Factors affecting the quality of life of hypertensive patients

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العوامل المؤثرة في نوعية حياة مرضى فرط ضغط الدم

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الخلاصة: تم في إطار هذه الدراسة استخدام قائمة جرد الوضع الصحي المتعلق بفرط ضغط الدم والتحليل العديد المتغيرات، لتحديد العوامل المنبئة بنوعية حياة مجموعة من 316 مريضاً بفرط ضغط الدم تم انتقاؤهم عشوائياً. وبدراسة تأثيرات العوامل الديمغرافية والاجتماعية الاقتصادية والمراضة المشتركة الموجودة، أمكن التنبؤ بتحسين نوعية الحياة عن طريق السيطرة على مستوى ضغط الدم واختفاء المضاعفات التي تصيب أعضاء الجسم المستهدفة. ولم يكن لعدد الأدوية الخافضة لضغط الدم ولا لتكرار الجرعة تأثير في نوعية حياة المرضى. كما أن وجود تأثيرات جانبية للأدوية ينبئ بانخفاض نوعية الحياة على المستوى الجسماني والعاطفي، وليس في الجوانب المتعلقة بالحياة اليومية. وقد أمكن للعوامل المنبئة المستقلة أن تفسر 25٪ إلى 30٪ من التباين في نوعية حياة مرضى فرط ضغط الدم. وتُبرز الدراسة الدور الذي تؤديه السيطرة على ضغط الدم في ضمان نوعية حياة أفضل لمرضى فرط ضغط الدم.

ABSTRACT Using the Hypertension Health Status Inventory and multivariate analysis, predictors of quality of life were determined for a random selection of 316 hypertensive patients. Controlling for the effects of demographic and socioeconomic factors and existing co-morbidity, a better quality of life was independently predicted by achieving a controlled blood pressure and absence of target organ complications. Neither the number of antihypertensive drugs received nor the dose frequency affected patients' quality of life. Presence of drug side-effects independently predicted a lower quality of life in the physical and emotional domains but not on aspects of daily living. The independent predictors explained 25%–30% of the variation in the quality of life of hypertensive patients. The study highlights the role of achieving blood pressure control to ensure a better quality of life for hypertensive patients.

Facteurs affectant la qualité de vie des patients hypertendus

RÉSUMÉ On a déterminé les facteurs prédictifs de la qualité de vie pour une sélection aléatoire de 316 patients hypertendus à l'aide du questionnaire ***Hypertension Health Status Inventory*** et de l'analyse multivariée. Après élimination des effets des facteurs démographiques et socioéconomiques et de la comorbidité existante, les facteurs prédictifs indépendants d'une meilleure qualité de vie étaient la normalisation de la pression artérielle et l'absence de complications des organes cibles. Ni le nombre des antihypertenseurs administrés ni la fréquence de la dose n'affectaient la qualité de vie des patients. La présence d'effets secondaires médicamenteux permettait de prédire indépendamment une moindre qualité de vie dans les domaines physique et psychologique mais non pour les aspects de la vie quotidienne. Les facteurs prédictifs indépendants expliquaient 25 % - 30 % de la variation de la qualité de vie des patients hypertendus. L'étude souligne le rôle du contrôle de la pression artérielle pour assurer une meilleure qualité de vie aux patients hypertendus.

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Introduction

As life expectancies increase and patients are less likely to die from common infectious diseases, the focus of health care increasingly shifts towards the prevention and control of chronic disorders. These are unlikely ever to be cured, and so new indicators of therapeutic success are needed: clinicians place the emphasis on biomedical outcome or improvement in physiological status, whereas behavioural scientists look at psychological outcome [*1*]. Currently, it seems that the gap between the 2 categories is narrowing as both professionals become interested in the same outcome for chronic disorders: quality of life [*1*].

The development of generic and disease-specific research tools has made it easier to quantify the concept of quality of life [*2*]. Disease-specific instruments have the advantage of providing information relevant to the underlying pathological condition [*2*, Irvine SH, unpublished report for Glaxo–Wellcome Italy]. Both types of instruments not only measure the patient's general well-being but also take into consideration a relatively detailed assessment of function in the social, domestic and work settings [*3*].

