



UFRGS
UNIVERSIDADE FEDERAL
DO RIO GRANDE DO SUL



Faculdade de Medicina

FACULDADE DE MEDICINA
PROGRAMA DE PÓS-GRADUAÇÃO EM CIÊNCIAS DA SAÚDE: CARDIOLOGIA
E CIÊNCIAS CARDIOVASCULARES

TESE DE DOUTORADO

QUALIDADE DE VIDA E HIPERTENSÃO ARTERIAL SISTÊMICA: ESTUDO DE
BASE POPULACIONAL NA CIDADE DE PORTO ALEGRE (RS).

Daiison José Trevisol

Orientador: Prof. Dr. Flávio Danni Fuchs
Co-orientadora: Prof^a. Dr^a. Leila Beltrami Moreira

PORTO ALEGRE, 2010

DAISSON JOSÉ TREVISOL

**QUALIDADE DE VIDA E HIPERTENSÃO ARTERIAL SISTÊMICA: ESTUDO DE
BASE POPULACIONAL NA CIDADE DE PORTO ALEGRE (RS).**

Tese de doutorado em Ciências da
Saúde: Cardiologia e Ciências
Cardiovasculares para obtenção do título
de doutor em Ciências da Saúde.
Universidade Federal do Rio Grande do
Sul, Faculdade de Medicina.

Orientador: Prof. Dr. Flávio Danni Fuchs
Co-orientadora: Prof^a.Dr^a Leila Beltrami Moreira

PORTO ALEGRE, 2010

AGRADECIMENTOS

A realização de nossos sonhos depende da dedicação, do esforço, de abrir mão de situações prioritárias em nossas vidas na busca pelo sucesso. Como dizia o poeta, “sonho que se sonha só, é só um sonho, mas sonho que se sonha junto é realidade”.

A conquista deste sonho não seria possível sem o apoio irrestrito e incondicional de diversas pessoas.

A Universidade do Sul de Santa Catarina – UNISUL, que me apoiou irrestritamente na realização deste sonho. Especialmente os professores Ailton Nazareno Soares, Sebastião Salésio Herdt, Sônia Probst, Valter Alves Schmitz Neto e Milene Pacheco Kindermann. Espero poder retribuir com trabalho de excelente qualidade.

Ao Dr. Flávio Danni Fuchs e a Dra. Leila Beltrami Moreira, meus orientadores, que me conduziram de forma exemplar, com paciência, com tranquilidade, com rapidez nas respostas e, principalmente, com muita qualidade nas orientações. Agradeço pela disposição em me orientar, auxiliando muito em minha formação acadêmica.

À Dra. Sandra Fuchs que abriu as portas do Cardiolab para que eu pudesse realizar as atividades da pesquisa com qualidade, e pelo importante apoio na análise dos dados.

Ao Dr. Wilson Schuelter pelas correções e traduções dos artigos para o inglês.

A Universidade Federal do Rio Grande do Sul – UFRGS, especialmente ao Dr. Luis Eduardo Rohde coordenador do Programa de Pós Graduação em Ciências da Saúde Cardiologia e Ciências Cardiovasculares.

À Sirlei Ferreira, secretária do curso, pelo apoio irrestrito na coordenação do curso.

À Flávia Ghizoni pelo apoio incondicional nas atividades do Cardiolab.

À Alessandra Kerkoff pelo auxílio na revisão sistemática e metanálise realizada.

Aos colegas de trabalho, especialmente ao Ivan Corrêa Lima e a Dra. Maria Zélia Baldessar que, na minha ausência, resolveram todos os problemas relacionados a minha atividade administrativa.

À Dra. Lenita Wannmacher, pessoa fantástica que entrou em nossas vidas e que tem contribuído muito para o meu crescimento profissional e pessoal. Obrigado pela hospitalidade, amizade e confiança. Serei eternamente grato.

Aos meus familiares o agradecimento mais especial. A minha mãe Mercilde, obrigado por toda dedicação, por estarmos juntos nos momentos difíceis que passamos, pelo suporte financeiro e psicológico nos momentos mais delicados e pela confiança de que um dia o sonho se realizaria. Nunca irei decepcioná-la.

Aos meus irmãos Deise e Diogo, por partilharem bons e maus momentos comigo, provando que, irmãos são para essas coisas.

Ao meu pai Eitor, que, apesar de distante, auxiliou na formação do meu caráter.

Ao Dr. Wilson Schuelter, que, desde que cheguei a Tubarão, tem sido um pai, sogro e amigo, além de um excelente avô para a Beatriz.

À Inês Secco Schuelter que, além fazer o papel de mãe substituta, com muito carinho e amizade, tem dado o suporte necessário para a Beatriz, substituindo a mim e à Fabiana durante estes longos anos de estudo.

O apoio de todos os citados acima foi muito importante para mim, porém, sem o apoio da Fabiana eu não teria conseguido. Esposa, amiga, colega e fundamentalmente válvula de escape para os momentos de tristeza, desânimo e nervosismo. Obrigado pelo suporte emocional, pelo amor e carinho e pela dedicação com os nossos filhos.

À Fabiana, à Beatriz, que é a minha princesa, e ao bebê que está por vir (Vinícius ou Letícia), vocês são a razão da minha existência. Nada seria sem vocês e não teria sentido seguir adiante.

Obrigado!

SUMÁRIO

INTRODUÇÃO.....	6
REVISÃO DA LITERATURA.....	8
EPIDEMIOLOGIA DAS DOENÇAS CARDIOVASCULARES.....	8
QUALIDADE DE VIDA RELACIONADA À SAÚDE.....	9
COMO A QUALIDADE DE VIDA É AFETADA PELA HIPERTENSÃO.....	10
INSTRUMENTOS PARA MEDIR QUALIDADE DE VIDA.....	12
TIPOS DE INSTRUMENTOS.....	13
JUSTIFICATIVA.....	15
OBJETIVOS.....	16
CONSIDERAÇÕES FINAIS.....	17
REFERÊNCIAS.....	19
ARTIGO 1.....	22
ARTIGO 2.....	49
ARTIGO 3.....	71

INTRODUÇÃO

Alterações nas características demográficas, nutricionais e epidemiológicas ocorridas nos últimos tempos têm determinado aumento na incidência de doenças crônicas como hipertensão e diabetes que, além de elevar o risco de morte, tendem a afetar a qualidade de vida, reduzindo os anos de vida saudável e produtiva. A qualidade de vida relacionada à saúde é um tema atual, de interesse da saúde pública e que vem sendo considerado pela Organização Mundial da Saúde como um fator importante no processo de envelhecimento da população.

A avaliação da qualidade de vida relacionada à saúde dos indivíduos tem como principal objetivo identificar os fatores interferentes visando a minimizá-los. Em hipertensos, apesar de estudos apresentarem menor qualidade de vida quando comparados com indivíduos saudáveis, estes fatores não são claramente definidos. Nesse sentido, este estudo foi proposto para avaliar a qualidade de vida relacionada à saúde dos indivíduos com hipertensão arterial sistêmica na cidade de Porto Alegre (RS), com intuito de verificar se a qualidade de vida dos hipertensos é pior que a dos normotensos e de identificar possíveis fatores que interferem na qualidade de vida dos hipertensos.

Ao longo desta tese, faz-se a revisão breve de aspectos epidemiológicos relacionados à hipertensão arterial sistêmica, conceituação de qualidade de vida e caracterização dos principais instrumentos para avaliação de qualidade de vida. A revisão da literatura sobre qualidade de vida relacionada à saúde em hipertensos é apresentada na forma de artigo de revisão sistemática com metanálise. Na sequência, encontra-se o artigo principal, com os resultados da pesquisa realizada. A tese é finalizada com artigo que compara os dados obtidos para a população de Porto Alegre com os hipertensos, através do escore normalizado, calculado no *NBS*

Calculator, disponibilizado *online* na página do programa oficial SF-12 com o objetivo de melhor explorar as diferenças na qualidade de vida relacionada à saúde dos hipertensos.

REVISÃO DA LITERATURA

EPIDEMIOLOGIA DAS DOENÇAS CARDIOVASCULARES

Nos países desenvolvidos há um crescente aumento nas mortes por doenças cardiovasculares (DCV). Estas contribuem com 30% no número de mortes em todo o mundo e em 10% dos anos de vida saudáveis perdidos¹. Na década de 1970, as DCV eram responsáveis por 25% das mortes na América Latina². No Brasil, país no qual a transição epidemiológica é notória, a DCV é a principal causa de morte³.

O aumento desta incidência, principalmente nos países em desenvolvimento, se deve a fatores como o aumento da expectativa de vida, a diminuição ou controle de doenças infecto-parasitárias e o aumento do poder socioeconômico, propiciando mudança no estilo de vida para pior em relação aos fatores patogênicos da doença⁴. Aproximadamente 75% dos casos novos de doença cardiovascular ocorridos nos países desenvolvidos, nas décadas de 1970 e 1980, poderiam ser explicados por dieta e atividade física inadequadas, níveis lipídicos desfavoráveis, obesidade, elevação da pressão arterial e fumo, ressaltando a importância do reconhecimento de tais fatores para uma conduta individual mais adequada, seja retardando a sua progressão, seja promovendo a sua regressão⁵.

Entre os fatores de risco para DCV, a hipertensão arterial ocupa posição destacada pela alta prevalência em praticamente todos os países⁶. Dados de prevalência de HAS no Rio Grande do Sul mostram tendência à elevação^{4, 7, 8}. Em Porto Alegre, a incidência de novos casos de hipertensão é de 39/1000 pessoas-ano e eleva-se para 59/1000 pessoas-ano entre pré-hipertensos, indicando que 80% deles tornar-se-ão hipertensos em 10 anos⁹.

Apesar de ser uma das principais causas de complicações cardiovasculares, encefálicas, coronarianas, renais e vasculares periféricas, a taxa de controle da hipertensão arterial sistêmica é insatisfatória. Além de haver indivíduos que não têm ciência de serem hipertensos, muitos dos que sabem não tratam do problema adequadamente^{10, 11}. Segundo Lewington, em indivíduos hipertensos entre 40 e 89 anos de idade, a cada 20 mmHg da pressão arterial sistólica, ou 10 mmHg da diastólica, aumenta em duas vezes o risco de morte por infarto ou doença cardíaca isquêmica se comparados a indivíduos normotensos.¹²

Dados do Ministério da Saúde do Brasil indicam que aproximadamente 40% dos acidentes vasculares encefálicos e 25% dos infartos do miocárdio que acometem pacientes hipertensos poderiam ser evitados com o diagnóstico precoce e o tratamento anti-hipertensivo adequado¹¹. Medidas não farmacológicas, como mudança nos hábitos de vida, devem ser implementadas com intuito de reduzir ou controlar os níveis tensionais. Dentre as mudanças que devem ocorrer estão a redução do peso corporal, dieta hipossódica e balanceada, redução na ingestão de bebidas alcoólicas, aumento no consumo de frutas e verduras, e realização de atividades físicas por, pelo menos, 50 minutos três vezes por semana. O sucesso do tratamento não farmacológico, além de reduzir o risco cardiovascular, tende a reduzir o número de fármacos a serem utilizados pelos hipertensos e, por consequência, tendem a reduzir as reações adversas aos medicamentos que podem comprometer a qualidade de vida.

QUALIDADE DE VIDA RELACIONADA À SAÚDE

A Organização Mundial de Saúde define saúde não apenas como a ausência de afecções ou doenças, mas como estado completo de bem-estar físico, mental e

social. A ausência ou presença do estado de bem-estar pode, inclusive, ser associada a aspectos políticos, sociais e econômicos¹³. O interesse atual em avaliar a qualidade de vida relacionada à saúde tem origem tanto na preocupação com o processo de atenção sanitária como na vontade de verificar e controlar os resultados da atenção ou intervenções realizadas.

Segundo Williams, qualidade de vida relacionada à saúde (QVRS) é o valor atribuído à duração da vida quando modificada pela percepção de limitações físicas, psicológicas, funções sociais e oportunidades que implicam a relação harmoniosa dos vários fatores do cotidiano do ser humano. Abrange fatores de natureza biológica, psicológica e sociocultural, tais como: estilo de vida, saúde física, saúde mental, longevidade, satisfação no trabalho, relações familiares, disposição, produtividade, dignidade e até mesmo espiritualidade¹⁴.

COMO A QUALIDADE DE VIDA É AFETADA PELA HIPERTENSÃO

A redução da qualidade de vida de pacientes hipertensos pode ser comparada à de pacientes diabéticos, sendo sobrepujada apenas pela detectada em pacientes com depressão, ansiedade ou problemas emocionais¹⁵.

Estudos demonstram que indivíduos hipertensos sintomáticos apresentam pior qualidade de vida quando comparados aos assintomáticos^{16, 17}. A justificativa de pior qualidade de vida destes indivíduos pode estar relacionada ao fato de se sentirem doentes, de tomarem medicamentos que tendem a causar reações adversas, do estresse de ter que fazer dieta, exercícios e privar-se de determinadas vontades, além de possíveis complicações, tais como acidente vascular cerebral ou infarto¹⁶⁻²⁰. Em indivíduos que não têm ciência de serem hipertensos, a qualidade de vida tende a ser melhor, podendo estar associada ao fato de os indivíduos não se sentirem doentes, não se preocuparem com mudanças no estilo de vida ou com as

possíveis reações adversas aos medicamentos^{21, 22}. Porém, indivíduos assintomáticos ou que não têm ciência de serem hipertensos, geralmente não controlam os níveis tensionais, aumentando o risco de morte ou de desenvolver doenças cardiovasculares²³.

Um estudo avaliando a qualidade de vida em 8.303 americanos identificou que a hipertensão aumentava o risco em 73% de apresentar saúde pobre ou razoável versus indivíduos sem hipertensão²¹. Ter hipertensão e estar ciente dela estava associado à menor qualidade de vida, assim como o uso de medicamentos anti-hipertensivos apresentou relação direta com o número de dias não saudáveis, independentemente dos níveis pressóricos. Os autores sugerem que novos estudos devem investigar essas associações, levando em consideração o gênero, a etnia e a gravidade da HAS. Embora os resultados sejam expressivos, não foi avaliado o impacto nos componentes físicos e mentais da qualidade de vida desses fatores¹⁴. Independentemente do mecanismo, o fato de estar ciente de ser hipertenso tem sido relacionado à perda de qualidade de vida; todavia, não foi observada diferença entre hipertensos controlados e não-controlados²¹. Pelo fato de HAS ser doença assintomática, pode ser vista como curável ou sem gravidade, o que interfere no seguimento do tratamento e controle da hipertensão arterial²⁰. Em pacientes hipertensos, essas relações não estão descritas em contexto populacional e amostras representativas.

Paralelamente à redução sustentada dos níveis pressóricos, os medicamentos anti-hipertensivos podem produzir efeitos adversos que interferem na qualidade de vida e na percepção geral das condições de saúde. Estudo realizado no Hospital de Clínicas de Porto Alegre demonstrou que os eventos adversos causados pelo uso de um ou mais anti-hipertensivos reduzem a adesão ao tratamento⁸. No Brasil, estima-

se que 16,8 milhões (aproximadamente 35% da população) de indivíduos, com 40 anos ou mais, sejam portadores de hipertensão²⁴. Desse total, cerca de 7,7 milhões estão cadastrados no SUS e recebem medicamentos gratuitamente, através de programas de atenção primária à saúde²⁵, constituindo a população-alvo para aplicação dos resultados desta pesquisa.

INSTRUMENTOS PARA MEDIR QUALIDADE DE VIDA

Essencialmente, os questionários que avaliam a qualidade de vida seguem estrutura de perguntas similares, levando em conta vários domínios específicos para avaliação física, mental e social que podem avaliar um determinado ponto no tempo ou a mudança que poderá acontecer a partir de uma intervenção, ou mesmo mudança de atitude.

A aplicação destes questionários pode ser realizada através de entrevistas, respostas por telefone, autoaplicáveis e respondidos por outra pessoa quando não é possível obter a resposta do entrevistado. Esta última situação pode dificultar a avaliação da qualidade de vida, pois ela se baseia na autopercepção do indivíduo em relação a sua saúde²⁶.

Os componentes de um questionário devem ser claros, ter formato simples, ser de fácil aplicação e compreensão e ter tempo de administração apropriado. Além disso, precisam ser adaptados e validados conforme as características culturais e uso do idioma da população a ser estudada.

A interpretação dos resultados dos questionários depende de escores categorizados como pior ou melhor qualidade de vida.

TIPOS DE INSTRUMENTOS

Estudo realizado em 1998 identificou 446 instrumentos utilizados para avaliação da qualidade de vida, sendo que 322 apareceram na literatura a partir de 1980, demonstrando acentuado crescimento nos esforços voltados para o amadurecimento conceitual e metodológico do uso do termo na linguagem científica²⁷.

Dentre os mais utilizados estão o “*The World Health Organization Quality of Life Assessment*” (WHOQOL) e o SF-36[®] *Health Survey* ou a versão reduzida chamada SF-12[®].

