were excluded. Data was then collected from pharmacists at the 174 remaining community pharmacies via face-to-face structured interview of the respondents at their work sites. **Results:** Of the 174 pharmacists, 173 (99.4%) claimed to offer or provide advice to clients at the time of purchasing devices, 117 (67.1%) of them stating that they did so even if the patients did not ask. Although 147 (84.5%) respondents correctly identified the mercury sphygmomanometer as the most reliable device for measuring blood pressure, less than half (86, 49.4%) claimed to know how to check the accuracy of the devices

they sold. Only 25 (14.4%) pharmacists could actually identify the correct procedure for checking the accuracy of the devices and only 25 (14.4%) pharmacists could correctly identify cutoff points for systolic and diastolic blood pressure delineating clinical hypertension. Only 1 pharmacist could correctly name a reference source for blood pressure measurement. **Conclusion:** There is a need for improvement of community pharmacists' competence in supporting patients and in providing them with information regarding devices for measuring blood pressure in Kuwait.

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## Introduction

The practice of self-monitoring blood pressure (BP) at home is a growing trend among hypertensive patients and health-conscious people eager to participate in the monitoring or management of their condition or general health as evidenced by the growing sales of devices for self-monitoring of BP [1–5]. A variety of these devices are widely available through community pharmacies and their purchase provides pharmacists with an opportunity to educate patients in their use and maintenance, in addition to counseling patients on their medications.

Home BP has been reported to accurately reflect the patient's mean daytime ambulatory BP, whether measured manually [6–9] or automatically [10, 11], and BP control has been shown to improve in patients instructed to monitor their BP at home and to adjust their antihypertensive drug therapy themselves, compared to patients receiving usual clinic-based care [2, 12].

In Kuwait, as in many other countries, hypertension is a common condition. Based on extrapolations of statistics from the World Health Organization it may affect more than 400,000 people in this country [13]. Consumers purchasing BP devices for self-monitoring usually rely on pharmacists to inform, educate and counsel them regarding their use and maintenance. When purchasing the devices patients have an implicit belief that pharmacists are knowledgeable regarding the devices they sell, and the disease condition and its management. Many problems with different types of available home BP measuring devices have been identified and described, and regulatory authorities in developed countries recommend that such devices meet certain minimum standards of reliability and accuracy before they can be sold to consumers. The most common standards employed to determine reliability and accuracy are those of the Association for the Advancement of Medical Instrumentation and the British Hypertension Society [14–17].

This study was therefore set out to evaluate the types of BP devices that are available to consumers in Kuwait and to assess pharmacist actions relevant to patient advice/education when purchasing a device for self-monitoring of BP, pharmacists' knowledge regarding the accuracy of the BP devices and their knowledge regarding high BP and resources for self-measurement of BP.

## Materials and Methods

The study method was a cross-sectional survey of pharmacists conducted in community pharmacies in Kuwait. It was predetermined to include only pharmacies usually accessible to the general public, and which allowed for direct interaction between pharmacists and patients/clients wanting to purchase BP devices for self-monitoring at home. These pharmacies were identified as community pharmacies (private and cooperative pharmacies and those located in private clinics and hospitals throughout Kuwait). A list obtained from the Ministry of Health (current at the time) was used to locate the private and cooperative pharmacies, and local directories were used to locate pharmacies in private clinics and hospitals. Interviewers were allocated different governorates (Ahmadi, Farwaniya, Capital, Hawalli and Jahra) of Kuwait in which the interviews were to be carried out. The total

number of eligible pharmacies operating within these areas was 230. Investigators and trained Ministry of Health pharmacists were able to reach 196 pharmacies. Prior to commencing the study all interviewers met and practiced the interviewing technique in order to be consistent with each other and to minimize intra- and intersurveyor variability. On approaching a pharmacy, an investigator would briefly explain the purpose of the survey to the pharmacist on duty. The investigator would then request the pharmacist to participate in the survey. Pharmacists were free to refuse to participate in the survey. Pharmacists at six of the pharmacies declined to participate in the survey, and another six did not carry BP monitoring devices and hence were not eligible for the survey. This left a total 174 pharmacies participating.