Regardless of the type of condition, patients' quality of life is adversely affected by chronic illness [*4*] and this is an important consideration in the management of even asymptomatic conditions such as hypertension [*5*]. However, quality of life of hypertensive patients is often of little interest to clinicians as the disease is neither painful nor debilitating [*6*]. Nevertheless, research has shown that the quality of life of hypertensive patients is not the same as normotensive subjects [*7,8*]. Robbins et al. [8] revealed that blood pressure in unmedicated patients adversely affects cognitive function and social activity with a deterioration of the sense of well-being as the duration of the illness increases. Most research in this area is in the form of clinical trials of individual drugs, focusing on how blood pressure can be controlled in a way that minimizes adverse effects on patients' quality of life [*9,10*]. Little knowledge is available about other factors that could contribute to the improvement of hypertensive patients' quality of life.

The purpose of this study was to identify the predictors of a better quality of life of hypertensive patients in Alexandria, Egypt, using a disease-specific inventory.

Methods

Patients

The target population was patients with hypertension attending the health insurance organization clinics in Alexandria for their monthly prescription refill. Administratively, the health insurance organization divides Alexandria into 6 medical zones. In each zone, the service is provided through a number of polyclinics, each of which has different specialized clinics. A multistage random sampling technique was adopted to select 1 health insurance polyclinic from each zone and 1 internal medicine clinic from each polyclinic. All medical zones were considered in this study to allow the representation of patients from different socioeconomic backgrounds. Six clinics were identified, from which 10% of patients attending for a prescription refill during October 2001 were enrolled.

Questionnaire

All patients were interviewed using a questionnaire consisting of the following sections:

Section 1: Sociodemographic information including age, sex, marital status, educational attainment and occupation.

Section 2: Detailed health history relevant to the onset of the hypertension, associated complications and co-morbidity, pharmacological management as well as any drug side-effects experienced. Blood pressure was recorded. For all patients, the recorded blood pressure reflects the effect of the last dose of medication taken the previous day as usually the first morning dose is postponed until the check-up is completed. Accordingly, controlled blood pressure was defined as systolic ≤ 140 mmHg and diastolic ≤ 90 mmHg.

Section 3: Assessment of the quality of life using a modified version of the Hypertension Health Status Inventory, which consists of 29 items designed to investigate general quality of life [*11*]. After data collection, the scale was validated by testing for inter-item correlation and reliability analysis. Three of the original 29 items were omitted (sexual life has been affected; fear about holding a job; and afraid that work makes things worse) as they were negatively correlated with all items of the scale. This may be because they were inapplicable to patients in the cultural context of Egypt: low levels of sexual activity among single people, failure of married people to distinguish between getting old and the adverse effect of hypertension or its treatment on sexual function, high job security among the employed and low employment among women.

The final scale therefore consisted of 26 items, 16 items with a 6-point response scale (from "Always" to "Never" or from "Severely" to "Not at all"), while 10 items had "Yes/No" responses. According to the phrasing, 12 statements were scored in a positive direction, while 14 were scored in the reverse direction. All items were positively correlated and Cronbach alpha reliability for the total scale was 0.951. The total scale score ranged from 26 to 116 where higher scores indicated a better quality of life.

Three subscales are derived from the Hypertension Health Status Inventory:

- *Physical condition* (6 items) assesses constraints that are likely to reduce hypertensive patients' viability and ability (scores range from 6 to 24; all items were positively correlated; Cronbach alpha reliability 0.758).
- *Daily living* (10 items) reveals patients' perception of the extent to which their daily living and social interaction are restrained (scores range from 10 to 32; all items positively correlated; Cronbach alpha reliability 0.805).
- *Emotional status* (10 items) portrays the emotional contribution made by patients' perceptions of their current health status (scores range from 10 to 60; all items were positively correlated; Cronbach alpha reliability 0.946).

