

Short and long-term impact of a structured educational program on the patient's knowledge of hypertension

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Background. It has been generally accepted that educational programs can be beneficial in the treatment of a number of chronic diseases such as diabetes mellitus as well as of cardiovascular risk factors and hypertension. We organized a structured educational intervention aimed at 1) assessing the patient's baseline knowledge of hypertension, 2) verifying the short and long-term impact of this initiative on patient's education.

Methods. We invited 174 consecutive patients referred to our hypertension outpatient clinic to participate in an educational meeting on hypertension. For organizational reasons, patients were divided into two groups, each attending a single meeting. Each meeting included four sessions: 1) in the first session a multiple choice questionnaire (nine questions, with answers collected by an interactive electronic system) was administered in order to evaluate patients' baseline knowledge of hypertension, 2) a traditional teaching session, 3) an interactive phase aimed at assessing the improvement of knowledge in which the same questions as in the first session were assessed again, 4) a general discussion session. At the end of the meeting a booklet on principal issues related to hypertension was given to each patient. In order to evaluate the long-term impact of this initiative on the patient's knowledge, 6 months later we invited the patients to answer to the same questions in a questionnaire sent to their home address.

Results. One hundred thirty-three patients of the 174 invited attended the meeting and 111 (57 males, 54 females, mean age 53 ± 13 years) completed the questionnaire after 6 months. The answers to the questions in the initial session were correct in a percentage ranging from 60 to 80% (mean 68%) and immediately after the teaching session this rate increased significantly (range 75-98%, mean 90%, $p < 0.05$ at least, in all questions). A similar good level of knowledge was maintained in the long term (percentage of exact answers ranging from 78 to 97%, mean 88%, $p < 0.05$ or $p < 0.01$ compared to baseline).

Conclusions. The findings of the present study show a positive short and long-term impact of a structured educational intervention on the patient's knowledge of issues related to arterial hypertension. The beneficial role on clinical outcomes such as blood pressure control and cardiovascular events will need future controlled trials.

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Introduction

Hypertension is an important public health challenge in the world because of its high prevalence and the concomitant increase in the risk of cardiovascular and renal disease¹. Despite the widespread diffusion of pharmacological treatment of arterial hypertension in western societies, epidemiological surveys in the United States and Europe indicate that patients with well-controlled blood pressure (BP) represent a relatively small percentage of the hypertensive population²⁻⁴. An inadequate BP control

may be dependent on several factors that can be schematically divided into factors related to physicians, patients and drugs⁵. Doctors sometimes neglect measuring the BP of all their patients, prescribe inconsistent therapeutic schemes and are too often satisfied with inducing some BP decrease rather than achieving the recommended BP goal⁶. Patients' compliance may be limited by a lack of understanding of the consequences of untreated hypertension, attitudes of indifference, side effects of the medication, and long-lasting duration of treatment^{7,8}. A good therapeutic compliance is essential for an ef-

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fective and persistent control of arterial pressure⁹. Thus, physicians must educate their patients on the consequences of hypertension and emphasize the importance of taking their medication as prescribed¹⁰. During the visit patients and their relatives should be correctly informed about the advantages of treatment, the available drugs, their mode of action, the possible side effects and metabolic changes. In addition, patients may be instructed on hypertension and other cardiovascular risk factors by educational meetings, clear and simple articles and booklets^{11,12}.

In the last year we organized some educational meetings involving about 400 patients followed up in the outpatient clinic of the Centro di Fisiologia Clinica e Ipertensione in Milan aimed at ascertaining how patients become aware of problems related to hypertension and to improve their knowledge. In particular this paper describes the short and long-term impact of a structured educational program on the knowledge of hypertension in 111 hypertensive patients.