O instrumento “*The World Health Organization Quality of Life Assessment*” (WHOQOL), desenvolvido pela Organização Mundial de Saúde, é composto por 100 itens e considera o conceito de qualidade de vida subjetivo, multidimensional, incluindo facetas positivas, como mobilidade, desempenho de papel, contentamento, e negativas, como fadiga, dor, dependência de medicação e sentimentos negativos²⁸.

A abordagem proposta pelo WHOQOL apresenta 6 domínios: psicológico, físico, nível de independência, relações sociais, ambiente, espiritualidade/ religião/ crenças pessoais. Cada domínio é sintetizado por vários subdomínios que são avaliados por quatro questões. Assim, o instrumento é composto por 24 subdomínios específicos e um domínio geral que inclui questões de avaliação global de qualidade de vida. A versão em português foi traduzida e validada por pesquisadores da Universidade Federal do Rio Grande do Sul^{29, 30} para avaliar qualidade de vida numa perspectiva transcultural.

O SF-36 é um instrumento genérico de avaliação de qualidade de vida, multidimensional, formado por 36 itens de avaliação englobados em 2 componentes divididos em 8 escalas: Componente Físico (PCS), que engloba capacidade funcional, aspectos físicos, dor e estado geral de saúde e Componente Mental (MCS), referindo-se à saúde mental, aspectos emocionais, aspectos sociais e vitalidade. Apresenta escore final numa escala de 0 a 100, no qual zero corresponde ao pior estado geral de saúde e 100, ao melhor estado de saúde³¹⁻³³. O SF-36 foi adaptado e validado para a língua portuguesa em estudo aplicado a pacientes portadores de artrite reumatóide^{34, 35}.

O SF-12[®] Health Survey é uma versão reduzida, traduzida e validada para o português, a partir do SF-36[®]³⁵. É um instrumento genérico de avaliação de qualidade de vida relacionada à saúde, multidimensional, formado por 12 itens, englobados em 8 escalas ou componentes: (1) Físico, englobando capacidade funcional, aspectos físicos, dor e estado geral de saúde e (2) Mental, referindo-se à saúde mental, aspectos emocionais, aspectos sociais e vitalidade. Apresenta um escore final numa escala de 0 a 100, no qual zero corresponde ao pior estado geral de saúde e 100 ao melhor estado de saúde^{32, 33, 36}.

O SF-12 apresenta um desempenho semelhante ao SF-36 na avaliação da qualidade de vida relacionada à saúde, sendo um dos principais questionários genéricos existentes e utilizados. O instrumento está amplamente documentado na literatura, tanto nas versões originais em inglês, quanto nas 30 diferentes versões em outras línguas já validadas³⁴.

Além dos instrumentos genéricos, existem vários instrumentos específicos para avaliar QOL em determinadas condições de saúde. Para pacientes hipertensos,

apenas o *Cuestionario de calidad de vida em Hipertensión Arterial – CHAL* foi validado até o momento³⁷.

O CHAL é um instrumento espanhol composto de 55 itens, agrupados em duas dimensões: (1) Estado Mental, constituído por 36 itens, e (2) Manifestações Somáticas, constituídas por 19 itens, com marco temporal de referência de 15 dias. Atualmente a forma reduzida deste instrumento chamada MINICHAL foi traduzida, adaptada e validada para o português e contém 16 questões de múltipla escolha, organizadas em Estado Mental (10 questões), Manifestações Somáticas (6 questões), e uma questão para verificar como a hipertensão e o seu tratamento têm influenciado na qualidade de vida do paciente^{37, 38}.

JUSTIFICATIVA

A qualidade de vida tem se tornado tema frequente em artigos científicos publicados na última década. A qualidade de vida em hipertensos tem sido abordada em ensaios clínicos de comparações entre diferentes grupos farmacológicos ou entre medicamento anti-hipertensivo e placebo. Porém, o número de publicações que comparam hipertensos e normotensos em estudos de base populacional é relativamente baixo e não abordam os domínios específicos da qualidade de vida. Dada a importância da hipertensão arterial como fator de risco para morbimortalidade, sua alta prevalência e dificuldade de controle, o conhecimento detalhado dos aspectos da qualidade de vida mais afetados pela hipertensão arterial poderá orientar ações que melhorem a adesão ao tratamento e, conseqüentemente, o controle da hipertensão.

OBJETIVOS

OBJETIVO GERAL

Avaliar a qualidade de vida relacionada à saúde em indivíduos hipertensos, participantes do estudo SOFT (Síndrome de Obesidade e Fatores de Risco para Doença Cardiovascular), conduzido com amostra representativa da cidade de Porto Alegre (RS).

OBJETIVOS ESPECÍFICOS

1. Avaliar na população adulta de Porto Alegre:
 - a) A associação entre qualidade de vida relacionada à saúde e hipertensão arterial sistêmica.
 - b) A associação dos componentes físico e mental da qualidade de vida com hipertensão arterial sistêmica.
 - c) A associação dos domínios da qualidade de vida com hipertensão arterial sistêmica.
2. Comparar os escores de qualidade de vida entre normotensos, hipertensos com pressão arterial controlada e hipertensos com pressão arterial não controlada.
3. Avaliar os domínios de qualidade de vida que mais impactam a qualidade de vida dos hipertensos comparados aos normotensos.

CONSIDERAÇÕES FINAIS

A avaliação da qualidade de vida relacionada à saúde, apesar de recente, tem contribuído com os profissionais da área no intuito de, além de melhorar a qualidade de vida, auxiliar no controle, intervir no tratamento e reduzir a morbimortalidade dos indivíduos.

A validação de questionários genéricos ou específicos permitiu mensurar e comparar diferentes populações. Além disso, o SF-12 permitiu definir o domínio que mais impacta a qualidade de vida de hipertensos, quando comparados a normotensos.

Uma das hipóteses iniciais era a de que o maior vilão da qualidade de vida relacionada à saúde de hipertensos fosse o tratamento medicamentoso e suas reações adversas. Porém, verificou-se que no componente físico há apenas uma tendência de que quanto maior o número de anti-hipertensivos ingeridos, menor a qualidade de vida. No componente mental, as diferenças entre hipertensos e normotensos não foram significativas.

Na comparação dos escores normalizados da população com os escores dos hipertensos, chama atenção a diferença nos domínios de dor e vitalidade, a favor dos hipertensos. Este achado indica a necessidade de mais pesquisas para melhor entender a relação da hipertensão arterial sistêmica e do seu tratamento com a qualidade de vida das pessoas.

Os resultados finais sugerem que a associação entre hipertensão arterial tratada com menor qualidade de vida pode ser atribuída ao fato de estar ciente da doença, a mudança no estilo de vida ou os efeitos adversos dos anti-hipertensivos. Cabe ressaltar que lesões de órgão-alvo, em geral, diminuem a qualidade de vida pela doença, e não por causa da pressão arterial elevada.

Em conclusão, os indivíduos com hipertensão têm menor qualidade de vida do que indivíduos normotensos, principalmente quando a pressão arterial é controlada por tratamento medicamentoso. Considerando o impacto negativo da hipertensão particularmente no domínio de funcionalidade física, estratégias que melhorem a condição física, orientadas por profissionais especializados, poderiam contribuir para melhorar a qualidade de vida e, talvez, melhorar a adesão ao tratamento e controle da hipertensão arterial.

REFERÊNCIAS

1. Anderson JL, Ronnow BS, Horne BD, Carlquist JF, May HT, Bair TL, Jensen KR, Muhlestein JB. Usefulness of a complete blood count-derived risk score to predict incident mortality in patients with suspected cardiovascular disease. *Am J Cardiol.* 2007;99(2):169-174.
2. Murray CJ, Lopez AD. Global mortality, disability, and the contribution of risk factors: Global Burden of Disease Study. *Lancet.* 1997;349(9063):1436-1442.
3. Mansur AP, Favarato D, Souza MF, Avakian SD, Aldrighi JM, Cesar LA, Ramires JA. Trends in death from circulatory diseases in Brazil between 1979 and 1996. *Arq Bras Cardiol.* 2001;76(6):497-510.
4. Gus I, Fischmann A, Medina C. Prevalence of risk factors for coronary artery disease in the Brazilian State of Rio Grande do Sul. *Arq Bras Cardiol.* 2002;78(5):478-490.
5. Kannel WB, Wilson PW. Comparison of risk profiles for cardiovascular events: implications for prevention. *Adv Intern Med.* 1997;42:39-66.
6. Kearney PM, Whelton M, Reynolds K, Whelton PK, He J. Worldwide prevalence of hypertension: a systematic review. *J Hypertens.* 2004;22(1):11-19.
7. Fuchs FD, Moreira LB, Moraes RS, Bredemeier M, Cardozo SC. [Prevalence of systemic arterial hypertension and associated risk factors in the Porto Alegre metropolitan area. Populational-based study]. *Arq Bras Cardiol.* 1994;63(6):473-479.
8. Gus I, Harzheim E, Zaslavsky C, Medina C, Gus M. Prevalence, awareness, and control of systemic arterial hypertension in the state of Rio Grande do Sul. *Arq Bras Cardiol.* 2004;83(5):429-433; 424-428.
9. Moreira LB, Fuchs SC, Wiehe M, Gus M, Moraes RS, Fuchs FD. Incidence of hypertension in Porto Alegre, Brazil: a population-based study. *J Hum Hypertens.* 2008;22(1):48-50.
10. Jones DW, Hall JE. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure and evidence from new hypertension trials. *Hypertension.* 2004;43(1):1-3.
11. BRASIL. Vigitel Brasil 2006: vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico. Brasília: Ministério da Saúde; 2007.
12. Lewington S, Clarke R, Qizilbash N, Peto R, Collins R. Age-specific relevance of usual blood pressure to vascular mortality: a meta-analysis of individual data for one million adults in 61 prospective studies. *Lancet.* 2002;360(9349):1903-1913.
13. WHO. Measuring quality of life. *Division of mental health and prevention of substance abuse.* Available at: http://www.who.int/mental_health/media/68.pdf. Accessed Feb 11, 2010.
14. Williams GH. Assessing patient wellness: new perspectives on quality of life and compliance. *Am J Hypertens.* 1998;11(11 Pt 2):186S-191S.
15. Cook EL, Harman JS. A comparison of health-related quality of life for individuals with mental health disorders and common chronic medical conditions. *Public Health Rep.* 2008;123(1):45-51.

16. Erickson SR, Williams BC, Gruppen LD. Perceived symptoms and health-related quality of life reported by uncomplicated hypertensive patients compared to normal controls. *J Hum Hypertens*. 2001;15(8):539-548.
17. Erickson SR, Williams BC, Gruppen LD. Relationship between symptoms and health-related quality of life in patients treated for hypertension. *Pharmacotherapy*. 2004;24(3):344-350.
18. Baune BT, Aljeesh Y. The association of psychological stress and health related quality of life among patients with stroke and hypertension in Gaza Strip. *Ann Gen Psychiatry*. 2006;5:6.
19. Banegas JR, Guallar-Castillon P, Rodriguez-Artalejo F, Graciani A, Lopez-Garcia E, Ruilope LM. Association between awareness, treatment, and control of hypertension, and quality of life among older adults in Spain. *Am J Hypertens*. 2006;19(7):686-693.
20. Brito DM, Araujo TL, Galvao MT, Moreira TM, Lopes MV. [Quality of life and perception of illness among individuals with high blood pressure]. *Cad Saude Publica*. 2008;24(4):933-940.
21. Mena-Martin FJ, Martin-Escudero JC, Simal-Blanco F, Carretero-Ares JL, Arzua-Mouronte D, Herreros-Fernandez V. Health-related quality of life of subjects with known and unknown hypertension: results from the population-based Ortega study. *J Hypertens*. 2003;21(7):1283-1289.
22. Chambers BA, Guo SS, Siervogel R, Hall G, Chumlea WC. Cumulative effects of cardiovascular disease risk factors on quality of life. *J Nutr Health Aging*. 2002;6(3):179-184.
23. The Framingham Heart Study. Available at: <http://www.framingham.com/heart/backgrnd.htm>. Accessed 11 de Março, 2010.
24. Achutti AC. [Health indicators in Brazil]. *Arq Bras Cardiol*. 2005;85(5):303-304.
25. DATASUS. Available at: <http://www.datasus.gov.br>. Accessed 5 de janeiro, 2010.
26. Guyatt GH, Feeny DH, Patrick DL. Measuring health-related quality of life. *Ann Intern Med*. 1993;118(8):622-629.
27. Costa-Neto SB. *Avaliação da Qualidade de Vida de Portadores de Neoplasias de Cabeça e de Pescoço: o bem-estar, o bem-ser, o bem-ter e o bem-viver*. Brasília, Universidade de Brasília; 2002.
28. Skevington SM. Advancing cross-cultural research on quality of life: observations drawn from the WHOQOL development. World Health Organisation Quality of Life Assessment. *Qual Life Res*. 2002;11(2):135-144.
29. Fleck MP, Louzada S, Xavier M, Chachamovich E, Vieira G, Santos L, Pinzon V. [Application of the Portuguese version of the instrument for the assessment of quality of life of the World Health Organization (WHOQOL-100)]. *Rev Saude Publica*. 1999;33(2):198-205.
30. Fleck MP, Louzada S, Xavier M, Chachamovich E, Vieira G, Santos L, Pinzon V. [Application of the Portuguese version of the abbreviated instrument of quality life WHOQOL-bref]. *Rev Saude Publica*. 2000;34(2):178-183.
31. Fayers P. *Quality of life. Assessment, analysis and interpretation*. 2.ed. ed. Chichester, England: John Wiley & Sons; 2000.
32. Ware JSKM, Gandek B. *SF-36® Health Survey Manual and Interpretation Guide*. New England Medical Center, The Health Institute; 1993.

33. Ware JE, Jr., Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Med Care*. 1992;30(6):473-483.
34. Ferreira PL. [Development of the Portuguese version of MOS SF-36. Part II -- Validation tests]. *Acta Med Port*. 2000;13(3):119-127.
35. Ciconelli RM. *Tradução para o português e validação do questionário genérico de avaliação de qualidade de vida "medical outcomes study 36-item short-form health survey (SF-36)"*. São Paulo, USP; 1997.
36. Ware JE; Kosinski M T-BD, Gandek B. How to Score version 2 of the SF-12® Health Survey (with a Supplement Documenting Version 1). Boston: QualityMetric Incorporated; 2004.
37. Badia X, Roca-Cusachs A, Dalfo A, Gascon G, Abellan J, Lahoz R, Varela C, Velasco O. Validation of the short form of the Spanish Hypertension Quality of Life Questionnaire (MINICHAL). *Clin Ther*. 2002;24(12):2137-2154.
38. Schulz RB, Rossignoli P, Correr CJ, Fernandez-Llimos F, Toni PM. Validation of the short form of the Spanish hypertension quality of life questionnaire (MINICHAL) for Portuguese (Brazil). *Arq Bras Cardiol*. 2008;90(2):127-131.

ARTIGO 1

**HYPERTENSION AND HEALTH-RELATED QUALITY OF LIFE (SF-36): A
SYSTEMATIC REVIEW AND META-ANALYSIS**

Hypertension and health-related quality of life (SF-36): a systematic review and meta-analysis

Hypertension and health-related quality of life

Daisson J Trevisol^{a,b}, Alessandra Kerkhoff^a, Leila B Moreira^a, Sandra C Fuchs^a, Flavio D Fuchs^a

^aPrograma de Pós-graduação em Ciências da Saúde: Cardiologia e Ciências Cardiovasculares; Faculdade de Medicina, Universidade Federal do Rio Grande do Sul. Porto Alegre – Brasil, ^bUniversidade do Sul de Santa Catarina Tubarão - Brasil

Sponsorship: This study was supported by CNPQ, FAPERGS and FIPE-HCPA

Correspondence and requests for reprints to Daisson J Trevisol, Universidade do Sul de Santa Catarina, Unidade Hospitalar de Ensino, Av. José Acácio Moreira, 787, Bairro Dehon, 88704-900, Tubarão, SC – Brasil

Tel: 55-48-36221442; fax: 55-48-36221808

Email: daisson.trevisol@unisul.br

ABSTRACT

OBJECTIVES: Most but not all cross-sectional surveys have identified lower quality of life among patients with hypertension. In this report, we summarized the estimates for this association in a systematic review and in a meta-analysis.

METHODS: We used the Short-Form Health Survey to assess the quality of life among hypertensive and normotensive individuals. Search was conducted in Embase, Medline/Pubmed, Lilacs, Ovid, Science Direct, Scielo, and Cochrane databases using *hypertension* and *quality of life* MeSH terms and the words *health survey*, SF-12, SF-36 and their spelling variations (SF12, SF 12, SF36, SF 36). Electronic search and data extraction were conducted by two researchers. Data were analyzed with MIX 1.7 using random effects model. The results were expressed as differences of mean scores between hypertensive and normotensive individuals.