Data handling and analysis

The overall scores on the Hypertension Health Status Inventory as well as the scores on the 3 subscales were transformed using the natural log to achieve a normal distribution. To examine the relation between the subscales, the scores on the 3 subscales were positively and significantly correlated. The scores on the *physical* subscale were significantly and positively correlated with those of the *daily living* subscale ($r = 0.833$, $P < 0.0001$) and the *emotional* subscale ($r = 0.837$, $P = 0.0001$). Similarly, the scores on the *emotional* subscale were significantly and positively correlated with those of the *daily living* subscale ($r = 0.848$, $P = 0.0001$). Hence, the 3 scales were considered collectively in the analysis.

Data were analysed using *SPSS*, version 10. Means, standard deviations (SD) and Pearson correlation coefficients were computed. Scores on the overall quality of life scale were transformed using the natural log to achieve normality. Multivariate analysis of variance (MANOVA) was used to test for the main effect of the demographic variables and co-morbidity on the 3 subscales of the quality of life. Full factorial analysis of covariance (ANCOVA) and multivariate analysis of covariance (MANCOVA) were used to identify independent predictors of the quality of life, controlling for demographic variables and existing comorbid conditions. Significance of the results was judged at the 5% level.

Results

A total of 316 patients were enrolled in this study: 59.8% men and 40.2% women. The mean (SD) age was 59.4 (9.2) years; minimum 35, maximum 83 years. Nearly two-thirds of patients (67.8%) were married, 29.7% were widows or widowers, 1.9% were divorced and 0.6% remained single.

The highest proportion (40.2%) of patients had not received any formal education while the others had accomplished basic (12.3%) or high school education (26.6%) and 20.9% were university graduates. Just less than half of the men (47.1%) had professional or semi-professional occupations, 20.7% were skilled or semi-skilled workers, 24.3% were unskilled or manual labourers and 7.9% were drivers or traders. At the time of the study, 64.6% were pensioners. Regarding women, 54.3% were housewives while 45.7% were employed outside the home. Of the latter, 62.1% were still working at the time of the study.

An earlier paper from this study has reported the medical history and pharmaceutical management of the patients [*12*]. The patients had suffered from hypertension for a mean (SD) duration of 10.2 (7.7) years; minimum 0.25, maximum 40.0 years. Just over half the patients (53.2%) had achieved controlled blood pressure and 34.5% suffered hypertension-related complications, the most common being cardiac events (99/109). Co-morbidity was noted in 52.8% patients, mainly diabetes mellitus (104/167), arthritis (31/167) and bronchial asthma (26/167).

In respect to pharmacotherapy, three-quarters of patients (75.0%) were managed by a single drug while the others were receiving a combination of 2 (23.4%) or 3 (1.6%) drugs of different classes. A single morning dose was prescribed for 55.1% of the patients while 44.3% were on a twice daily dose. Only 11 patients (1.9%) reported side-effects of the drugs.

On the Hypertension Health Status Inventory, significantly higher scores in the *physical*, *daily living* and *emotional* domains were observed among married patients ($P = 0.002$), those below the age of 60 years ($P < 0.0001$), the educated ($P < 0.0001$) and those employed at the time of the study ($P < 0.0001$). The scores of men were significantly higher than of women ($P = 0.002$). However, significant differences were observed only in the domain of emotions ($P = 0.019$). The presence of comorbid conditions was associated with significantly lower scores ($P < 0.0001$) in the *physical*, *daily living* and *emotional* domains (Table 1).

Tables 2 and 3 portray the total scores on the Hypertension Health Status Inventory, as well as the scores in the *physical*, *daily living* and *emotional* domains, in relation to medical conditions and drug use

Table 1 **Scores on the quality of life subscales in relation to patients' demographic characteristics and co-morbid conditions**