Methods

One hundred seventy-four consecutive hypertensive patients, attending the outpatient clinic of our Hypertension Center during a period of 1 month (November 10th-December 10th, 1999) were invited to an educational program on hypertension and related problems. In the case of a positive verbal answer (167 out of 174) a written invitation was sent to their home address. A few days before the meeting, two members of our staff checked by phone the effective willingness of the patients to participate. One hundred thirty-three treated hypertensive patients participated in one of the two meetings held at the Hypertension Center located at the Ospedale Maggiore Policlinico in Milan (the patients were divided into two groups for organizational reasons). Each of the two educational meetings lasted about 2 hours and was organized into four sessions. In the first session, a multiple choice questionnaire (nine questions with answers collected by an interactive electronic system) (Table I) was administered to the patients in order to evaluate their level of knowledge of hypertension. The second session lasted 1 hour and included a presentation given by two members of our medical staff with the support of simple and schematic slides. The main topics of the presentation were the following: definition of hypertension and its prevalence, hypertension as a risk factor, cardiovascular complications due to hypertension. The correct way to measure BP, the diagnostic work-up of hypertensive patients and the main cardiovascular risk factors were also illustrated. The last part of the teaching session was devoted to the therapeutical aspects: lifestyle changes, pharmacological treatment. In the third session patients

Table I. Questions proposed before and after the educational teaching session and after 6 months of follow-up.

1. Which are the normal upper limits of blood pressure values in the adult population?
 - < 160/105 mmHg
 - < 150/90 mmHg
 - < 140/90 mmHg
2. What is the prevalence of hypertension in Italy?
 - 1-5%
 - 15-20%
 - 6-10%
3. Is it true that the precise cause of hypertension is unknown in 90% of patients?
 - Yes
 - No
4. Arterial hypertension is more frequent in:
 - Diabetic and obese subjects
 - Thin and smoking subjects
 - Individuals with an excess of red blood cells
5. Which is the target organ mostly involved in hypertension apart from the brain and the heart?
 - Thyroid
 - Kidney
 - Adrenal gland
6. Should hypertensives take antihypertensive drugs even if they have no symptoms of hypertension?
 - No, they should not
 - No, only in particular circumstances
 - Yes, always
7. How long should antihypertensive therapy be taken?
 - Until normalization of blood pressure levels
 - For ever
 - For 1-2 years
8. Which one of these drugs can induce hypertension?
 - Aspirin
 - Adrenal steroids
 - Antibiotics
9. Is exercise useful in reducing blood pressure?
 - Yes, always
 - Yes, but only when regularly performed
 - No

were requested to answer the same nine questions posed in the first session. The fourth session was devoted to a general discussion.

At the end of the meeting a booklet, written by two members of the medical staff and published with the support of Sanofi Synthelabo, was hand out to each participating patient. In this 25-page booklet, all principal issues concerning arterial hypertension, debated at the meeting, were clearly explained. In order to explore the long-term impact of this educational intervention on the patient's knowledge after 6 months we invited the patients to answer the same questions posed during the meeting by sending a questionnaire to their home address.

Statistical analysis. Data are expressed as means \pm SD. Comparison of two means was performed using paired Student's t test. Correlations were obtained using Pearson's or Sperman's equations. A p value of < 0.05 was considered statistically significant.

Results

Demographic and clinical characteristics of patients.

Among 111 hypertensive patients participating in both phases of the educational program (attendance at the meeting and compilation of the questionnaire sent by mail after 6 months), 57 were men and 54 were women. Their average age was 53 ± 13 years. A large fraction of patients (59%) had a high general educational level (> 13 years of schooling). The known duration of hypertension was longer than 10 years in 35% of patients, between 6 to 10 years in 24%, and between 1 to 5 years in the remaining 41%. (Table II).

Table II. Clinical characteristics of patients.