RESULTS: Despite the variation of methods and sampling criteria, most of the 20 studies selected for the systematic review identified lower quality of life in patients with hypertension. The meta-analysis, which included six studies, identified lower scores in hypertensive patients for the physical (-2.43; CI -4.77 to -0.08) and the mental (-1.68; CI -2.14 to -1.23) components, and for each of the eight domains of the SF-36.

CONCLUSION: Quality of life of individuals with hypertension is worst than in normotensive individuals. Further studies are required to identify if the worst quality of life may ascribed to the awareness about the disease or to the high blood pressure itself.

Keywords

Hypertension, quality of life, systematic review, meta-analysis.

INTRODUCTION

Blood pressure higher than 115/75 mmHg accounts for about a half of the incident cases of coronary heart disease and a third of strokes ^{1, 2}. Although the treatment and control of hypertension reduces morbidity and mortality, the proportion of patients with controlled hypertension is not higher than 20% worldwide ². The low level of control has been related to low adherence to treatment, which could be associated with worsened quality of life and perception of general health conditions, and high prevalence of adverse effects of blood pressure-lowering drugs ^{3, 4}. Several studies have shown lower health-related quality of life (HRQL) in patients with hypertension compared to normotensive subjects ⁵⁻⁷. A multicenter study ⁵, including 24,936 participants, recorded lower HRQL in both mental (MCS) and physical (PCS) SF-36 components for hypertensive compared to normotensive individuals, but the differences were of small magnitude. Another population-based study from Spain, with 466 participants, found no difference in the HRQL components scores ⁸. The discrepancy of findings in some studies may be related to methodological differences, including sampling criteria and use of different tools for measuring quality of life. The SF-36[®] Health Survey ⁹⁻¹¹ or its reduced version SF-12[®] ^{9, 10} are the most widely used instrument for assessing HRQL in individuals with chronic diseases. HRQL is measured by two summarized components - PCS – physical component summary, and MCS – mental component summary, and eight domains of the SF-36, but scores for each domain were scarcely described for hypertensive individuals. In this systematic review and meta-analysis we summarize the evidence about such association, as measured by SF-36 and SF-12, in order to better understand the relationships between HRQL and hypertension.

METHODS

Criteria for article selection

All articles that presented quality of life scores in hypertensive patients in the two summarized components or in the eight domains assessed by the SF-36 or SF-12, published between January 1980 and August 2009, were eligible. Studies assessing HRQL among patients using different classes of blood pressure-lowering drugs or placebo and those which did not use the SF as the instrument for quality of health evaluation were excluded.

Articles selected in the systematic review that presented the scores of the summarized components or domains along with their standard deviation were included in a meta-analysis.

Article search

A systematic literature review was performed by two independent researchers in Embase, Medline/Pubmed, Bireme, Ovid, Science Direct and Scielo databases, with no language restriction. The following MeSH terms were used: Hypertension and quality of life. Short-form Health Survey, SF-12 and SF-36, and their spelling variations (SF12, SF 12, SF36, SF 36) descriptors were also used. The search terms were connected by the AND operator. The first descriptor used was hypertension; the second was quality of life, followed by the above mentioned descriptors.

Article retrieval

The initial analysis was carried out from the article titles identified as potentially eligible for the abstract analysis. The articles, whose abstracts met the inclusion criteria, were retrieved for full for data extraction. Disagreements were solved by consensus.

Data extraction

The process of data extraction was performed using a protocol adapted from the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) ¹², including the study identification data, period of the study conduction, design, inclusion and exclusion criteria, demographic characteristics, quality of life measures, statistical analysis and limitations. Scores were recorded for each summarized component and domain or as a qualitative variable (better/worse) if the numbers were not informed.

Measurement of quality of life

All retrieved studies had to report evaluation of quality of life by the SF-36. The SF-36 is a generic multidimensional instrument for assessing quality of life, consisting of 36 items grouped into two components divided into eight scales: Physical Component (PCS) encompasses physical functioning, role physical, bodily pain, general health, and vitality; and the Mental Component (MCS), which refers to mental health, role emotional, social functioning, and vitality. The final score ranges from 0 to 100, where zero represents the worst overall health status and 100 the best health status ^{10, 11}.

Data analysis

All articles evaluating quality of life in hypertensive individuals through SF were included in the systematic review. Only those articles showing summarized

components or domains score along with standard deviation were included in meta-analysis. The data were summarized in descriptive tables and analysis was performed using SPSS statistical MIX 1.7¹³. Random effects model was used to take heterogeneity between the studies into account. The results were expressed in mean score differences between hypertensive and normotensive individuals.

RESULTS

A total of 278 articles were initially identified, being 58 selected for full-text evaluation and application of data collection protocol. The main reasons to exclude 38 articles were the evaluation of quality of life by another tools and not by the SF (11 studies), the absence of scores of quality of life (6 studies) and the comparison between treatments (21 studies). The characteristics of the 20 cross-sectional studies selected for the current review are presented in Table 1, 2 and 3. Of those, six studies could be included in a meta-analysis following the selection criteria. Figure 1 show the flowchart of article selection.

Blood pressure was measured for high blood pressure identification in 16 studies, and hypertension history was reported by participants in four. All studies but one¹⁴ included men and women.

Description of the studies

Table 1 presented characteristics of health-related quality of life of studies which have reported partial or different scores between 0 and 100 normally used by the SF. Table 2 presented characteristics of cross-sectional studies that assessed quality of life in hypertensive individuals in the eight SF-36 domains and Table 3 presented

quality of life studies that compared normotensive with hypertensive individuals including full assessment of quality of life by the SF-36.

Health-related quality of life scores are presented in tables 1, 2 and 3, being 10 studies results from outpatient samples¹⁴⁻²¹, seven from population samples^{5-8, 22-27} and two from hospital samples^{14, 28-31}. Differences between hypertensive and normotensive individuals were recorded for all the 8 SF domains in five studies, which identified lower scores in participants with hypertension^{5-7, 24, 28}. In three studies differences were found for the most domains^{16, 23, 25}, in three differences were statistically significant only for general health, bodily pain and role physical^{14, 20, 29} and in two studies no difference was found in all domains^{8, 26}. Among three studies that described summarized component, PCS and MCS scores^{5, 8, 16}, differences were found in PCS only in two studies^{5, 16} and in MCS only in one study⁵. One population-based study conducted in Spain, with 3,368 participants over 60 years²⁶, compared HRQL between treated and untreated hypertensive individuals and found no association with pharmacological treatment. A multicenter study⁵, which included some 24,000 participants from eight countries, showed a statistically significant difference, but of small magnitude. Hypertension awareness was associated with lower quality of life in a study carried out in a Spanish community by Mena-Martin⁸. Two studies comparing patients who reported hypertension-related symptoms with asymptomatic patients showed that symptomatic patients had a worse HRQL than asymptomatic patients^{17, 32}.

In a population-based study with 8,303 people, hypertension was associated with increased risk (OR 1.72) of having a worse HRQL, representing 14 or more unhealthy days per month compared to normotensive individuals, which suggests low quality of life²¹.

Meta-analysis of the studies

Six articles that presented scores of quality of life in all domains were included in the meta-analysis^{5-8, 16, 23}. Three of them additionally presented summarized scores of MCS and PCS^{5, 8, 16},

Quality of life was lower both for the mental component score (-1.68; 95% CI -2.14 to -1.23) and the physical component score (-2.43; CI -4.77 to -0.08) in individuals with hypertension (Figure 2). Studies presented low heterogeneity for PCS ($t^2 = 3.3$) and absence of heterogeneity for MCS ($t^2 = 0$).

Figure 3 presents meta-analysis of the eight domains of the SF-36. There was statistically significant lower quality of life in individuals with hypertension in the eight domains. The heterogeneity between studies was higher comparatively to the PCS and MCS domains. The effect of heterogeneity was minimized by using random effect model for all domains as well as for the summarized components of SF-36.

DISCUSSION

In this systematic review and meta-analysis of studies that reported an association between hypertension and quality of life we identified worst quality of life among individuals with hypertension. The cross-sectional studies were heterogeneous regarding their primary objectives, the sampling criteria, and the questionnaires employed for evaluation of health quality, but most identified worst quality of life among hypertensive patients. Just a few studies could be included in the meta-analysis, which presented lower overall estimates of quality of life for patients with hypertension. The magnitude of differences, however, was small and the confidence intervals were close to null..

The quality of studies was low, and most of them used sampling criteria that limit their external validity, since just a few investigated population-based samples. Furthermore, the assessment of HRQL was often a secondary objective; some studies just showed summarized scores, while others presented scores only in the eight domains or just in those with statistically significant differences.

Essentially, questionnaires that assess quality of life follow a structure of similar questions, taking into account several specific domains to assess physical, mental and social health components of quality of life. They can evaluate a particular point in time or a change resulting from an intervention or change of attitude.^{10, 11} Rather than classifying individuals as having good or bad HRQL, the significance of HRQL score is best understood by comparing the groups or populations, which allows to conclude that individuals scoring higher have better HRQL than individuals with lower scores.

The meta-analysis including three studies that showed summarized score for PCS and MCS demonstrated lower values for hypertensive individuals in both the mental and physical components, although the latter was of borderline statistical significance. Moreover, considering the eight domains shown in six studies, although some areas had a borderline statistically significant difference, all summarized scores showed a lower HRQL in hypertensive patients compared to normotensive individuals. Differences in domains between hypertensive and normotensive individuals ranged from -18.2 to +6.8. Two studies^{8, 23} showed higher scores in some domains for hypertensive patients. The quality of life of hypertensive patients was higher than of normotensive individuals in regard to role physical, such as bodily pain, social functioning and role emotional in one study⁸ and vitality, social

functioning, role emotional and mental health in the other ²³). These differences may be ascribed to characteristics of specific populations or to chance.

The cross-sectional design of all studies included in the systematic review and meta-analysis precluded to affirm the direction of the causality, since both hypertension can be responsible for lower quality of life and vice-versa. Additionally, the worst quality of life of individuals with hypertension could be ascribed to the awareness about the disease and not to the disease itself. Studies have shown that the awareness of having a chronic disease may be responsible for lower quality of life. According to BREMER, characteristics associated with the individual's health tend to reduce the quality of life of hypertensive patients compared with normotensive individuals, like the fact of being symptomatic, perceiving to be ill and having adverse drug reactions³³. In a cross-sectional study, we identified that the association between stress events and distress with self-reported hypertension was not intermediated by effects of stress on blood pressure, and could be secondary to negative feeling about disease and not to the disease itself ³⁴. The influence of awareness of hypertension on the association between hypertension and quality of life was scarcely investigated. Only the study of Mena-Martin et al. demonstrated that individuals who are aware of being hypertensive have a poorer quality of life concerning general health, physical functioning, vitality and mental health than those who are not aware ⁸. The lower frequency of complain of pain in individuals with high blood pressure ³⁵ suggests that the relationship between hypertension and quality of life could be biased by the awareness of having a chronic and serious disease.

Our study has some limitations that deserve mention. Some articles that assessed HRQL in hypertensive patients were published in Chinese and Turkish, and were not

included in our review. The majority of studies, however, were published in English and allowed to cover most of the published papers on the subject. We did not attempt to improve the quality of information asking for additional information to the authors of the original studies. This would be difficult to apply for all studies, since some were published many years ago, and the attempt to improve the information from a few papers could be another fountain of bias. Although 20 articles on the subject were found, only six had similar characteristics that allowed to include them in a meta-analysis with the SF-36 domains and only three in the summarized components PCS and MCS. Despite the small number of studies, the overall estimates allowed to have more confidence about the relationship between hypertension and quality of life. We did not explore the association between different drug treatments and quality of life. These studies have the advantage of their longitudinal design, but they did not allow comparing the quality of life in patients with hypertension versus normal individuals. Anyway, the influence of drug treatment is not important and not remarkably different between groups of drugs³⁶. In conclusion, individual results of cross-sectional studies and summarized estimates of quality of life of studies included in a meta-analysis point to lower quality of life of individuals with hypertension. The magnitude of difference in scores of quality of life is small and can be potentially ascribed to awareness of hypertension and other confounders. The specific association between blood pressure levels and quality of life require further investigation.

REFERENCE

1. Brundtland GH. From the World Health Organization. Reducing risks to health, promoting healthy life. *JAMA*. 2002;288(16):1974.
2. Pereira M, Lunet N, Azevedo A, Barros H. Differences in prevalence, awareness, treatment and control of hypertension between developing and developed countries. *J Hypertens*. 2009;27(5):963-975.
3. Goncalves CB, Moreira LB, Gus M, Fuchs FD. Adverse events of blood-pressure-lowering drugs: evidence of high incidence in a clinical setting. *Eur J Clin Pharmacol*. 2007;63(10):973-978.
4. Jayasinghe J. Non-adherence in the hypertensive patient: can nursing play a role in assessing and improving compliance? *Can J Cardiovasc Nurs*. 2009;19(1):7-12.
5. Alonso J, Ferrer M, Gandek B, Ware JE, Jr., Aaronson NK, Mosconi P, Rasmussen NK, Bullinger M, Fukuhara S, Kaasa S, Lepelge A. Health-related quality of life associated with chronic conditions in eight countries: results from the International Quality of Life Assessment (IQOLA) Project. *Qual Life Res*. 2004;13(2):283-298.
6. Arslantas D, Ayranci U, Unsal A, Tozun M. Prevalence of hypertension among individuals aged 50 years and over and its impact on health related quality of life in a semi-rural area of western Turkey. *Chin Med J (Engl)*. 2008;121(16):1524-1531.
7. Bardage C, Isacson D, Ring L, Bingefors K. A Swedish population-based study on the relationship between the SF-36 and health utilities to measure health in hypertension. *Blood Press*. 2003;12(4):203-210.
8. Mena-Martin FJ, Martin-Escudero JC, Simal-Blanco F, Carretero-Ares JL, Arzua-Mouronte D, Herreros-Fernandez V. Health-related quality of life of subjects with known and unknown hypertension: results from the population-based Horteiga study. *J Hypertens*. 2003;21(7):1283-1289.
9. Ware JSKM, Gandek B. *SF-36® Health Survey Manual and Interpretation Guide*. New England Medical Center, The Health Institute; 1993.
10. Ware JE; Kosinski M T-BD, Gandek B. How to Score version 2 of the SF-12® Health Survey (with a Supplement Documenting Version 1). Boston: QualityMetric Incorporated; 2004.
11. Fayers P. *Quality of life. Assessment, analysis and interpretation*. 2.ed. ed. Chichester, England: John Wiley & Sons; 2000.
12. Vandembroucke JP, Elm EV, Altman DG, Gotzsche PC, Mulrow CD, Pocock SJ, Poole C, Schlesselman JJ, Egger M. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE): Explanation and Elaboration. *PLoS Medicine*. 2007;4(10):27.
13. Bax L, Yu LM, Ikeda N, Tsuruta H, Moons KG. Development and validation of MIX: comprehensive free software for meta-analysis of causal research data. *BMC Med Res Methodol*. 2006;6:50.
14. Kushiro T, Takahashi A, Saito F, Otsuka Y, Soma M, Kurihara T, Satomura A, Saito T, Kanmatsuse K. Erectile dysfunction and its influence on quality of life in patients with essential hypertension. *Am J Hypertens*. 2005;18(3):427-430.
15. Anderson RT, Hogan P, Appel L, Rosen R, Shumaker SA. Baseline correlates with quality of life among men and women with medication-controlled

- hypertension. The trial of nonpharmacologic interventions in the elderly (TONE). *J Am Geriatr Soc.* 1997;45(9):1080-1085.
16. Erickson SR, Williams BC, Gruppen LD. Perceived symptoms and health-related quality of life reported by uncomplicated hypertensive patients compared to normal controls. *J Hum Hypertens.* 2001;15(8):539-548.
 17. Erickson SR, Williams BC, Gruppen LD. Relationship between symptoms and health-related quality of life in patients treated for hypertension. *Pharmacotherapy.* 2004;24(3):344-350.
 18. Okano Y, Hirawa N, Tochikubo O, Mizushima S, Fukuhara S, Kihara M, Toya Y, Umemura S. Relationships between diurnal blood pressure variation, physical activity, and health-related QOL. *Clin Exp Hypertens.* 2004;26(2):145-155.
 19. Aydemir O, Ozdemir C, Koroglu E. The impact of co-morbid conditions on the SF-36: a primary-care-based study among hypertensives. *Arch Med Res.* 2005;36(2):136-141.
 20. Brito DM, Araujo TL, Galvao MT, Moreira TM, Lopes MV. [Quality of life and perception of illness among individuals with high blood pressure]. *Cad Saude Publica.* 2008;24(4):933-940.
 21. Hayes DK, Denny CH, Keenan NL, Croft JB, Greenlund KJ. Health-related quality of life and hypertension status, awareness, treatment, and control: National Health and Nutrition Examination Survey, 2001--2004. *J Hypertens.* 2008;26(4):641-647.
 22. Lawrence WF, Fryback DG, Martin PA, Klein R, Klein BE. Health status and hypertension: a population-based study. *J Clin Epidemiol.* 1996;49(11):1239-1245.
 23. DeForge BR, Stewart DL, DeVoe-Weston M, Graham L, Charleston J. The relationship between health status and blood pressure in urban African Americans. *J Natl Med Assoc.* 1998;90(11):658-664.
 24. Kusek JW, Greene P, Wang SR, Beck G, West D, Jamerson K, Agodoa LY, Faulkner M, Level B. Cross-sectional study of health-related quality of life in African Americans with chronic renal insufficiency: the African American Study of Kidney Disease and Hypertension Trial. *Am J Kidney Dis.* 2002;39(3):513-524.
 25. Thommasen HV, Zhang W. Impact of chronic disease on quality of life in the Bella Coola Valley. *Rural Remote Health.* 2006;6(2):528.
 26. Banegas JR, Guallar-Castillon P, Rodriguez-Artalejo F, Graciani A, Lopez-Garcia E, Ruilope LM. Association between awareness, treatment, and control of hypertension, and quality of life among older adults in Spain. *Am J Hypertens.* 2006;19(7):686-693.
 27. Banegas JR, Lopez-Garcia E, Graciani A, Guallar-Castillon P, Gutierrez-Fisac JL, Alonso J, Rodriguez-Artalejo F. Relationship between obesity, hypertension and diabetes, and health-related quality of life among the elderly. *Eur J Cardiovasc Prev Rehabil.* 2007;14(3):456-462.
 28. Wang R, Wu C, Zhao Y, Yan X, Ma X, Wu M, Liu W, Gu Z, Zhao J, He J. Health related quality of life measured by SF-36: a population-based study in Shanghai, China. *BMC Public Health.* 2008;8:292.
 29. Li W, Liu L, Puente JG, Li Y, Jiang X, Jin S, Ma H, Kong L, Ma L, He X, Ma S, Chen C. Hypertension and health-related quality of life: an epidemiological study in patients attending hospital clinics in China. *J Hypertens.* 2005;23(9):1667-1676.