Characteristic	Mean quality of life subscale scores (SD)			$F_{3,312}$	*P*-value
	Physical	Daily living	Emotional		
Age (years)					
< 60 (***n*** = 151)	18.73 (2.54)	27.17 (4.52)	44.73 (9.40)	10.137	
≥ 60 (***n*** = 165)	16.67 (3.61)	24.24 (5.59)	39.53 (11.49)		***P*** < 0.0001
	P < 0.0001	***P*** < 0.0001	***P*** < 0.0001		
Sex					
Men (***n*** = 189)	17.44 (3.56)	25.72 (5.44)	42.64 (11.28)	5.011	
Women (***n*** = 127)	17.20 (3.26)	24.42 (5.37)	39.12 (10.55)		***P*** = 0.002
	P = 0.693	***P*** = 0.053	***P*** = 0.019		
Marital status					
Married (***n*** = 214)	17.79 (3.41)	25.96 (5.33)	42.98 (10.85)	4.953	
Single[a] (***n*** = 102)	16.42 (3.32)	23.59 (5.35)	37.54 (10.81)		***P*** = 0.002
	P = 0.002	***P*** = 0.001	***P*** < 0.0001		
Education					
Educated[b] (***n*** = 189)	18.11 (3.31)	26.09 (5.06)	43.46 (10.32)	8.335	
Uneducated (***n*** = 127)	16.21 (3.32)	23.86 (5.71)	37.91 (11.46)		***P*** < 0.0001
	P < 0.0001	***P*** < 0.0001	***P*** < 0.0001		
Employment					
Employed (***n*** = 103)	18.73 (2.54)	27.17 (4.52)	44.73 (9.40)	9.709	
Unemployed (***n*** = 213)	16.67 (3.61)	24.24 (5.59)	39.53 (11.49)		***P*** < 0.0001
	P < 0.0001	***P*** < 0.0001	***P*** < 0.0001		
Co-morbidity					
Absent (***n*** = 149)	18.32 (3.28)	26.86 (4.96)	44.46 (10.49)	9.015	
Present (***n*** = 167)	16.49 (3.35)	23.72 (5.44)	38.34 (10.89)		***P*** < 0.0001
	P < 0.0001	***P*** < 0.0001	***P*** < 0.0001		

[a]Single includes never married, divorced, widows and widowers.
[b]Educated includes primary, preparatory, secondary, university and higher.
n ***= number of respondents.***
SD = standard deviation.

after controlling for patients' demographic characteristics and co-morbidity. Significantly higher scores on the Hypertension Health Status Inventory and in the 3 domains of the quality of life were observed among patients who endured hypertension for less than 10 years, those who were free from hypertension-related complications as well as those who achieved blood pressure control. In respect to drug factors, patients who reported drug side-effects had significantly lower scores on the Hypertension Health Status Inventory ($P = 0.005$). These patients had significantly lower scores in the *physical* ($P = 0.008$) and *emotional* ($P = 0.001$) domains but not in the domain of *daily living* ($P = 0.063$). Significantly higher scores were associated with single dose frequency ($P = 0.046$) while no significant difference was observed when comparing patients' scores in the 3 domains. On the other hand, no significant

Table 2 **Multivariate analysis of covariance for the medical condition and drug factors in relation to the scores on the overall quality of life**

Medical condition/ drug factor	Mean quality of life scores (SD)	*F*	*P*-value
Duration of hypertension (years)			
< 10 (***n*** = 159)	88.43 (17.95)	12.631	***P*** < 0.0001
≥ 10 (***n*** = 157)	79.06 (19.01)		
Complications			
Absent (***n*** = 207)	89.84 (16.86)	45.539	***P*** < 0.0001
Present (***n*** = 109)	72.27 (17.64)		
Blood pressure			
Controlled (***n*** = 168)	88.07 (18.30)	18.748	
Uncontrolled (***n*** = 148)	78.91 (18.76)		***P*** < 0.0001
Number of drugs			
1 (***n*** = 237)	84.78 (19.04)	2.830	
> 1 (***n*** = 79)	80.74 (18.86)		***P*** = 0.094
Dose frequency per day			
1 (***n*** = 174)	86.21 (18.31)	4.037	
> 1 (***n*** = 142)	80.79 (19.56)		***P*** = 0.046
Drug side-effects			
Absent (***n*** = 305)	84.43 (18.61)	7.930	***P*** = 0.005
Present (***n*** = 11)	65.54 (6.89)		

n ***= number of respondents.***
SD = standard deviation.

difference was observed in relation to the number of antihypertensive drugs received.