No. patients	111
Age (years)	53 ± 13
Sex (M/F)	57/54
Clinic systolic blood pressure (mmHg)	137 ± 14
Clinic diastolic blood pressure (mmHg)	82 ± 10
Heart rate (b/min)	74 ± 3
Blood pressure control (< 140/90 mmHg) (%)	58
Body mass index (kg/m ²)	25.9 ± 4.2
Duration of hypertension (%)	
1-5 years	41
6-10 years	24
> 10 years	35
Education (%)	
University	18
General certificate of education	41
Secondary school	24
Primary school	17

All patients were on antihypertensive treatment: 32% on monotherapy, 36% on two drugs and 32% on three or more drugs. Mean clinic BP on treatment was $137 \pm 14/82 \pm 10$ mmHg and the percentage of patients with adequate BP control (BP < 140/90 mmHg) was 58%. The level of attendance at the educational meeting was satisfactory (76.5%) as well the percentage of patients who responded correctly to the questionnaire (83.4%). No differences were found in age, gender, duration of hypertension and degree of general education among patients attending or absent from the meetings as well as among the patients who, after 6 months, answered the questionnaire and those who did not. In particular mean BP values ($139 \pm 14/85 \pm 10$ mmHg) and percentage of BP control (53%) were not statistically different in patients not participating in the meetings compared to those participating.

Baseline knowledge of hypertension. The answers to the questions during session one of the meeting were correct in a percentage ranging from 60 to 80% (mean score 68%). The lower rates of correct answers concerned the questions related to the definition, preva-

lence, etiology of hypertension, the effect of some drugs on BP and the impact of physical exercise on BP levels. A good baseline level of knowledge was evident for topics such as target organ damage induced by hypertension and treatment. The percentage of correct answers was positively correlated with age and known duration of hypertension (Pearson's $r = 0.33$ and $r = 0.38$, $p < 0.05$ and $p < 0.01$, respectively) and with the general education level (Spearman's $r = 0.35$, $p < 0.05$). Baseline knowledge of hypertension did not differ in men and women.

Short and long-term impact of the educational intervention on knowledge. The short-term impact of the educational intervention on the patient's knowledge was evaluated immediately after the teaching session by posing the same questions as in phase one. The percentage of correct answers significantly improved from baseline (range 75-98%, $p < 0.05$ or $p < 0.01$ for all questions) and was equal or higher than 90% in 7 questions. A less evident improvement was seen in the two answers regarding the etiology of hypertension and the effect of physical exercise. The long-term effect of the structured educational program was assessed 6 months later using the same questionnaire. The level of knowledge resulted significantly higher compared to baseline (with a prevalence of correct answers ranging from 78 to 97%, $p < 0.05$ or $p < 0.01$ for all questions, mean 88%) and remained substantially unchanged in comparison to that observed in the short term (Fig. 1).

Discussion

The program organized to educate the hypertensive subjects referred to our Center had two main purposes: 1) to evaluate the baseline level of information on arterial hypertension, 2) to test whether through a structured educational intervention the patient's knowledge of hypertension related issues in the short and long term may improve.

The percentage of exact answers at baseline (mean 68%) indicates that our patients had a satisfactory background knowledge of hypertension. These patients, indeed, represented a well motivated group and interested in health problems related to the prevention and treatment of high BP; most of them were regularly followed in our Hypertension Center, had been recently referred to the Center by their general practitioners or self-referred, and under this profile they may be considered a particularly selected group not representative of the general population of hypertensives. On the other hand, a relevant fraction of our patients (about 30-40%) was not correctly informed on some important issues such as definition, prevalence and etiology of hypertension. The most notable finding of this study (the first to the best of our knowledge addressed to investi-