30. de Souza WA, Yugar-Toledo JC, Bergsten-Mendes G, Sabha M, Moreno H, Jr. Effect of pharmaceutical care on blood pressure control and health-related quality of life in patients with resistant hypertension. *Am J Health Syst Pharm.* 2007;64(18):1955-1961.
31. dos Reis MG, Glashan RQ. [Hospitalized hypertensive adults: perception about disease severity and quality of life]. *Rev Lat Am Enfermagem.* 2001;9(3):51-57.
32. Anderson GF, Chu E. Expanding priorities--confronting chronic disease in countries with low income. *N Engl J Med.* 2007;356(3):209-211.
33. Bremner AD. Antihypertensive medication and quality of life--silent treatment of a silent killer? *Cardiovasc Drugs Ther.* 2002;16(4):353-364.
34. Sparrenberger F, Fuchs SC, Moreira LB, Fuchs FD. Stressful life events and current psychological distress are associated with self-reported hypertension but not with true hypertension: results from a cross-sectional population-based study. *BMC Public Health.* 2008;8:357.
35. Hagen K, Zwart JA, Holmen J, Svebak S, Bovim G, Stovner LJ. Does hypertension protect against chronic musculoskeletal complaints? The Nord-Trondelag Health Study. *Arch Intern Med.* 2005;165(8):916-922.
36. Neaton JD, Grimm RH, Jr., Prineas RJ, Stamler J, Grandits GA, Elmer PJ, Cutler JA, Flack JM, Schoenberger JA, McDonald R, et al. Treatment of Mild Hypertension Study. Final results. Treatment of Mild Hypertension Study Research Group. *JAMA.* 1993;270(6):713-724.

Table 1. Characteristics of cross-sectional studies that assessed quality of life associated with hypertension: studies including with evaluation of components of the SF36.

Characteristics of the study	HRQL instrument / Detection of hypertension (SH)	Quality of life (HRQL) measure total / per component / per domain	Comments	Reference
N=519 Population sample Both genders Wisconsin - USA	HBP= measured HRQL = SF-36	Treated vs Non treated 70.8 76.9 p<0.01 GH	HBP demonstrated that there is a lower HRQL in non treated patients.	22
N=975 Outpatient sample Both genders All controlled hypertensive patients (PA<145x85) Baltimore, New Brunswick e Wiston-Salerm - USA	HBP= measured HRQL = SF-36	Male 51.6 Female 48.7 * MCS 55.3 54.3 * VT 71.2 64.6 * * p<0.05	Hypertensive men demonstrated better HRQL when compared to women. Among the general population, those who have more symptoms have lower HRQL. In this case, women had more symptoms.	15
N=97 Outpatient sample Both genders Yokohama - Japan	HBP= measured (MAPA) HRQL = SF-36	PCS: R=0.269 p<0.01 MCS: R=0.281 p<0.017 Association between physical activity and quality of life	Physical activity and psychological factors affect quality of life in hypertensive patients; there was a higher HRQL among those who are more active.	18
N=125 Outpatient sample Both genders Michigan - USA	HBP= measured HRQL = SF-36	Symptomatic vs. asymptomatic R ² 0.31 vs 0.22 p<0.05 PCS R ² 0.41 vs 0.40 NS MCS Linear regression between the differences in HRQL scores in hypertensives	Lower HRQL among hypertensive patients who reported symptoms when compared to those with no symptoms. Significant only for PCS.	17
N=347 Outpatient sample Only men with erectile dysfunction Tokyo - Japan	HBP= measured HRQL = SF-36	GH lower HRQL in hypertensive subjects when compared with normotensive individuals. p <0.05.	When comparing between hypertensive and normotensive individuals in the sample, only the general health status HBP a statistically significant difference for the lower HRQL in hypertensive subjects.	14
N=8303 Outpatient sample Both genders Atlanta - USA	HBP= measured HRQL = SF-36	SF-36 Poor health status: ≥14 unhealthy days: ≥14 physical unhealthy days: ≥14 mental unhealthy days: ≥14 days of limited activity:	OR HBP x non HBP 1.72 1.23 1.39 1.12 1.55 Hypertensive patients are more likely to present increased risk for having ≥ 14 unhealthy days for 30 days. Hypertensive patients have 72% higher risk to have lower HRQL than normotensive individuals.	21
N=3567 Population sample Both genders Madrid - Spain	HBP= measured HRQL = SF-36	SF-36 PF -3.5 (-7.8 to 0.8) RP - 4.2 (-10.3 to 1.9) BP -3.2 (-7.5 to 1.2) GH -0.4 (-4.2 to 3.3) VT -2.6 (-6.6 to 1.4) SF -3.3 (-7.3 to 0.7) RE -4.2 (-8.6 to 0.2)	Hypertensive (CI) Difference between the HRQL scores of hypertensive patients compared to patients without metabolic risk factors.	27

		MH	-3.1(-6.7 to 0.4)		
N=9703	HBP= measured	Modified SF-36	Normotensive	Hypertensive	Lower quality of life scores of hypertensive patients statistically significant for all domains * (p <0.0001) ²⁹
Hospital sample	HRQL = SF-36	Self-esteem	3.26	3.10	
Both genders		RP	3.43	3.19	
8 cities - China		BP	3.34	3.20	
		Stress perception	3.40	3.31	
		Coping ability	4.07	3.76	
		Worries on health	3.24	3.07	

HBP - high blood pressure; HRQL – health-related quality of life; PCS – physical component summary; MCS – mental component summary; GH – general health; VT – vitality; RP – role physical; BP – bodily pain.

Table 2. Characteristics of cross-sectional studies that assessed quality of life associated with hypertension in the eight SF36 domains.

Characteristics of the study	HRQL instrument / Detection of hypertension (SH)	Quality of life (HRQL) measure total / per component / per domain	Comments	Reference	
N=1094 Population sample Both genders New York, Wilmington e Bristol – USA	HBP= measured HRQL = SF-36	SF-36	Hypertensive	Suggests that the physical component is more affected than the mental component in hypertensive individuals when compared to the general population.	24
		PF	69.8 (\pm 27.3)		
		RP	65.2 (\pm 42.2)		
		BP	70.4 (\pm 26.5)		
		GH	58.4 (\pm 20.9)		
		VT	58.2 (\pm 22.6)		
		SF	80.2 (\pm 24.4)		
		RE	78.2 (\pm 37.4)		
N=938 Outpatient sample Both genders Turkey	HBP= measured HRQL = SF-36	SF-36	Hypertensive	Hypertensive patients showed significant differences in HRQL when compared to normotensive individuals.	19
		PF	65.7 (\pm 23.4)		
		RP	44.9 (\pm 42.2)		
		BP	55.1 (\pm 22.2)		
		GH	44.9 (\pm 21.1)		
		VT	50.8 (\pm 20.2)		
		SF	60.8 (\pm 22.3)		
		RE	47.9 (\pm 23.6)		
N=113 Outpatient sample Both genders Fortaleza - Ceará	HBP= measured diagnosed for over a year. HRQL = SF-36	SF-36	Hypertensive	Authors considered a cutoff point of 60 in the score value and concluded that general health and bodily pain are indications of low quality of life.	20
		PF	66.28 (\pm 27.9)		
		RP	60.80 (\pm 39.9)		
		BP	56.74 (\pm 32.6)		
		GH	53.58 (\pm 22.0)		
		VT	63.32 (\pm 23.7)		
		SF	69.36 (\pm 30.6)		
		RE	64.60 (\pm 40.6)		
MH	65.45 (\pm 22.0)				

HBP - high blood pressure; HRQL – health-related quality of life; PF – physical functioning; RP – role physical; BP – bodily pain; GH – general health; VT – vitality; SF – social functioning; RE – role emotional; MH – mental health

Table 3. Characteristics of cross-sectional studies that assessed quality of life associated with hypertension: studies with full evaluation of quality of life by the SF36.

Characteristics of the study	HRQL instrument / Detection of hypertension (SH)	Quality of life (HRQL) measure total / per component / per domain	Quality of life (HRQL) measure total / per component / per domain		Comments	Reference
			Normotensive	Hypertensive		
N=1389 Population sample Both genders African Americans from Baltimore - USA	HBP= measured HRQL = SF-36	SF-36			The data suggest that the quality of life is not significantly altered by hypertension, except in the domains of Physical functioning and General health.	23
		PF	88.1 (\pm 21.2)	84.1 (\pm 23.7)		
		RP	90.0 (\pm 23.4)	88.8 (\pm 25.7)		
		BP	67.3 (\pm 30.2)	65.6 (\pm 30.5)		
		GH	65.3 (\pm 16.6)	61.8 (\pm 16.1)		
		VT	66.2 (\pm 17.3)	67.1 (\pm 16.3)		
		SF	82.4 (\pm 20.2)	82.5 (\pm 19.5)		
		RE	84.9 (\pm 30.5)	87.9 (\pm 28.5)		
		MH	74.2 (\pm 15.1)	74.4 (\pm 15.4)		
N=224 Outpatient sample Both genders Michigan - USA	HBP= measured HRQL = SF-36	SF-36			Hypertensive patients have lower HRQL than normotensive patients. No significant difference for MCS, Role emotional and Mental health	16
		PCS	54.2 (\pm 5.7)	49.4 (\pm 9.3)		
		MCS	52.7 (\pm 9.4)	51.1 (\pm 10.1)		
		PF	91.1 (\pm 15.6)	85.5 (\pm 18.9)		
		RP	91.7 (\pm 19.3)	77.3 (\pm 35.1)		
		BP	87.5 (\pm 17.7)	77.9 (\pm 22.9)		
		GH	81.7 (\pm 15.6)	70.1 (\pm 21.4)		
		VT	69.4 (\pm 18.1)	61.5 (\pm 23.3)		
		SF	93.3 (\pm 16.1)	86.2 (\pm 21)		
		RE	86.3 (\pm 29.1)	80.1 (\pm 33.2)		
				MH		
N=466 Population sample Both genders Rio Hortega - Spain	HBP= informed HRQL = SF-36	SF-36			Hypertensive patients shown worse scores of quality of life in the MCS and PCS, but these differences are not statistically significant. Non diagnosed hypertensive patients have lower HRQL scores than normotensive individuals. Despite this, diagnosed hypertension patients have lower HRQL those who are unaware of being hypertensive, suggesting treatment effect.	8
		PCS	46.8 (\pm 22.4)	46.0 (\pm 11,1)		
		MCS	47,8 (\pm 37,9)	47,1 (\pm 18,8)		
		PF	81.6 (\pm 43.0)	75.5 (\pm 21.3)		
		RP	82.4 (\pm 103.9)	89.2 (\pm 51.5)		
		BP	60.8 (\pm 70.5)	62.6 (\pm 34.9)		
		GH	56.1 (\pm 61.2)	48.9 (\pm 30.3)		
		VT	57.2 (\pm 70.9)	50.8 (\pm 35.1)		
		SF	89.3 (\pm 69.8)	91.2 (\pm 34.6)		
		RE	74.2 (\pm 127.1)	76.5 (\pm 63.0)		
				MH		
N=5404 Population sample	HBP= informed HRQL = SF-36	SF-36			Significant difference (p <0.001) for lower HRQL in hypertensive patients compared to normotensive individuals in all domains.	7
		PF	89.2 (\pm 18.6)	71 (\pm 27.4)		
		RP	83.9 (\pm 31.6)	66.9 (\pm 41.5)		

Both genders		BP	76.4 (+24.6)	65.1 (+27.7)	
Uppsalla		GH	74.9 (+21.1)	59.1 (+22.7)	
County	-	VT	65.6 (+22.3)	59.2 (+24.3)	
Sweden		SF	85.5 (+20.8)	82 (+23.7)	
		RE	84.2 (+31.1)	77.2 (+37.4)	
		MH	78.3 (+19.0)	75.2 (+21.0)	
N=24.936	HBP= informed	SF-36	Normotensive	Hypertensive	HRQL scores of hypertensives patients were significantly lower than those of the general population, however, are higher than the scores of other chronic diseases such as arthritis, diabetes, congestive heart failure, chronic pulmonary disease or ischemic heart disease. ⁵
Multicentric	SF-36	PF	88.9 (+0.17)	85.3 (+0.43)	
population		RP	85.5 (+0.29)	81.7 (+0.73)	
sample		BP	80.9 (+0.21)	77.8 (+0.50)	
Both genders		GH	74.7 (+0.17)	69.4 (+0.40)	
United States		VT	67.6 (+0.18)	64.0 (+0.41)	
Denmark		SF	87.9 (+0.19)	84.5 (+0.46)	
France		RE	86.2 (+0.30)	82.0 (+0.74)	
Germany		MH	76.9 (+0.17)	73.2 (+0.40)	
Italy					
Japan					
Netherlands					
Norway					
N=3368	HBP measured (6 times)	SF-36	Normotensive	Hypertensive	Hypertension, antihypertensive treatment and blood pressure control were not associated with lower HRQL. ²⁶
Population	≥140x90mmHg or use of	Men			
sample	antihypertensive	PF	75 (+27)	75 (+27)	
Both genders	HRQL = SF-36	RP	81 (+40)	81 (+29)	
Madrid - Spain		BP	76 (+29)	78 (+28)	
		GH	60 (+23)	60 (+23)	
		VT	66 (+25)	69 (+24)	
		SF	85 (+26)	87 (+23)	
		RE	92 (+28)	92 (+27)	
		MH	75 (+22)	77 (+21)	
		SF-36	Normotensive	Hypertensive	
		Women			
		PF	66 (+28)	60 (+27)	
		RP	73 (+40)	69 (+39)	
		BP	66 (+29)	63 (+28)	
		GH	56 (+20)	53 (+19)	
		VT	58 (+24)	56 (+23)	
		SF	78 (+26)	75 (+27)	
		RE	83 (+33)	81 (+33)	
		MH	64 (+22)	63 (+21)	
N=1193	HBP= measured	SF-36	Normotensive	Hypertensive	Significant difference was shown between the HRQL scores in all domains for lower HRQL of hypertensive patients when compared to normotensive individuals. p <0.005 ⁶
Population	HRQL = SF-36	PF	81.6 (+18.8)	71.5 (+23.5)	
sample		RP	74.2 (+39.2)	60.4 (+43.5)	
Both genders		BP	80.6 (+18.9)	72.4 (+22.2)	

Semi-rural location in western Turkey - Turkey		GH	61.2 (\pm 19.5)	50.8 (\pm 22.3)	
		VT	68.5 (\pm 18.7)	62.9 (\pm 18.2)	
		SF	85.8 (\pm 17.4)	78.6 (\pm 20.8)	
		RE	82.7 (\pm 32.9)	72.8 (\pm 39.1)	
		MH	69.4 (\pm 17.7)	65.1 (\pm 16.9)	
N=675	HBP= informed	SF-36	Normotensive	Hypertensive	No significant difference only in the domains of vitality, social functioning and mental health for lower HRQL when compared between hypertensive and normotensive individuals.
Population sample	HRQL = SF-36	PF	84.8	67.0	
Both genders		RP	72.3	45.7	
Bella Coola Valley - Canada		BP	67.0	57.2	
		GH	70.0	56.5	
		VT	57.4	50.6	
		SF	79.0	75.5	
		RE	77.8	64.3	
		MH	73.2	72.3	
N=1009	HBP= informed	SF-36	Normotensives	Hypertensive	Hypertensive patients have lower HRQL than normotensive individuals in the domains of physical functioning, role physical, bodily pain and general health. In the domains of vitality, social functioning and role emotional this difference was not significant; in mental health HRQL is significantly higher for hypertensive patients than for normotensive individuals.
Hospital sample	HRQL = SF-36	PF	82.8	71.5	
Both genders		RP	69.1	58.4	
Hannover - Germany		BP	68.6	62.9	
		GH	64.0	56.3	
		VT	54.1	56.8	
		SF	77.7	79.7	
		RE	72.6	77.8	
		MH	67.0	72.4	

HBP - high blood pressure; HRQL – health-related quality of life; PCS – physical component summary; MCS – mental component summary; PF – physical functioning; RP – role physical; BP – bodily pain; GH – general health; VT – vitality; SF – social functioning; RE – role emotional; MH – mental health

Table 1. Characteristics of cross-sectional studies that assessed quality of life associated with hypertension: studies including evaluation of SF36 components .