Considering patients' medical condition as well as drug factors, after controlling for demographic characteristics and co-morbid conditions, the full factorial analysis of covariance (Table 4) identified achieving blood pressure control, absence of complications and absence of drug side-effects as independent predictors of higher scores on the Hypertension Health Status Inventory. These factors explained 30.2% of the variability in patients' score on the quality of life scale. Regarding the scale's domains (Table 5), the full factorial multivariate analysis of variance revealed the same independent predictors. However, absence of drug side-effects independently predicted higher scores in the *physical* (P = 0.009) and *emotional* (P = 0.001) domains but not in the domain of *daily living* (P = 0.088). This model explained 31.6% of the variation of the scores in the *physical* domain, 29.9% in the *daily living* domain and 25.2% in the *emotional* domain.

Discussion

Improving the quality of life of the population will become an increasingly important goal for health professionals, supplanting

Table 3 **Multivariate analysis of covariance for the medical condition and drug factors in relation to the 3 quality of life subscales**

Medical condition/drug factor	Mean quality of life subscale scores (SD) Physical	Daily living	Emotional	$F_{3,270}$	*P*-value
Duration of hypertension (years)					
< 10 (***n*** = 159)	18.29 (3.08)	26.54 (5.06)	43.59 (10.66)	5.642	***P*** = 0.001
≥ 10 (***n*** = 157)	16.38 (3.52)	23.83 (5.49)	38.83 (11.09)		
	P < 0.0001	***P*** = 0.001	***P*** = 0.003		
Complications					
Absent (***n*** = 207)	18.47 (3.01)	27.06 (4.72)	44.30 (10.06)	19.998	***P*** < 0.0001
Present (***n*** = 109)	15.21 (3.19)	21.67 (4.97)	35.38 (10.70)		
	P < 0.0001	***P*** < 0.0001	***P*** < 0.0001		
Blood pressure					
Controlled (***n*** = 168)	17.97 (3.29)	26.36 (5.13)	43.73 (10.74)	6.817	
Uncontrolled (***n*** = 148)	16.63 (3.46)	23.89 (5.50)	38.38 (10.88)		***P*** < 0.0001
	P = 0.001	***P*** < 0.0001	***P*** < 0.0001		
Number of drugs					
1 (***n*** = 237)	17.52 (3.42)	25.56 (5.39)	41.69 (11.04)	1.949	***P*** = 0.122
> 1 (***n*** = 79)	16.81 (3.44)	24.10 (5.46)	39.83 (11.29)		
Dose frequency per day					
1 (***n*** = 174)	17.71 (3.28)	25.83 (5.20)	42.67 (10.53)	1.504	
> 1 (***n*** = 142)	16.91 (3.58)	24.42 (5.64)	39.46 (11.53)		***P*** = 0.214
Drug side-effects					
Absent (***n*** = 305)	17.48 (3.39)	25.40 (5.36)	41.74 (10.82)	4.297	
Present (***n*** = 11)	14.81 (3.33)	21.37 (5.69)	31.50 (12.34)		***P*** = 0.006
	P = 0.008	***P*** = 0.063	***P*** = 0.001		

n ***= number of respondents.***
SD = standard deviation.

Table 4 **Independent predictors of overall quality of life**

Independent predictor	*F*	*P*-value
Absence of complications	38.086	***P*** < 0.0001
Controlled blood pressure	15.513	***P*** < 0.0001
Absence of drug side-effects	7.782	***P*** = 0.006
Model R^2	0.409	
Adjusted R^2	0.302	

the current medical and social objectives [*1*]. On the community and individual levels, quality of life can be affected by health status [*13*] and socioeconomic indicators [*1,13*]. It has been emphasized that low quality of life is related to poverty, non-completion of high school and unemployment [*1,* Irvine SH, unpublished report]. This agrees with our study where better quality of life in all domains was observed among hypertensive patients who were