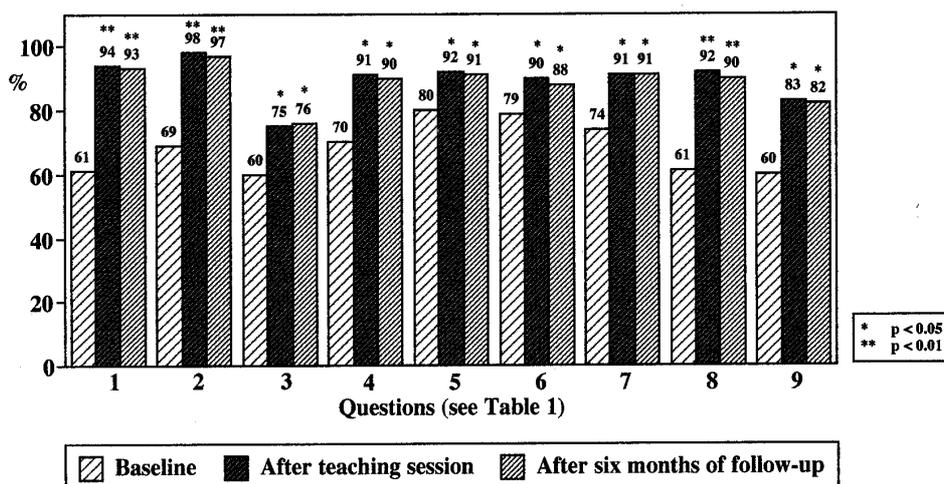


Figure 1. Percentage of correct answers at baseline, after a single educational teaching session, and after 6 months of follow-up.

gate both the immediate and long-term effects of a structured educational approach on the patient's knowledge) is the marked improvement of patients' background knowledge of hypertension after a single educational session and its persistence over time. In fact the percentage of correct answers increased significantly from a mean of 68 to 90% and remained at a similar level after 6 months (88%) suggesting that the information given during the meeting and subsequently reinforced by a booklet had been clearly understood by almost all participants. What are the positive effects of improving patients' knowledge?

There is no doubt that if patients are not fully informed about the risks of hypertension and of the need for effective and prolonged treatment, their compliance to therapy is unsatisfactory^{13,14}. The advantages derived from good BP control should be clearly explained to the patients in order to improve their compliance. The most suitable context for providing this type of information is the ambulatory visit, when the doctor should explain the diagnostic work-up and the therapeutic program.

Communication between doctor and patient about these issues constitutes the corner stone of patients' education¹⁵. Nevertheless in clinical practice doctors have very little time for these educational aspects. Considering this reality, the educational meetings, particularly those organized and conducted by the same physicians who have the patients in their charge may have some positive implications. Firstly, the educational message provided during 1-2 hours may simultaneously reach many patients. Second, this approach implemented with the support of simple publications or booklets, is willingly accepted by patients and may be a good way to understand and solve their problems. Therefore, we suggest that these educational interventions that have a positive impact on patient's short and long-term knowledge, as demonstrated by the present study, may contribute to achieving the therapeutic goal in the treatment of arterial hypertension.

Limitations of the study. A potential limitation of this study is represented by the lack of a control group. A more adequate survey of patient's baseline knowledge and its evolution over time could have also included the group of patients who did not attend the meetings. Unfortunately this was not possible for organizational reasons.

Previous studies. It has been generally established that patient's education plays a fundamental role in the successful management of hypertension, and consequently the failure to effectively communicate with patients is associated with inadequate BP control¹⁶. Despite this, only few studies to date have focused their attention on the implementation of educational programs in the management of hypertension. Dukat and Balazovjeh¹⁷ demonstrated that a better knowledge significantly reduces BP and modifies additional risk factors in essential hypertensive patients. Subsequently, Zernike and Henderson¹⁸ showed that a structured educational program is more effective compared to the information received routinely from the hospital staff. Our data about the persistence of knowledge agree with the finding by Zernike and Henderson who reported that patients could retain their knowledge up to 1 year after the education program.

Other studies found that hypertensive patients with inadequate health literacy had higher BP levels than literate patients^{19,20}. Finally, the initiatives concerning the promotion of pilot structured educational interventions by hypertension referral clinics aimed at improving compliance and BP control are very limited.

In conclusion, the present study assessed for the first time the immediate and long-term impact of a structured educational program on the knowledge of hypertension in a group of treated subjects with essential hypertension. Our findings show that the health education of a large number of patients may substantially

improve in the short term and subsequently be maintained for a long time as the consequence of a single 2-hour informative meeting supported by an educational booklet. These findings suggest the opportunity to extend this approach, particularly through the collaboration of hypertension outpatient clinics with general practitioners.

Further controlled studies should be planned to investigate whether improving the patient's education will result in a positive impact on BP control and on complications related to hypertension.

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