Table 2. Characteristics of cross-sectional studies that assessed quality of life associated with hypertension in the eight SF36 domains.

Table 3. Characteristics of cross-sectional studies that assessed quality of life associated with hypertension: studies with full evaluation of quality of life by the SF36.

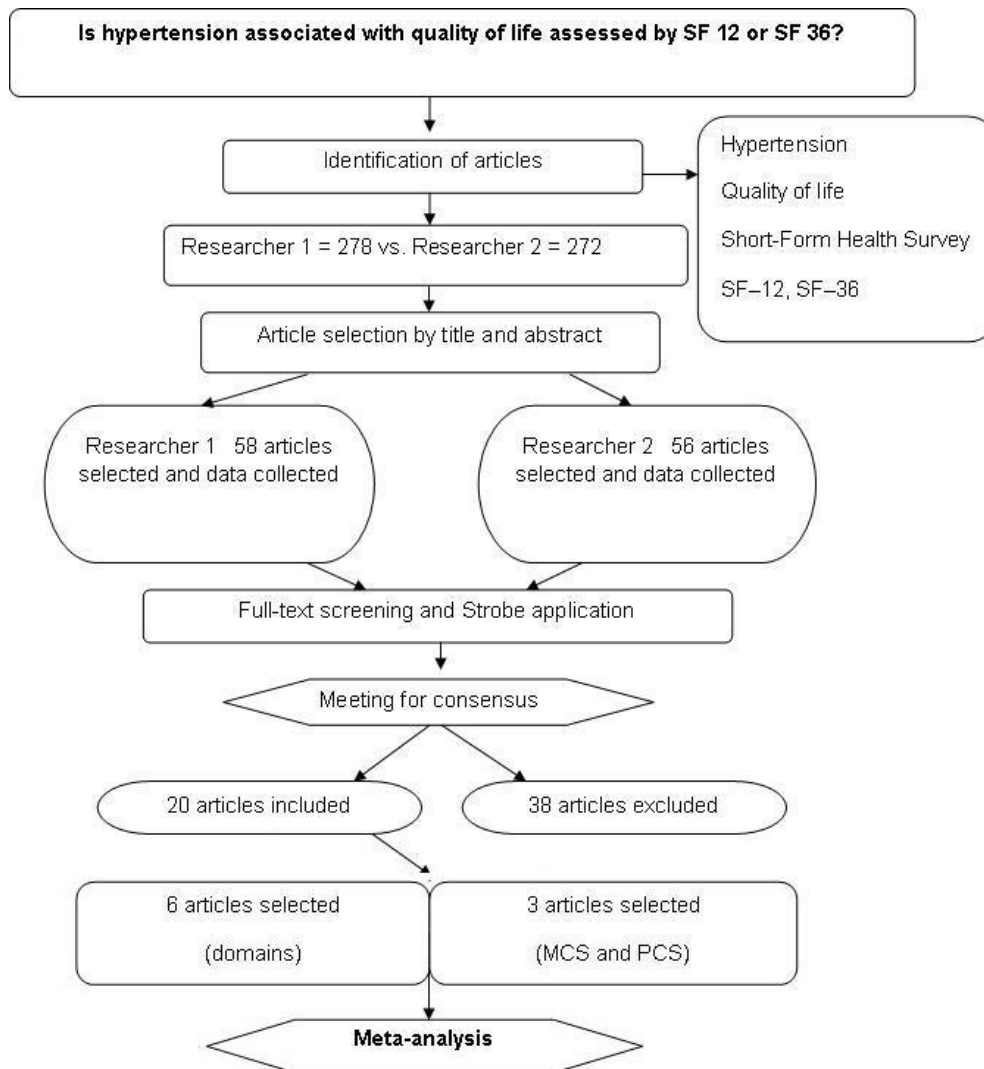
Figures

Figure 1: Research flowchart.

Figure 2: Meta-analysis of physical and mental component scores of quality of life in a comparison between hypertensive and normotensive individuals.

Figure 3: Meta-analysis of the quality of life scores comparing between hypertensive and normotensive individuals in the SF-36 domains of the physical and mental components.

Figure 1. Research flowchart



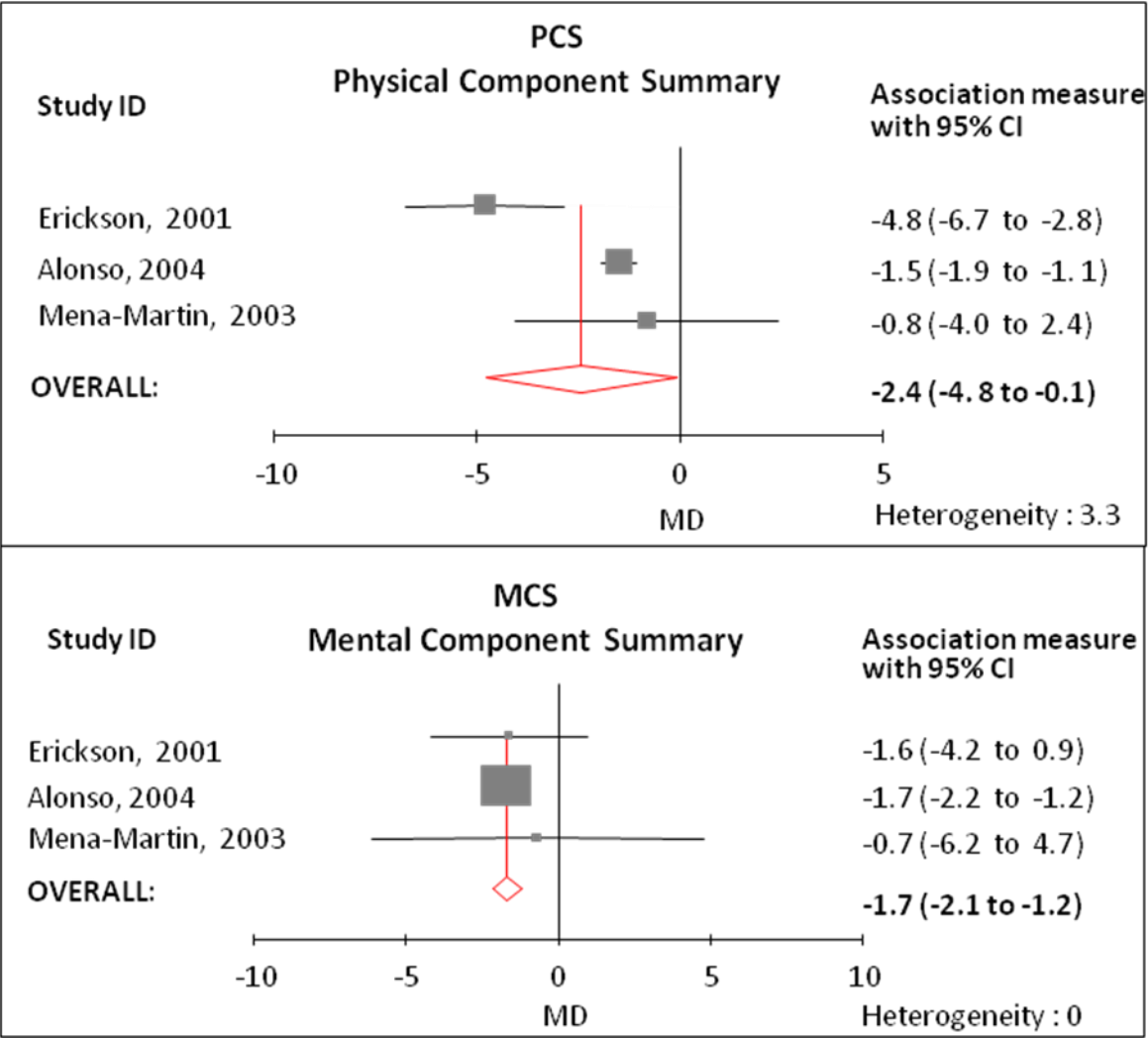
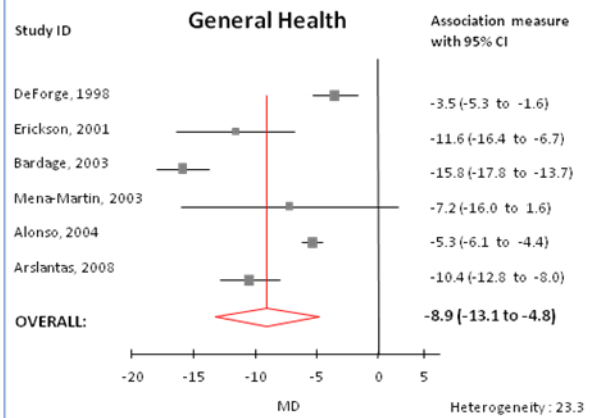
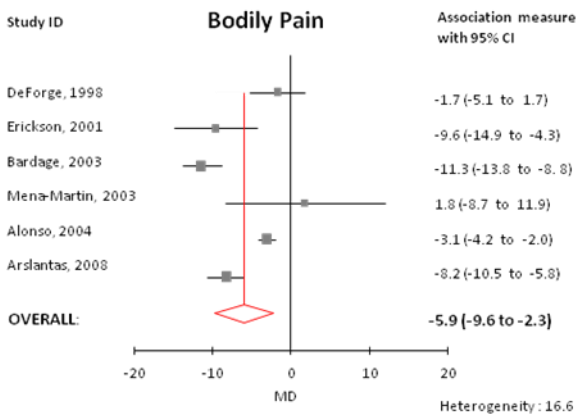
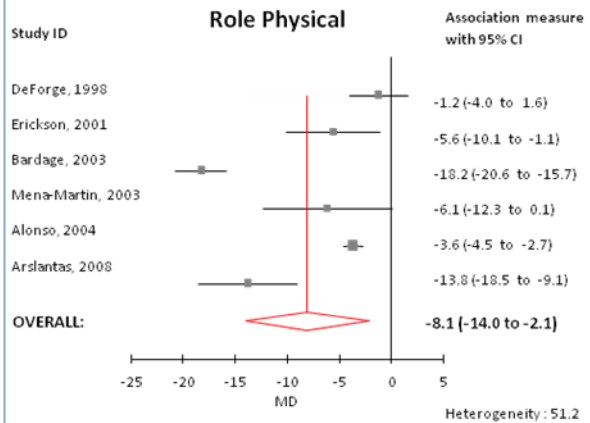
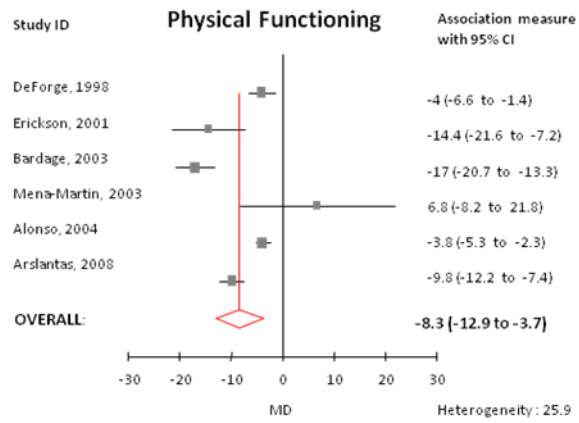


Figure 2: Meta-analysis of physical and mental component scores of quality of life in a comparison between hypertensive and normotensive individuals.



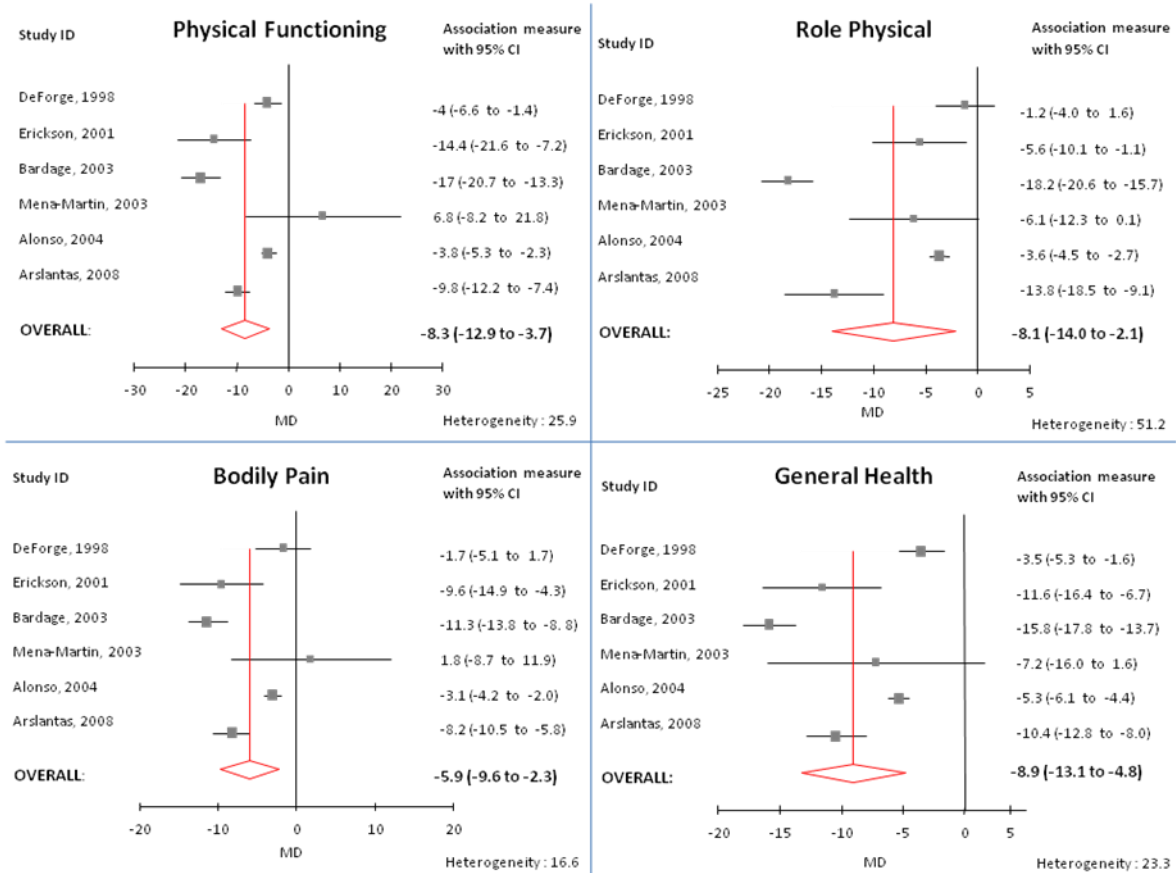


Figure 3: Meta-analysis of the quality of life scores comparing between hypertensive and normotensive individuals in the SF-36 domains of the physical and mental components.

ARTIGO 2

HEALTH-RELATED QUALITY OF LIFE AND HYPERTENSION: A POPULATION-BASED STUDY IN SOUTHERN BRAZIL.

Health-related quality of life and hypertension: a population-based study in Southern Brazil.

Daisson J Trevisol^{a,b}, Leila B Moreira^a, Sandra C Fuchs^a, Flavio D Fuchs^a

^aPrograma de Pós-graduação em Ciências da Saúde: Cardiologia e Ciências Cardiovasculares; Faculdade de Medicina, Universidade Federal do Rio Grande do Sul. Porto Alegre – Brasil, ^bUniversidade do Sul de Santa Catarina Tubarão - Brasil

Sponsorship: This study was supported by CNPQ, FAPERGS, HCPA (FIPE), UFRGS

Correspondence and requests for reprints to Daisson J Trevisol, Universidade do Sul de Santa Catarina, Unidade Hospitalar de Ensino, Av. José Acácio Moreira, 787, Bairro Dehon, 88704-900, Tubarão, SC – Brasil
Tel: 55-48-36221442; fax: 55-48-36221808
Email: daisson.trevisol@unisul.br

ABSTRACT

Objective: To evaluate the association between hypertension and health-related quality of life in a population based sample in southern Brazil.