Table 5 **Independent predictors of the 3 quality of life domains**

Independent predictor	Quality of life domains			$F_{3,265}$	*P*-value
	Physical	Daily living	Emotional		
Absence of complications	$P < 0.0001$	$P < 0.0001$	$P < 0.0001$	15.700	$P < 0.0001$
Controlled blood pressure	$P = 0.005$	$P < 0.0001$	$P < 0.0001$	5.708	$P = 0.001$
Absence of drug side-effects	$P = 0.009$	$P = 0.088$	$P = 0.001$	4.206	$P = 0.006$
Model R^2	0.420	0.405	0.366		
Adjusted R^2	0.316	0.299	0.252		

better educated and those who were employed at the time of the study. The favourable effect of social stability was demonstrated by the significantly higher quality of life for patients who were married. This study and a previous one [Irvine SH, unpublished report] have demonstrated an age and sex variation in the quality of life of hypertensive patients. Better quality of life overall was observed among men and those in the younger age group, and men scored significantly higher in the emotional contribution of the perception of illness suggesting that men tolerate chronic illness without being emotionally affected to the same extent as women.

Stewart et al. in their study on the quality of life of patients with chronic disorders indicated that patients with multiple ailments showed greater decrements in functioning and well-being than those with only one condition [*4*]. Hypertensive patients are no exception to this finding as co-morbidity was associated with a deterioration of the quality of life in all domains. Each additional ailment exerts its toll on a patient's physical condition, limiting his/her day-to-day activities with considerable repercussions on emotional status. Co-morbid conditions were encountered among more than half of our patients, and this precluded any attempt to exclude those with more than one chronic health problem. A similar problem confronted Stewart et al. who highlighted the importance of considering the primary diagnosis along with any co-morbid condition in controlling for differences in patient case-mix in studies of quality of life [*4*].

Identifying aspects of hypertension that contribute to a better quality of life requires that the effects of demographic factors and existing co-morbidity are removed from the analysis. In this study, after controlling for these factors, longer duration of the original illness was associated with a significant reduction in quality of life. This was also reported by Robbins et al. who observed that the duration of hypertension is inversely proportional to the dimension of general well-being among women [*8*]. However, the effect of duration of hypertension was eliminated from the model when other parameters were considered. Our study as well as previous ones [*2,8,* Irvine SH, unpublished report] demonstrated the impact of achieving controlled blood pressure on the quality of life of hypertensive patients. Indeed, blood pressure control independently predicted a better quality of life in all domains. A mutual interaction between blood pressure control and quality of life has been postulated. Uncontrolled blood

pressure alters hypertensive patients' quality of life through anxiety and depressive reactions, and poor quality of life hampers blood pressure control even with a therapeutic regimen [*2*]. To prevent patients from being trapped in this vicious circle, it is important to consider dimensions of the quality of life along with pharmacological compliance in achieving blood pressure control, as among this group of patients controlled blood pressure was achieved with at least 90% pharmacological compliance [*12*]. Besides its direct effect on quality of life, achieving and maintaining blood pressure control minimizes complications resulting from target organ damage with subsequent beneficial effects [*14*]. In our study, the presence of complications of hypertension independently predicted lower quality of life in all domains.

Clinical trials often aim to identify the superiority of one antihypertensive drug over another in controlling blood pressure without impairing quality of life [*9,10*]. The nature of our study design did not allow the investigation of the effect of different therapeutic agents on quality of life. However, neither the number of prescribed antihypertensive drugs nor the dose frequency had any influence on patients' quality of life. McInnes [*15*] suggested that aggressive treatment with a combination of antihypertensives does not necessarily impair quality of life but a large body of literature has documented the role of drug side-effects [*3,9,10,16–18*]. The present study revealed the unfavourable consequences of hypertensive drug side-effects on quality of life, particularly in the *physical* and *emotional* domains. It is therefore essential for clinicians to select the drug best tolerated by individual patients to balance bio-physiological needs with quality of life.

Predictors identified by this study explained only a small proportion (25%–30%) of the variation in the quality of life of hypertensive patients. This could be attributed to the fact that the precise elements contributing to the quality of life vary substantially in different individuals. Other factors could have influenced the quality of life of these patients, such as: the quality and quantity of social support [*1,19*], stressful events recently encountered [*19*] and patients' quality of life before the start of therapy [*20*]. However, our study points to the importance of achieving blood pressure control and minimizing the occurrence of complications to ensure better quality of life for hypertensive patients. In this respect it is important to select the antihypertensive drug that is the best tolerated by an individual patient in order to achieve the most successful patient outcome.

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