A survey questionnaire was designed and pretested on 10 pharmacists (not included in the analysis of results) working in community pharmacies. It was checked for question design, readability, ease of comprehension and the approximate length of time it would take to complete. It was further refined to enhance clarity of some questions by changing them from open-ended to close-ended questions with options to qualify or clarify the responses in some cases. The final version comprised the following main sections:

- 1 demographics including gender, age, nationality, number of years practicing pharmacy and duration of educational training in pharmacy;
- 2 questions covering the type of devices for self-monitoring of BP carried by the pharmacy and the pharmacist-client interaction when selling the devices;
- 3 questions assessing the respondent pharmacists' knowledge of the accuracy and reliability of the devices they sold, and
- 4 pharmacists' knowledge regarding hypertension and resources for self-monitoring of BP.

The study was conducted during the period from January to June 2005. Permission to carry out the study was obtained from the Head, Division of Pharmaceutical Services, Ministry of Health. Informed verbal consent was obtained from the participants at the time of survey. Data were collected with the assistance of trained Ministry of Health pharmacists via face-to-face structured interview of the respondents in their pharmacies using the developed and pretested questionnaire. On average, each interview lasted for 30 min.

Data obtained were anonymized and entered into a computer using the Statistical Package for Social Sciences (SPSS, version 13) and descriptive analysis was conducted. Prevalence was reported as a percentage with 95% confidence intervals. The  $\chi^2$  test was used to test for correlations between the categorical variables. Statistical significance was accepted at  $p < 0.05$ .

## Results

The mean ( $\pm$ SD) age of participants was  $35 \pm 8$  years with men being the majority (73.9%). The average length of time in practice for all participants was  $11 \pm 8$  years, with a range spanning nearly 4 decades. The baccalaureate degree was the basic qualification in pharmacy (98.9%), and participants were from 16 different coun-

tries and had graduated from 49 different universities. Eleven participants had higher qualifications in pharmacy, which included diplomas and a master's degree.

#### *BP Devices Available in Kuwait*

A total of 43 brands and 124 models of three types of BP devices for self-monitoring were found on sale in Kuwait community pharmacies. These ranged from fully manual mercury sphygmomanometers to semiautomated (manual inflation) and fully automated digital devices for both upper arm and wrist. The devices originated from Japan, the USA, Germany and South Korea. The price for devices of the same type and model were comparable in various pharmacies so that they differed at the most by KD 1 (about USD 3.00). This can be ascribed to the fact that prices are government-controlled and the price variation was probably due to the difference at the time of acquisition of the device by the individual pharmacy. The types of devices available are listed in table 1.

#### *Pharmacist Action when Selling Devices*

One hundred and seventy-three pharmacists (99.4%) claimed that they gave the patient some level of advice regarding the device at the time of purchase (table 2). One hundred and sixteen (66.7%) of the pharmacists reported that they either explained (46, 26.4%) or demonstrated (70, 40.2%) the use of the device to the patient at the time of purchase, even if the patient did not ask. As shown in table 3, the mercury sphygmomanometer was correctly identified as the most accurate and reliable device for measuring BP. A high percentage of participants knew this information, but slightly less than half (86, 49.4%) claimed to know how to determine the accuracy of the devices. Further detailed questioning revealed that only 25 (14.3%) actually knew.

None of the pharmacists could identify appropriate sources of information regarding the accuracy and reliability of the devices, as approved by international standards. Also, none could name any appropriate reference sources where one could look up information regarding the proper technique or guidelines for self-monitoring of BP.

No significant correlation was found between pharmacists' age or the number of years practicing pharmacy and their knowledge regarding the method for determining accuracy of device, measuring BP or finding resources for this information ( $p > 0.05$ ).