Methods: In a cross-sectional study using a multistage population-based sample, participants were interviewed at home and had their blood pressure (BP) measured four times. Hypertension was defined as BP \geq 140/90mmHg or anti-hypertensive drugs use. Health-related quality of life was assessed through the Short-Form Health Survey (SF-12[®]), and presented as the Physical Component Summary (PCS), Mental Component Score (MCS) and by the SF-12 eight-domain scale, ranging from 0 to 100. Multivariate analysis was performed using General Linear Model, of the Complex Samples module, including age, education and gender as covariates.

Results: In the total, 1,858 individuals were evaluated, being 1,117 (60.1%) women, with 52.5 ± 4.1 years of age and 741 (39.9%) men with 47.2 ± 9.1 years of age. The overall scores of quality of life were 50.5 ± 9.2 for PCS and 50.0 ± 11.0 for MCS. Prevalence of hypertension was 34.2% (95% CI 31.5–36.9). The PCS scores for hypertensive and normotensive were, respectively, 47.2 (CI 46.3-48.1) vs. 52.2 (CI 51.6-52.8) ($P < 0.001$), and for MCS were 49.7 (CI 48.6-50.8) vs. 50.1 (CI 49.4-50.9) ($P = 0.5$). Health-related quality of life in the PCS tended to be lower ($p = 0.09$) with increasing number of blood pressure-lowering agents in use. Participants with hypertension not using BP drugs had higher health-related quality of life scores (PCS 49.6; MCS 51.9) than subjects using BP pressure drugs either with uncontrolled (PCS 45.3; MCS 49.4) and controlled blood pressure (PCS 46.2; MCS 47.7) ($P < 0.05$).

Conclusion: Individuals with hypertension have poorer health-related quality of life than subjects with normal blood pressure, particularly when they have blood pressure controlled by drug treatment. Awareness of being sick and adverse events attributed to blood pressure agents may be responsible for this association and not high blood pressure per se.

Key-words: hypertension, blood pressure, quality of life, Short-Form Health Survey, SF-12

INTRODUCTION

Hypertension is the major cardiovascular risk factor and is highly prevalent worldwide¹,². The estimated incidence of new cases of hypertension in a Brazilian population-based cohort study was 39/1000 person-years and rose to 59/1000 person-years among individuals with pre-hypertension, indicating that approximately 60 percent of them become hypertensive in ten years³.

The goals of chronic disease treatment include relief of symptoms and prevention of complications that lead to physical, psychological and social impairments and precocious death. The treatment of hypertension intends to contribute not only to reducing mortality, but also providing years of life with quality. Nonetheless, health-related quality of life is a subjective concept which depends on the perception and individual preferences^{4, 5}.

The risk associated with hypertension warrants therapeutic intervention, even in the absence of symptoms⁶. The diagnosis, treatment and control of hypertension prevent complications^{7, 8} that are expected to diminish quality of life(QOL)⁹. On the other hand, disease labels and treatment lead to changes in lifestyle that also may affect health-related quality of life. A study evaluating health-related quality of life in 8,303 Americans found that high blood pressure entailed 73 percent higher risk of having poor or fair health when compared to non-hypertensive individuals¹⁰. Having hypertension and being aware of it was associated with a lower health-related quality of life¹¹(HRQoL), as

well as the use of antihypertensive agents had a direct association with the number of unhealthy days¹⁰. Some aspects on the relationship between high blood pressure and QOL were still not addressed in epidemiological investigations, such as the relationship with QOL domains and components and the differences between individuals with controlled and uncontrolled hypertension.

The objective of this study was to evaluate the association between hypertension and health-related quality of life, evaluated by the Short-Form Health Survey (SF-12 ®) questionnaire, in a population-based sample of free-living adults in southern Brazil.

METHODS

The SOFT study (Syndrome of Obesity and Risk Factors for Cardiovascular Disease is) is a cross-sectional study that investigated individuals aged 18-90 years living in Porto Alegre, a State capital in Brazil with more than 1.5 million inhabitants and a health development index of 0.800. Details of this survey were presented elsewhere ¹² Subjects were selected by multistage population-based sampling, based on geographic subdivisions of the city, defined by the Brazilian Institute of Geography and Statistics (IBGE) ¹³. Supervisors established the age strata of the individuals in each household for further interview. Among adults 18 to 59 years of age, the sampling was proportional to the number of individuals, and in the 60-to-90-year range all participants were sampled.

A sample size to detect a difference of 10 points in the SF-12[®] score between hypertensive and non-hypertensive individuals with a ratio 1:3, confidence interval of 95% and power of 80% was estimated in 1,858 adult subjects for HRQoL analyses.

The study was approved by the Institutional Review Board of the Hospital de Clínicas de Porto Alegre , which is accredited by the Office of Human Research Protections, and all participants signed the informed consent form. Data were collected through a structured questionnaire applied in household interviews. The questionnaire included demographic questions, dietary survey, physical activity, lifestyle habits such as smoking and alcohol consumption, diseases, medication use, and previous record of hypertension.

Four standardized blood pressure measurements were performed over the course of the interview using OMRON CP-705 digital sphygmomanometer, according to technical recommendations ¹⁴. Hypertension was defined as an average of four blood pressure measurements of 140/90 mmHg or higher or the use of blood pressure-lowering drugs ¹⁴. The Short-Form Health Survey (SF-12 [®]), derived from the SF-36 ¹⁵⁻¹⁷ was used to assess health-related quality of life.

The SF-36 is a generic multidimensional instrument for assessing health-related quality of life, comprising 36 items, grouped into two components, and each sub-divided into sub-scales. The Physical Component (PCS; Physical Component Summary) includes physical functioning, physical role limitations, bodily pain and general health; and Mental

Component (MCS; Mental Component Summary) refers to mental health, emotional role limitations, social functioning and vitality. The final score ranges from 0 (worst overall health state) to 100 (best health state)¹⁷. This instrument was adapted and validated for the Portuguese language in a study applied to patients with rheumatoid arthritis¹⁸. HRQoL of the study population was presented by score values ranging between 0-100 in the component summary (PCS and MCS) scores and the SF-12 eight-domain scale.

Data were entered in an Epi Info software database, version 2000, with checking for consistency on data entry and double entry. Statistical analysis was performed in the complex samples option of the Statistical Program for Social Sciences version 16.0 (SPSS Inc., Chicago, USA). At each sampling frame a probability of selection was calculated to conduct the analysis, taking into account the effect of design. Crude analysis was performed using Pearson's chi-square test (categorical variables) and t-test (continuous variables). Data were stratified or adjusted by gender, considering the differences in quality of life between genders reported by several investigators¹⁹⁻²¹. Multivariate analysis was performed in the Complex Samples General Linear Model including age, education and gender as covariates.

RESULTS

In total, 1,858 individuals were evaluated between 2005 and 2007. The age ranged from 18 to 96 years, 1,117 (60.1%) were women with 52.5 ± 4.1 years and 741 (39.9%) were men with 47.2 ± 9.1 years of age. Table 1 shows the population characteristics and HRQoL scores by gender. Men had higher education but smoked and abused from

alcohol more frequently. Women were more frequently separated or widowed and older than men. The HRQoL general population scores were 49.6 (± 9.8) for PCS and 50.2 (± 11.1) for MCS. Men had summary PCS and MCS scores of 50.9 (± 8.7) and 52.7 (± 9.9), respectively, versus 48.7 (± 10.3) and 48.5 (± 11.5), respectively, for women ($P < 0.001$). Men had domain scores something higher than women.

The prevalence of hypertension was 34.2% (95% CI 31.5–36.9). Table 2 shows that individuals with hypertension had lower scores for HRQoL in all domains than normotensive subjects, and only in the MCS the difference was not significant. In the analyses stratified by gender (Table 3) the worst quality of life persisted for hypertensive men and women, but lost significance in some domains in men for physical functioning. Scores for women were lower than in men for all domains independently of the diagnosis of hypertension. The lower quality of life in subjects with hypertension was independent of age and education.

Figure 1 shows the component summary scores of HRQoL measured by the SF-12 and domains scores comparing participants with normal blood pressure with participants with hypertension with and without controlled blood pressure, stratified by gender. Lower scores on all components and domains were found among controlled hypertensive men when compared with uncontrolled hypertensive or normotensive individuals. Among women, only the general health state did not follow this pattern, showing lower scores for uncontrolled hypertensive women. Women had lower HRQoL scores in both components and all domains when compared with men.

Table 4 presents the HRQoL scores of participants with controlled and uncontrolled hypertension using and not using blood pressure drugs. Participants with blood pressure equal or higher than 140/90 mmHg not using blood pressure drugs (38.3 % of all hypertensive's) had higher health-related quality of life scores in all components of the SF-12 compared to those with blood pressure of 140/90 mmHg or higher on antihypertensive drugs (28.3% of all hypertensive's) or BP lower than 140/90 mmHg using antihypertensive agents (33.4% of hypertensive's).

The most commonly used antihypertensive drugs were diuretics (n=234, 12.3% of all participants with hypertension) and angiotensin-converting enzyme inhibitors (n=220, 11.8%). Monotherapy was more frequently employed (42%), and the drug of choice in these cases was an angiotensin-converting enzyme (ACE) inhibitor. There was a tendency toward lower HRQoL in the PCS ($p<0.09$) with the increasing number of antihypertensive drugs (1, 2, 3 or 4 and higher), whereas in the MCS this difference was not significant.

DISCUSSION

In this population-based survey we identified a high prevalence of hypertension even after the adjustment for the oversampling of elderly individuals. The prevalence of 34.2 % was higher than the prevalence of 29.8 % reported previously in this population more than a decade ago¹⁹. Ageing of this population and increasing of risk factors, particularly

of obesity, beside the play of chance, may explain this difference. Health-related quality of life in this population was relatively high values in the eight SF domains (higher than 65) and had average values in the summary component scores (around 50). These values are very similar to those of population-based studies conducted in several countries.¹⁷ The assessment of HRQoL by the SF-12 has become standard in epidemiological surveys, since it is a generic instrument for assessing health-related quality of life and not just quality of life in general²⁰. Moreover, the fact of being short makes its application easier particularly in population-based studies.

Compared to normotensive participants, hypertensive men and women had lower scores in PCS and MCS components. Quality of life in all domains and summary component scores of SF-12, were also lower in hypertensive compared to normotensive individuals, reproducing findings reported in population-based surveys, outpatient clinics and hospitals^{11, 21-27}. High diastolic blood pressure (≥ 110 mmHg) and the presence of target organ damage were also associated with lower scores of HRQoL in the domains of bodily pain, vitality and general health among patients with hypertension²⁸. The magnitude of the association of hypertension with low QOL has been smaller than the association with arthritis, diabetes, depression, congestive heart failure, lung disease and coronary heart disease^{9, 29}.

Lower HRQoL in women has been reported in the general population and among normotensive and hypertensive individuals²⁹⁻³¹ which was also observed in our study. Some differences in the HRQOL scores lost significance in the stratified analyses, but remained in the risk side both for men and women. Lower quality of life in women

compared to men has been attributed to depression, hormonal changes and self perception of health among other factors³²⁻³⁴.

The influence of treatment of hypertension on QOL has been scarcely investigated in population-based surveys. We identified that QOL was lower in subjects with controlled hypertension under drug treatment than in subjects with uncontrolled hypertension using or not using blood pressure drugs. These findings are discordant with those reported by Li and collaborators, who found higher HRQOL in controlled hypertensive patients compared to uncontrolled hypertensive subjects under drug treatment. A study showed that awareness of being hypertensive was associated with worse health-related quality of life³⁵. On the other side, Erickson and associates reported reduction in health-related quality of life due to symptoms associated with drug treatment.²² The worst QOL of treated hypertensive's with controlled blood pressure could be ascribed to the more intensive treatment to control blood pressure levels as well as adherence to changes in lifestyle that could adversely influence HRQoL.

The association of drug treatment with lower quality of life has not been attributed to adverse effects of blood pressure-lowering drugs as a whole or to a particular group of agents. In the TOHMS trial³⁶, which followed more than a 1,000 individuals randomized to four classes of blood agents and placebo for 4 years, did not find any difference in several scores of QOL between participants allocated to active drugs a placebo. The low incidence of adverse effects of blood pressure agents has been consistent in controlled clinical trials. On the other side, adverse events, i.e, intolerance to drugs

ascribed to the placebo effect, are quite frequent in a clinical setting, where about 35% of patients under drug treatment reported an adverse event related to drug treatment³⁷. Awareness of being sick and not the disease itself can be another reason for lower quality of life. In the SOFT study we identified an association between the awareness of having hypertension but not of high blood pressure with higher scores of stress³⁸. Other studies have reported lower HRQoL among people who consider themselves ill and take medication often^{11, 39}. There is a common sense that some symptoms, such as headache, are caused by high blood pressure, which could be another reason to feel ill after being aware of the diagnosis of hypertension. In population-based surveys and in the clinical setting we and others have repeatedly showed that there is no association between high blood pressure and headache^{40, 41}, even for severe hypertension⁴². In addition, higher blood pressure has been associated with lower perception of pain⁴³. Taking together, these findings suggest that the association between uncomplicated hypertension and particularly of treated hypertension with lower quality of life may be attributed to the awareness of disease and adverse events of blood pressure agents and not to higher blood pressure itself. The occurrence of end-organ damage, particularly of clinical disease, lowers quality of life by the disease and not because of high blood pressure⁴⁴⁻⁴⁶.

Our study has some limitations that deserve mention. The cross-sectional design does not allow demonstrating the temporal association, but it is unlikely that poor quality of life is a cause of hypertension, and particularly of controlled hypertension. The MINICHAL questionnaire was specifically developed to investigate HRQoL among

individuals with hypertension ⁴⁷, but was not available at the time of our data collection. Nevertheless, the SF-12 has been considered powerful instruments to assess HRQoL ^{48, 49}. The use of this questionnaire and the meticulous evaluation of risk factors for hypertension in a large sample of adult's representative of a whole city can be taken as strengths of our investigation.

In conclusion, individuals with hypertension have lower quality of life than normotensive subjects, particularly when blood pressure is controlled by drug treatment. Awareness of being sick and adverse events attributed to blood pressure agents may be responsible for this association and not high blood pressure per se.

REFERENCES

1. Kearney PM, Whelton M, Reynolds K, Whelton PK, He J. Worldwide prevalence of hypertension: a systematic review. *J Hypertens*. 2004;22(1):11-19.
2. Whincup P, Emberson J, Morris R, Shaper AG. Interheart. *Lancet*. 2005;365(9454):117; author reply 118.
3. Moreira LB, Fuchs SC, Wiehe M, Gus M, Moraes RS, Fuchs FD. Incidence of hypertension in Porto Alegre, Brazil: a population-based study. *J Hum Hypertens*. 2008;22(1):48-50.
4. Minayo MCS HZ, Buss PM. . Qualidade de vida e saúde: um debate necessário. *Cien Saude Colet*. 2000;5(1):7-18.
5. Williams GH. Assessing patient wellness: new perspectives on quality of life and compliance. *Am J Hypertens*. 1998;11(11 Pt 2):186S-191S.
6. Whitworth JA. 2003 World Health Organization (WHO)/International Society of Hypertension (ISH) statement on management of hypertension. *J Hypertens*. 2003;21(11):1983-1992.
7. Geraci TS, Geraci SA. What ALLHAT tells us about treating high-risk patients with hypertension and hyperlipidemia. *J Cardiovasc Nurs*. 2003;18(5):389-395.
8. Williams B. Drug treatment of hypertension: implications of ALLHAT. *Heart*. 2003;89(6):589-590.
9. Cook EL, Harman JS. A comparison of health-related quality of life for individuals with mental health disorders and common chronic medical conditions. *Public Health Rep*. 2008;123(1):45-51.
10. Hayes DK, Denny CH, Keenan NL, Croft JB, Greenlund KJ. Health-related quality of life and hypertension status, awareness, treatment, and control: National Health and Nutrition Examination Survey, 2001--2004. *J Hypertens*. 2008;26(4):641-647.
11. Mena-Martin FJ, Martin-Escudero JC, Simal-Blanco F, Carretero-Ares JL, Arzuamouronte D, Herreros-Fernandez V. Health-related quality of life of subjects with known and unknown hypertension: results from the population-based Ortega study. *J Hypertens*. 2003;21(7):1283-1289.
12. Fuchs SC, Moreira LB, Camey SA, Moreira MB, Fuchs FD. Clustering of risk factors for cardiovascular disease among women in Southern Brazil: a population-based study. *Cad Saude Publica*. 2008;24 Suppl 2:S285-293.
13. IBGE. Instituto Brasileiro de Geografia e Estatística. Setores censitários. Available at: www.ibge.gov.br. Accessed december 20, 2009.
14. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL, Jr., Jones DW, Materson BJ, Oparil S, Wright JT, Jr., Roccella EJ. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. *JAMA*. 2003;289(19):2560-2572.
15. Fayers P. *Quality of life. Assessment, analysis and interpretation*. 2.ed. ed. Chichester, England: John Wiley & Sons; 2000.

16. Ware JE; Kosinski M T-BD, Gandek B. How to Score version 2 of the SF-12® Health Survey (with a Supplement Documenting Version 1). Boston: QualityMetric Incorporated; 2004.
17. Ware JSKMM, Gandek B. *SF-36® Health Survey Manual and Interpretation Guide*. New England Medical Center, The Health Institute; 1993.
18. Ciconelli RM. Tradução para o português e validação do questionário genérico de avaliação de qualidade de vida "medical outcomes study 36-item short-form health survey (SF-36)". São Paulo, USP; 1997.
19. Trindade IS, Heineck G, Machado JR, Ayzemberg H, Formighieri M, Crestani M, Gusso J. [Prevalence of systemic arterial hypertension in the population of +Passo Fundo (Brazil) metropolitan area]. *Arq Bras Cardiol*. 1998;71(2):127-130.
20. Gandek B, Ware JE, Aaronson NK, Apolone G, Bjorner JB, Brazier JE, Bullinger M, Kaasa S, Lepage A, Prieto L, Sullivan M. Cross-validation of item selection and scoring for the SF-12 Health Survey in nine countries: results from the IQOLA Project. International Quality of Life Assessment. *J Clin Epidemiol*. 1998;51(11):1171-1178.
21. DeForge BR, Stewart DL, DeVoe-Weston M, Graham L, Charleston J. The relationship between health status and blood pressure in urban African Americans. *J Natl Med Assoc*. 1998;90(11):658-664.
22. Erickson SR, Williams BC, Gruppen LD. Perceived symptoms and health-related quality of life reported by uncomplicated hypertensive patients compared to normal controls. *J Hum Hypertens*. 2001;15(8):539-548.
23. Bardage C, Isacson D, Ring L, Bingefors K. A Swedish population-based study on the relationship between the SF-36 and health utilities to measure health in hypertension. *Blood Press*. 2003;12(4):203-210.
24. Alonso J, Ferrer M, Gandek B, Ware JE, Jr., Aaronson NK, Mosconi P, Rasmussen NK, Bullinger M, Fukuhara S, Kaasa S, Lepage A. Health-related quality of life associated with chronic conditions in eight countries: results from the International Quality of Life Assessment (IQOLA) Project. *Qual Life Res*. 2004;13(2):283-298.
25. Thommasen HV, Zhang W. Impact of chronic disease on quality of life in the Bella Coola Valley. *Rural Remote Health*. 2006;6(2):528.
26. Wang R, Wu C, Zhao Y, Yan X, Ma X, Wu M, Liu W, Gu Z, Zhao J, He J. Health related quality of life measured by SF-36: a population-based study in Shanghai, China. *BMC Public Health*. 2008;8:292.
27. Arslantas D, Ayranci U, Unsal A, Tozun M. Prevalence of hypertension among individuals aged 50 years and over and its impact on health related quality of life in a semi-rural area of western Turkey. *Chin Med J (Engl)*. 2008;121(16):1524-1531.
28. de Gusmao JL, Mion D, Jr., Pierin AM. Health-related quality of life and blood pressure control in hypertensive patients with and without complications. *Clinics (Sao Paulo)*. 2009;64(7):619-628.
29. Banegas JR, Lopez-Garcia E, Graciani A, Guallar-Castillon P, Gutierrez-Fisac JL, Alonso J, Rodriguez-Artalejo F. Relationship between obesity, hypertension and diabetes, and health-related quality of life among the elderly. *Eur J Cardiovasc Prev Rehabil*. 2007;14(3):456-462.

30. Burstrom K, Johannesson M, Diderichsen F. Swedish population health-related quality of life results using the EQ-5D. *Qual Life Res.* 2001;10(7):621-635.
31. Anderson RT, Hogan P, Appel L, Rosen R, Shumaker SA. Baseline correlates with quality of life among men and women with medication-controlled hypertension. The trial of nonpharmacologic interventions in the elderly (TONE). *J Am Geriatr Soc.* 1997;45(9):1080-1085.
32. Gaynes BN, Burns BJ, Tweed DL, Erickson P. Depression and health-related quality of life. *J Nerv Ment Dis.* 2002;190(12):799-806.
33. Wells KB, Schoenbaum M, Unutzer J, Lagomasino IT, Rubenstein LV. Quality of care for primary care patients with depression in managed care. *Arch Fam Med.* 1999;8(6):529-536.
34. Wells KB, Sherbourne CD. Functioning and utility for current health of patients with depression or chronic medical conditions in managed, primary care practices. *Arch Gen Psychiatry.* 1999;56(10):897-904.
35. Li W, Liu L, Puente JG, Li Y, Jiang X, Jin S, Ma H, Kong L, Ma L, He X, Ma S, Chen C. Hypertension and health-related quality of life: an epidemiological study in patients attending hospital clinics in China. *J Hypertens.* 2005;23(9):1667-1676.
36. Neaton JD, Grimm RH, Jr., Prineas RJ, Stamler J, Grandits GA, Elmer PJ, Cutler JA, Flack JM, Schoenberger JA, McDonald R, et al. Treatment of Mild Hypertension Study. Final results. Treatment of Mild Hypertension Study Research Group. *JAMA.* 1993;270(6):713-724.
37. Goncalves CB, Moreira LB, Gus M, Fuchs FD. Adverse events of blood-pressure-lowering drugs: evidence of high incidence in a clinical setting. *Eur J Clin Pharmacol.* 2007;63(10):973-978.
38. Sparrenberger F, Fuchs SC, Moreira LB, Fuchs FD. Stressful life events and current psychological distress are associated with self-reported hypertension but not with true hypertension: results from a cross-sectional population-based study. *BMC Public Health.* 2008;8:357.
39. Banegas JR, Guallar-Castillon P, Rodriguez-Artalejo F, Graciani A, Lopez-Garcia E, Ruilope LM. Association between awareness, treatment, and control of hypertension, and quality of life among older adults in Spain. *Am J Hypertens.* 2006;19(7):686-693.
40. Gus M, Fuchs FD, Pimentel M, Rosa D, Melo AG, Moreira LB. Behavior of ambulatory blood pressure surrounding episodes of headache in mildly hypertensive patients. *Arch Intern Med.* 2001;161(2):252-255.
41. Wiehe M, Fuchs SC, Moreira LB, Moraes RS, Fuchs FD. Migraine is more frequent in individuals with optimal and normal blood pressure: a population-based study. *J Hypertens.* 2002;20(7):1303-1306.
42. Fuchs FD, Gus M, Moreira LB, Moreira WD, Goncalves SC, Nunes G. Headache is not more frequent among patients with moderate to severe hypertension. *J Hum Hypertens.* 2003;17(11):787-790.
43. Hagen K, Zwart JA, Holmen J, Svebak S, Bovim G, Stovner LJ. Does hypertension protect against chronic musculoskeletal complaints? The Nord-Trondelag Health Study. *Arch Intern Med.* 2005;165(8):916-922.

44. Kots la I, Libis RA. [Quality of life in patients with cardiovascular diseases]. *Kardiologija*. 1993;33(5):66-71, quiz 71-62.
45. Li C, Ford ES, Mokdad AH, Balluz LS, Brown DW, Giles WH. Clustering of cardiovascular disease risk factors and health-related quality of life among US adults. *Value Health*. 2008;11(4):689-699.
46. Alonso Saenz de Miera MJ, Balanza Galindo S, Leal Hernandez M, Abellan Aleman J. [Quality of life and cardiovascular risk]. *Aten Primaria*. 2008;40(9):475-476.
47. Badia X, Roca-Cusachs A, Dalfo A, Gascon G, Abellan J, Lahoz R, Varela C, Velasco O. Validation of the short form of the Spanish Hypertension Quality of Life Questionnaire (MINICHAL). *Clin Ther*. 2002;24(12):2137-2154.
48. Cote I, Gregoire JP, Moisan J, Chabot I. Quality of life in hypertension: the SF-12 compared to the SF-36. *Can J Clin Pharmacol*. 2004;11(2):e232-238.
49. Lundberg L, Johannesson M, Isacson DG, Borgquist L. The relationship between health-state utilities and the SF-12 in a general population. *Med Decis Making*. 1999;19(2):128-140.

Table 1 – Socio-demographic characteristics and physical and mental component summary scores, by gender [% or Mean \pm SD]

Variables	Overall	Men	Women	P
	%	%	%	
Age				
18-49	63.8	68.0	60.8	<0.001
50-64	22.6	21.5	23.3	
65-96	13.7	10.5	16.0	
Years at school				
0 a 4	16.3	11.0	20.1	<0.001
5 a 8	28.5	30.0	27.4	
9 a 11	31.9	34.7	29.9	
12 a 23	22.6	24.3	23.3	
Skin color				
White	71.6	71.6	71.6	0.9
Non white	28.4	28.4	28.4	
Marital status				
Single	28.7	31.7	26.6	<0.001
Separated/widowed	20.1	6.4	28.5	
Married/partner	51.2	63.7	44.9	
Hypertension				
Yes	34.2	36.0	32.8	0,2
No	65.8	64.0	67.2	
BMI (kg/m²)				
< 25	46,5	47,0	46,1	0,7
\geq 25	53,5	53,0	53,9	
Current smoking				
Yes	26.6	29.9	24.3	0.01
No	73.4	70.1	75.7	
Alcohol abuse*				
Yes	10.3	14.5	7.3	<0.001
No	89.7	85.5	92.7	
Physical activity				
< 150 min/week	25.5	25.4	25.6	0.9
\geq 150 min/week	74.6	74.6	74.4	
PCS	49.6 \pm 9.8	50.9 \pm 8.7	48.7 \pm 10.3	<0.001
MCS	50.2 \pm 11.1	52.7 \pm 9.9	48.5 \pm 11.5	<0.001
Physical functioning	81.1 \pm 30.5	86.4 \pm 26.9	77.5 \pm 32.3	<0.001
Role physical	84.1 \pm 27.6	87.8 \pm 25.5	81.6 \pm 28.6	<0.001
Bodily pain	83.1 \pm 25.2	88.1 \pm 22.2	79.8 \pm 26.5	<0.001
General health	58.5 \pm 25.2	61.9 \pm 24.6	56.2 \pm 25.4	<0.001
Vitality	66.2 \pm 26.5	71.3 \pm 24.8	62.8 \pm 27.1	<0.001
Social functioning	84.2 \pm 28.0	89.7 \pm 22.6	80.5 \pm 30.6	<0.001
Role emotional	84.3 \pm 24.4	88.8 \pm 20.9	81.3 \pm 26.0	<0.001
Mental health	69.0 \pm 29.0	74.5 \pm 20.9	65.3 \pm 23.6	<0.001

* Alcohol abuse: \geq 30 g/day for men and \geq 15 g/d for women.

Table 2 – Adjusted health-related quality of life by hypertension [mean (CI 95%)]

SF-12	Whole sample	Hipertensive	Normotensive	P♦
PF	81.7 (79.8-83.7)	74.2 (71.3-77.1)	89.3 (87.5-91.0)	<0.001
RP	84.3 (82.7-86.0)	79.2 (76.6-81.8)	89.5 (87.8-91.2)	<0.001
BP	83.0 (81.4-84.7)	80.3 (77.8-82.8)	85.7 (84.2-87.3)	<0.001
GH	57.7 (56.1-59.4)	51.5 (49.4-53.7)	64.0 (62.1-65.9)	<0.001
VT	65.9 (64.3-67.5)	64.1 (61.7-66.5)	67.6 (65.9-69.4)	0.01
SF	83.8 (82.2-85.7)	80.8 (78.2-83.4)	87.1 (85.3-88.9)	<0.001
RE	84.2 (82.4-86.0)	82.5 (79.9-85.0)	86.0 (84.3-87.7)	0.004
MH	68.2 (66.9-69.6)	66.8 (64.6-69.0)	69.6 (68.1-71.1)	0.03
PCS	49.7 (49.0-50.3)	47.2 (46.3-48.1)	52.2 (51.6-52.8)	<0.001
MCS	49.9 (49.2-50.6)	49.7 (48.6-50.8)	50.1 (49.4-50.9)	0.5

PF = physical functioning, RP = role physical, BP = bodily pain, GH = general health, VT = vitality, SF = social functioning, RE = role emotional, MH = mental health, PCS = physical component summary and MCS = mental component summary; ♦Adjusted for age and education.

Table 3 – Adjusted health-related quality of life by gender according to hypertension [mean (CI 95%)]

SF-12	Men (N=741) Hypertension			Women (N=1117) Hypertension		
	Yes	No	P \blacklozenge	Yes	No	P \blacklozenge
PF	86.1(83.2-89.1)	89.6(87.2-91.9)	0.08	76.1(71.9-80.2)	83.6(80.9-86.4)	<0.01
RP	87.6(84.2-90.9)	89.8(87.1-92.5)	0.3	80.7(77.5-84.0)	85.4(83.5-87.3)	0.01
BP	87.4(83.8-90.9)	89.3(87.1-91.5)	0.4	78.1(74.8-81.4)	81.7(79.5-83.8)	0.06
GH	57.3(54.1-60.5)	65.9(63.5-68.4)	<0.01	52.6(49.5-55.7)	59.9(58.0-61.9)	<0.01
VT	67.8(64.3-71.3)	73.7(71.5-75.8)	<0.01	60.0(56.5-63.5)	64.2(62.0-66.5)	0.06
SF	88.6(85.4-91.8)	91.3(89.5-93.2)	0.1	76.5(72.5-80.5)	83.4(80.8-86.0)	<0.01
RE	88.3(85.5-91.1)	89.5(87.1-91.9)	0.5	78.8(74.8-82.8)	83.1(81.0-85.3)	0.05
MH	71.1(67.8-74.4)	76.3(73.9-78.6)	<0.01	61.4(58.3-64.5)	66.1(64.1-68.1)	0.01
PCS	50.6(49.5-51.7)	52.0 (51.2-52.8)	0.05	48.4(47.2-49.5)	50.5(49.6-51.3)	<0.01
MCS	51.4(49.9-52.9)	53.2(52.1-54.3)	0.07	46.7(45.2-48.3)	48.8(47.9-49.8)	0.02

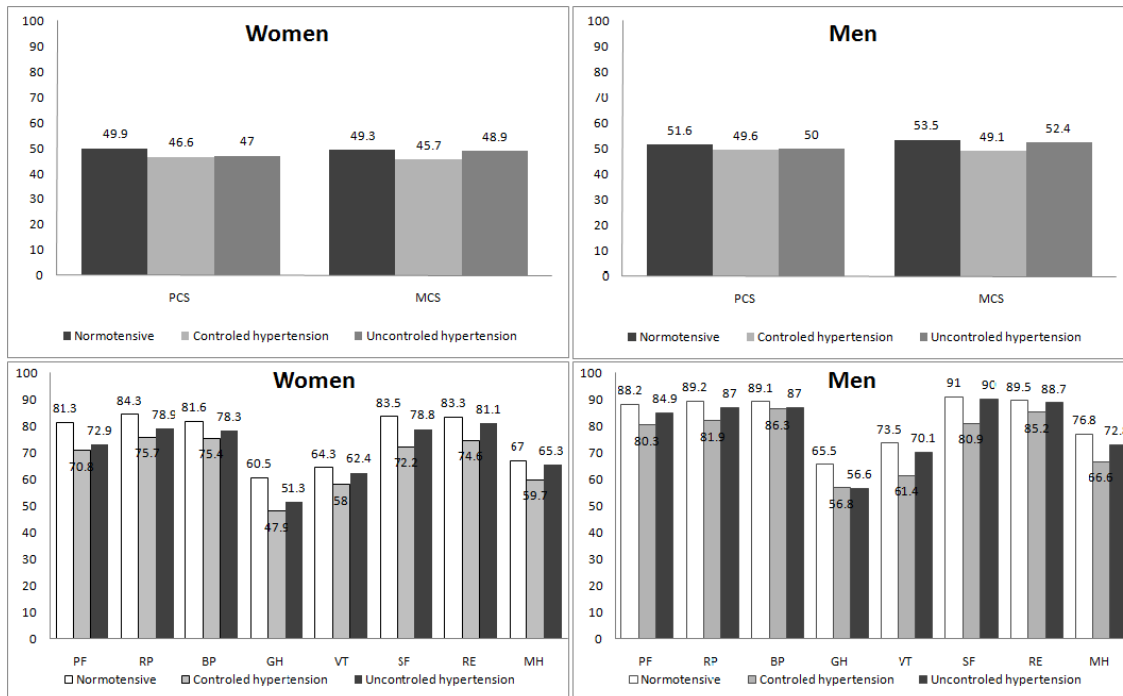
PF = physical functioning, RP = role physical, BP = bodily pain, GH = general health, VT = vitality, SF = social functioning, RE = role emotional, MH = mental health, PCS = physical component summary and MCS = mental component summary; \blacklozenge Adjusted for age and education.