**Table 1.** Types of BP monitoring devices available by brand and model (n = 124)

Type of device (by site)	Number	Percent
Upper arm mercury sphygmomanometer	20	16.1
Aneroid sphygmomanometer	1	0.8
Automated (digital)	62	50.0
Wrist automated	41	33.1

**Table 2.** Level of pharmacist action when selling BP monitoring device (n = 174)

Pharmacist's action when selling device	Number	Percent
Explained how to use the device to the patient if patient asked	22	12.6
Always explained even if the patient did not ask	46	26.4
Demonstrated how to use the device if patient asked	35	20.1
Always demonstrated even if patient did not ask	70	40.2
Did not explain because I do not know how to measure blood pressure	1	0.6

**Table 3.** Type of device believed to be most accurate (n = 174)

Response	Number	Percent
'Do not know'	1	0.6
Aneroid sphygmomanometer, upper arm	3	1.7
Digital, upper arm	12	6.9
Digital, wrist	11	6.3
Mercury sphygmomanometer, upper arm	147	84.5

## **Discussion**

In this study we addressed several concerns regarding both the devices and the information that pharmacists may have or provide consumers when they purchase devices.

Firstly, current standards for BP measuring devices for self-monitoring require that devices be validated for reliability and accuracy [18]. Although many types of devices are available in Kuwait, which gives the consumers a wide choice, many of these devices have not been designed to meet international standards of accuracy and

reliability [14–17]. Because Kuwait does not require such standards at present and because there is no national quality control testing of new devices, there is no assurance that many of the available devices meet these criteria. Additionally, based on our assessment of pharmacists' knowledge regarding resources for BP devices and self-monitoring measurement, it appears that they are not even aware that such standards exist. If the pharmacists are not aware of the recommendations that devices meet certain standards for accuracy and reliability, it is logical to assume that they would be less concerned about the suitability of the devices they sell for self-monitoring of BP.

As recommended by Stergiou et al. [6] and Mengden et al. [7], self-monitoring requires patient training under the supervision of a health care professional. Such training would include information about high BP, the proper procedure for self-monitoring, instructions on device maintenance and the proper use of the devices. Community pharmacists in Kuwait perceive themselves as providing valuable and needed information to consumers. This study has therefore shown that their actual knowledge, at least regarding self-monitoring devices for BP, is not commensurate with what they themselves perceived it to be.

Several difficulties limited the scope of this study. First, interview times for many pharmacists were not ideal as there were several interruptions by customers necessitating the interviewer to return at a later time. This tended to make interview times longer and tiresome for both interviewer and interviewee. Also, some participating pharmacists had limited knowledge of English, which made it difficult for them to understand some questions and to explain their answers to some interviewers who did not speak Arabic.

The questionnaire was designed to discover only certain specific information in a limited time and therefore did not include in-depth examination of pharmacists' knowledge especially with regard to the management of hypertension. Furthermore, due to logistic reasons, it was difficult to reach 44 eligible pharmacies and hence these were not included in the survey. Another limitation in this study was that inter- and intrainviewer variability was not assessed.

Given these limitations, however, the study provides a strong incentive to further this type of research and work at equipping pharmacists to provide better services to the public and to patients seeking such help.

Since many pharmacy schools have been changing their curricula to develop more clinically competent

practitioners, a greater number of recent graduates would be expected to fare better providing knowledge-based answers to these survey questions. It was disappointing to find that this was not the case. Follow-up studies are needed to identify and rectify deficiencies in pharmacists' competences and knowledge. A specific aspect arising from this study that should be examined is maintenance and use of BP devices by the general public and the effect of educational and training intervention at the pharmacist level. This can be addressed through continuing education programs to ensure that pharmacists have adequate background knowledge regarding BP self-measurement and meet requirements for competence in the use and maintenance of devices they sell to the public.

## Conclusions

In this study of community pharmacy practice in Kuwait we have identified deficiencies in community pharmacists' knowledge regarding how to determine the accuracy of BP self-monitoring devices, the cutoff points for clinical hypertension, and their knowledge of information resources regarding the proper use of BP self-monitoring devices or for the measurement of BP.

## Acknowledgment

The authors gratefully acknowledge the assistance of the Ministry of Health pharmacists who helped with the administration of the questionnaires and data collection.

## References

- 1 Manning G, Donnelly R: Use of home blood-pressure monitoring in the detection, treatment and surveillance of hypertension. *Curr Opin Nephrol Hypertens* 2005;14:573–578.
- 2 Krecke HJ, Lutkes P, Maiwald M: Patient assessment of self-measurement of blood pressure: results of a telephone survey in Germany. *J Hypertens* 1996;14:323–326.
- 3 Lopez LM, Taylor JR: Home blood pressure monitoring: point-of-care testing. *Ann Pharmacother* 2004;38:868–873.
- 4 Mehos BM, Saseen JJ, MacLaughlin EJ: Effect of pharmacist intervention and initiation of home blood pressure monitoring in patients with uncontrolled hypertension. *Pharmacotherapy* 2000;20:1384–1389.

- 5 Pickering TG, Hall JE, Appel LJ, Falkner BE, Graves J, Hill MN, Jones DW, Kurtz T, Sheps SG, Roccella EJ: Recommendations for blood pressure measurement in humans and experimental animals. Part 1: Blood pressure measurement in humans: a statement for professionals from the Subcommittee of Professional and Public Education of the American Heart Association Council on High Blood Pressure Research. *Circulation* 2005; 111:697-716.
- 6 Stergiou GS, Skeva II, Zourbaki AS, Moutokalakis TD: Self-monitoring of blood pressure at home: how many measurements are needed? *J Hypertens* 1998;16:725-731.
- 7 Mengden T, Chamontin B, Phong CN, Luis Palma GJ, Chanudet X: User procedure for self-measurement of blood pressure. First International Consensus Conference on Self Blood Pressure Measurement. *Blood Press Monit* 2000;5:111-129.
- 8 O'Brien E, Pickering T, Asmar R, Myers M, Parati G, Staessen J, Mengden T, Imai Y, Waeber B, Palatini P, Gerin W: Working Group on Blood Pressure Monitoring of the European Society of Hypertension International Protocol for validation of blood pressure measuring devices in adults. *Blood Press Monit* 2002;7:3-17.
- 9 Kleinert HD, Harshfield GA, Pickering TG, Devereux RB, Sullivan PA, Marion RM, Mallory WK, Laragh JH: What is the value of home blood pressure measurement in patients with mild hypertension? *Hypertension* 1984;6:574-578.
- 10 Stergiou GS, Voutsas AV, Achimastos AD, Moutokalakis TD: Home self-monitoring of blood pressure: is fully automated oscillometric technique as good as conventional stethoscopic technique? *Am J Hypertens* 1997;10:428-433.
- 11 Stergiou GS, Zourbaki AS, Skeva II, Moutokalakis TD: White coat effect detected using self-monitoring of blood pressure at home: comparison with ambulatory blood pressure. *Am J Hypertens* 1998;11:820-827.
- 12 Zarnke KB, Feagan BG, Mahon JL, Feldman RD: A randomized study comparing a patient-directed hypertension management strategy with usual office-based care. *Am J Hypertens* 1997;10:58-67.
- 13 [http://www.cureresearch.com/h/hypertension/stats-country\\_printer.htm](http://www.cureresearch.com/h/hypertension/stats-country_printer.htm) accessed on August 22, 2006.
- 14 O'Brien E, Mee F, Atkins N, O'Malley K: The quest for better validation: a critical comparison of the AAMI and BHS validation protocols for ambulatory blood pressure measurement systems. *Biomed Instrum Technol* 1992;26:395-399.
- 15 O'Brien E, Atkins N, Staessen J: Factors influencing validation of ambulatory blood pressure measuring devices. *J Hypertens* 1995;13:1235-1240.
- 16 Taylor R, Chidley K, Goodwin J, Broeders M, Kirby B: Accutacker II (version 30/23) ambulatory blood pressure monitor: clinical validation using the British Hypertension Society and Association for the Advancement of Medical Instrumentation standards. *J Hypertens* 1993;11:1275-1282.
- 17 Evans CE, Haynes RB, Goldsmith CH, Hewson SA: Home blood pressure-measuring devices: a comparative study of accuracy. *J Hypertens* 1989;7:133-142.
- 18 Stergiou G, Mengden T, Padfield PL, Parati G, O'Brien E: Self-monitoring of blood pressure at home. *BMJ* 2004;329:870-871.