Table 4 –Adjusted health-related quality of life according to hypertension status [mean (CI 95%)]

	Controlled hypertension^a	Uncontrolled hypertension^a	Untreated hypertension	P ♦
Physical functioning	69.9 (65.5-74.2)	68.5 (62.7-74.2)	82.4 (78.6-86.2)	< 0.01
Role physical	75.0 (71.2-78.2)	76.4 (71.6-81.2)	85.1 (81.6-88.6)	< 0.01
Bodily pain	78.3 (74.1-82.6)	75.8 (71.5-80.2)	85.3 (81.9-88.8)	< 0.01
General health	47.8 (44.0-51.6)	46.8 (42.9-50.6)	58.3 (55.2-61.4)	< 0.01
Vitality	60.5 (55.9-65.1)	60.9 (56.5-65.4)	69.8 (66.3-73.2)	< 0.01
functioning	75.9 (70.8-81.0)	80.7 (76.0-85.4)	85.3 (81.8-88.8)	< 0.01
Role emotional	78.3 (74.0-82.6)	81.3 (77.7-84.9)	86.9 (83.8-90.0)	< 0.01
Mental health	62.6 (58.7-66.5)	64.3 (60.6-67.9)	72.3 (69.3-75.4)	< 0.01
PCS	46.2 (44.8-47.5)	45.3 (43.5-47.0)	49.6 (48.4-50.8)	< 0.01
MCS	47.7 (45.7-49.7)	49.4 (47.6-51.1)	51.9 (50.3-53.2)	< 0.01

a: using blood pressure agents; PF = physical functioning, RP = role physical, BP = bodily pain, GH = general health, VT = vitality, SF = social functioning, RE = role emotional, MH = mental health, PCS = physical component summary and MCS = mental component summary; ♦adjusted for age, education and gender.

Figure 1 – Comparison of the health-related quality of life scores between men and women



PF = physical functioning, RP = role physical, BP = bodily pain, GH = general health, VT = vitality, SF = social functioning, RE = role emotional, MH = mental health, PCS = physical component summary and MCS = mental component summary; ♦adjusted for age, education and gender.

ARTIGO 3

SHORT COMMUNICATION

**A COMPARISON OF HEALTH-RELATED QUALITY OF LIFE OF HYPERTENSIVE
INDIVIDUALS WITH THE SF-12 NORM-BASED SCORES OF THE GENERAL
POPULATION**

A comparison of health-related quality of life scores between hypertensive individuals and the SF12 norm-based scores for the general population

Daisson J Trevisol^{a,b}, Leila B Moreira^a, Sandra C Fuchs^a, Flavio D Fuchs^a

^aPrograma de Pós-graduação em Ciências da Saúde: Cardiologia e Ciências Cardiovasculares; Faculdade de Medicina, Universidade Federal do Rio Grande do Sul. Porto Alegre – Brasil, ^bUniversidade do Sul de Santa Catarina ³Tubarão - Brasil

Sponsorship: This study was supported by CNPQ, FAPERGS and FIPE-HCPA

Correspondence and requests for reprints to Daisson J Trevisol, Universidade do Sul de Santa Catarina, Unidade Hospitalar de Ensino, Av. José Acácio Moreira, 787, Bairro Dehon, 88704-900, Tubarão, SC – Brasil
Tel: 55-48-36221442; fax: 55-48-36221808
Email: daisson.trevisol@unisul.br

Abstract

Objective: To compare health-related quality of life scores between hypertensive individuals and the SF12 norm-based scores for the general population.

Methods: In a cross-sectional study using a multistage population-based sample, participants were interviewed at home and had their blood pressure (BP) measured four times. Hypertension was defined as BP \geq 140/90mmHg or the report of antihypertensive drug use. Health-related quality of life was assessed using the Short-Form Health Survey (SF-12 [®]) and presented as Physical Component Summary (PCS), Mental Component Summary (MCS) and by the SF-12 eight-domain scale of the norm-based score. The quality of life scores were entered into the NBS calculator, available in the SF-12 official program, aiming to obtain the norm-based scores, which employ a linear T-score transformation with a mean of 50 and standard deviation of 10 used to compare value differences in the eight SF domains between two samples on the same graph.

Results: In total, 1,858 individuals were evaluated, of whom 1,117 (60.1%) were women aged 52.5 ± 4.1 years and 741 (39.9%) were men aged 47.2 ± 9.1 years. The norm-based scores of the general population compared with hypertensive individuals show the following values, respectively: PF 49.8/45; RP 51.4/49.7; BP 53.6/54.1; GH 43.8/41.1; VT 52.6/53.2; SF 50.6/48.4; RE 51.1/49.7; MH 46.6/45.7; PCS 50.6/48; and MCS 49.9/49.

Conclusion: Individuals with hypertension have lower scores of quality of life scores than the general population, particularly in regard to physical functioning, general health and social functioning.

Keywords

Hypertension, quality of life, short-form health survey.

INTRODUCTION

Health-related quality of life is intended to benefit patients, clinicians, researchers, managers and health maintenance organizations in decision making for treatment and therapeutic monitoring of patients. Quality of life can be measured by generic instruments used and validated to assess quality of life in general, in all situations. Different instruments assess the context of a specific condition, like hypertension¹⁻⁶. In general, questionnaires that assess quality of life have similar questions and take several specific domains of physical, mental and social assessment into account. They allowed the assessment of a given point in time or change that could happen from an intervention or even attitude change.

Score interpretation and differences between health-related quality of life of subgroups can be accomplished by analyzing the score values ranging between 0 up to 100 or by comparing norm-based score. In this case, the domain values are calibrated and transformed in an average around 50 and can be compared to values of other general populations or to some comorbidity⁷.

This study evaluated health-related quality of life in a representative sample of the general population of Porto Alegre, southern Brazil, comparing norm-based scores of the general population with hypertensive individuals of that sample, aiming to assess which SF domains presented the greatest difference from the norm-based score.

METHODS

This cross-sectional study investigated adults living in Porto Alegre, a state capital located in southern Brazil, with more than 1.5 million inhabitants and a health development index of 0.800, in 2005. Subjects were selected by multistage population-based sampling. The sampling process was described with detail previously⁸. A sample size to detect a difference of 10 points in the SF-12[®] score between hypertensive and non-hypertensive individuals with a ratio 1:3, confidence interval of 95% and power of 80% was estimated in 1,858 adult subjects for HRQoL analyses.

The study was approved by the Institutional Review Board of the Clinical Hospital of Porto Alegre (HCPA), and all participants signed the informed consent form. Data were collected through a structured questionnaire administered in household interviews, prepared for the SOFT study⁸. The questionnaire included demographic questions, dietary survey, physical activity, lifestyle habits such as smoking and alcohol consumption, diseases, medication use, and previous record of hypertension. Four standardized blood pressure measurements were performed over the course of the interview using OMRON[®] CP-705 digital sphygmomanometer, according to technical recommendations⁹. Hypertension was defined as an average of four blood pressure measurements of 140/90 mmHg or higher or the use of antihypertensive drugs⁹. The Short-Form Health Survey (SF-12[®]), derived from the SF-36^{2, 7, 10} was used to assess health-related quality of life.

Measurement data were entered into the database, created in the Epi Info software, version 2000, with consistency checks on data entry and double entry. Statistical analysis was performed in the complex samples option of the Statistical Program for Social Sciences version 16.0 (SPSS Inc., Chicago, USA). At each sampling frame a probability of selection was calculated to conduct the analysis, taking the effect of design into account. Data on the quality of life scores were entered in the NBS Calculator, available on the SF-12 official program, aiming to obtain the values of the norm-based score, which employs a linear T-score transformation with an average score of 50 and standard deviation of 10 used to compare value differences in the eight SF domains between two samples on the same graph¹¹. Positive difference means higher HRQoL.

RESULTS

In the total, 1,858 individuals aged 18-96 years were evaluated. Of them, 1,117 (60.1%) were women and 741 (39.9%) men, 34.4% had measured hypertension or use anti-hypertensive.

Figure 1 presents the original scale scores of quality of life for the population of Porto Alegre, showing the following values for the general population and hypertensive individuals, respectively: physical functioning (PF) 84.1/71; role physical (RP) 85.9/76.9; bodily pain (BP) 83.9/79.9; general health (GH) 59.7/51.1; vitality (VT) 66.4/63.8; social functioning (SF) 84.9/79.9; role emotional (RE) 84.7/82; mental health (MH) 68.6/67.7.

Figure 2 shows the scale scores of health-related quality of life and the difference between the scores of the general population compared to hypertensive patients in Porto Alegre, taking the average score into account.

The norm-based scores of the general population compared with hypertensive individuals show the following values, respectively: physical functioning 49.8/45; role physical 51.4/49.7; bodily pain 53.6/54.1; general health 43.8/41.1; vitality 52.6/53.2; social functioning 50.6/48.4; role emotional 51.1/49.7; mental health 46.6/45.7; physical component summary 50.6/48; and mental component summary 49.9/49.

It can be observed that only in the bodily pain and vitality domains the HRQoL scores are higher in hypertensive patients. In the other domains, they have poorer quality of life compared to the general population.

DISCUSSION

In this study, it was found that the quality of life scores, when calculated in the normal range of the SF-12 (0 up to 100), were higher in the general population than in hypertensive patients. Others studies have recorded that individuals with hypertension and other chronic diseases that affect the population tend to have lower scores of quality of life compared to the scores of the general population¹²⁻¹⁴. Reduction in quality of life of hypertensive patients can be compared to diabetic patients, only surpassed by that detected in patients with depression, anxiety or emotional problems^{15, 16}.

However, in this variation of scores, it is not possible to assess which area has more impact on quality of life of individuals in the study. To assess this impact, the values were transformed into NBS, allowing specific actions related to the most relevant aspects of the study population. We showed that HRQoL is diminished in hypertensive subjects, and physical component is more affected than mental component. It can be observed that only in the bodily pain and vitality domains the HRQoL scores are higher in hypertensive patients. In the other domains, they have poorer quality of life compared to the general population. Physical functioning was the SF domain which presented the greatest difference between hypertensive participants and the general population of this study. This domain may reflect physical capacity reduction due to stroke, coronary disease, and other target organ damages that tend to reduce the quality of life scores^{12, 17, 18} or the presence of adverse drug reactions. The reduction in general health domain

is in accordance with the hypothesis that the label of being hypertensive is associated with worse health-related quality of life ¹⁹

The observed differences in the scores of NBS, which represent poorer quality of life, can result in decreased compliance with treatment and difficulty in controlling blood pressure levels. Identifying the domain that has the greatest impact on quality of life of these individuals, allows designing more effective approaches to improve quality of life, improving the physical condition, inserting the hypertensive in social groups, forwarding it to specialized professionals, improving medication adherence in order to obtain better control of hypertension rates and reduce cardiovascular risks.

It can be concluded that hypertensive patients have lower quality of life scores compared to those of the general population, and that physical functioning, general health and social functioning domains suffer the greatest impact. In addition, the physical component presents the largest changes. In this sense, strategies can be created to increase quality of life and improve blood pressure levels of hypertensive patients.

REFERENCES

1. Ware JE, Jr., Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Med Care*. 1992;30(6):473-483.
2. Ware JE; Kosinski M T-BD, Gandek B. How to Score version 2 of the SF-12® Health Survey (with a Supplement Documenting Version 1). Boston: QualityMetric Incorporated; 2004.
3. Schulz RB, Rossignoli P, Correr CJ, Fernandez-Llimos F, Toni PM. Validation of the short form of the Spanish hypertension quality of life questionnaire (MINICHAL) for Portuguese (Brazil). *Arq Bras Cardiol*. 2008;90(2):127-131.
4. Badia X, Roca-Cusachs A, Dalfo A, Gascon G, Abellan J, Lahoz R, Varela C, Velasco O. Validation of the short form of the Spanish Hypertension Quality of Life Questionnaire (MINICHAL). *Clin Ther*. 2002;24(12):2137-2154.
5. Campolina AG, Ciconelli RM. [SF-36 and the development of new assessment tools for quality of life]. *Acta Reumatol Port*. 2008;33(2):127-133.
6. Fleck MP, Louzada S, Xavier M, Chachamovich E, Vieira G, Santos L, Pinzon V. [Application of the Portuguese version of the abbreviated instrument of quality life WHOQOL-bref]. *Rev Saude Publica*. 2000;34(2):178-183.
7. Ware JSKMM, Gandek B. *SF-36® Health Survey Manual and Interpretation Guide*. New England Medical Center, The Health Institute; 1993.
8. Fuchs SC, Moreira LB, Camey SA, Moreira MB, Fuchs FD. Clustering of risk factors for cardiovascular disease among women in Southern Brazil: a population-based study. *Cad Saude Publica*. 2008;24 Suppl 2:S285-293.
9. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL, Jr., Jones DW, Materson BJ, Oparil S, Wright JT, Jr., Roccella EJ. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. *JAMA*. 2003;289(19):2560-2572.
10. Fayers P. *Quality of life. Assessment, analysis and interpretation*. 2.ed. ed. Chichester, England: John Wiley & Sons; 2000.
11. Ware JE, Jr. SF-36 health survey update. *Spine (Phila Pa 1976)*. 2000;25(24):3130-3139.
12. Xie J, Wu EQ, Zheng ZJ, Croft JB, Greenlund KJ, Mensah GA, Labarthe DR. Impact of stroke on health-related quality of life in the noninstitutionalized population in the United States. *Stroke*. 2006;37(10):2567-2572.
13. Chambers BA, Guo SS, Siervogel R, Hall G, Chumlea WC. Cumulative effects of cardiovascular disease risk factors on quality of life. *J Nutr Health Aging*. 2002;6(3):179-184.
14. Poljicanin T, Ajdukovic D, Sekerija M, Pibernik-Okanovic M, Metelko Z, Vuletic-Mavrincac G. Diabetes mellitus and hypertension have comparable adverse effects on health-related quality of life. *BMC Public Health*. 10(1):12.
15. Alonso J, Ferrer M, Gandek B, Ware JE, Jr., Aaronson NK, Mosconi P, Rasmussen NK, Bullinger M, Fukuhara S, Kaasa S, Leplege A. Health-related quality of life associated with chronic conditions in eight countries: results from

- the International Quality of Life Assessment (IQOLA) Project. *Qual Life Res.* 2004;13(2):283-298.
16. Cook EL, Harman JS. A comparison of health-related quality of life for individuals with mental health disorders and common chronic medical conditions. *Public Health Rep.* 2008;123(1):45-51.
 17. Alonso Saenz de Miera MJ, Balanza Galindo S, Leal Hernandez M, Abellan Aleman J. [Quality of life and cardiovascular risk]. *Aten Primaria.* 2008;40(9):475-476.
 18. Brito DM, Araujo TL, Galvao MT, Moreira TM, Lopes MV. [Quality of life and perception of illness among individuals with high blood pressure]. *Cad Saude Publica.* 2008;24(4):933-940.
 19. Li W, Liu L, Puente JG, Li Y, Jiang X, Jin S, Ma H, Kong L, Ma L, He X, Ma S, Chen C. Hypertension and health-related quality of life: an epidemiological study in patients attending hospital clinics in China. *J Hypertens.* 2005;23(9):1667-1676.

LEGENDS

FIGURE 1: Quality of life scale scores of the general population (left) and hypertensive individuals (right) in Porto Alegre.

FIGURE 2: Difference between the norm-based score of the general population and hypertensive individuals in Porto Alegre.

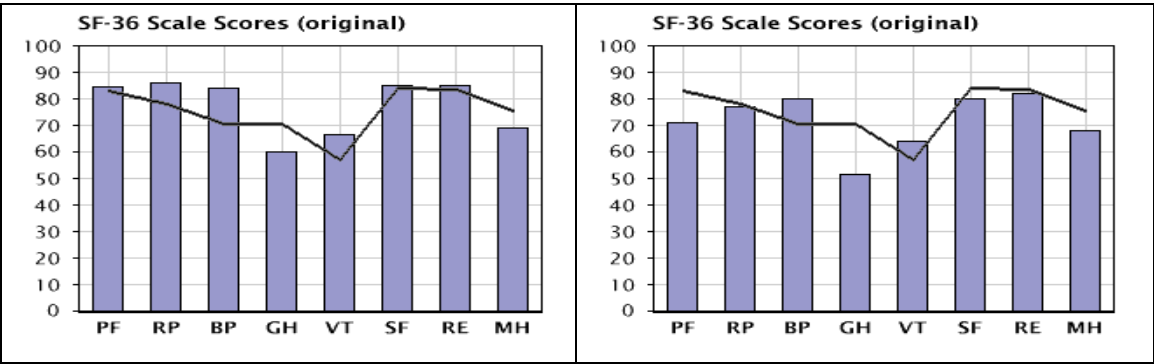


Figure 1 – Quality of life scale scores of the general population (left) and hypertensive individuals (right) in Porto Alegre.

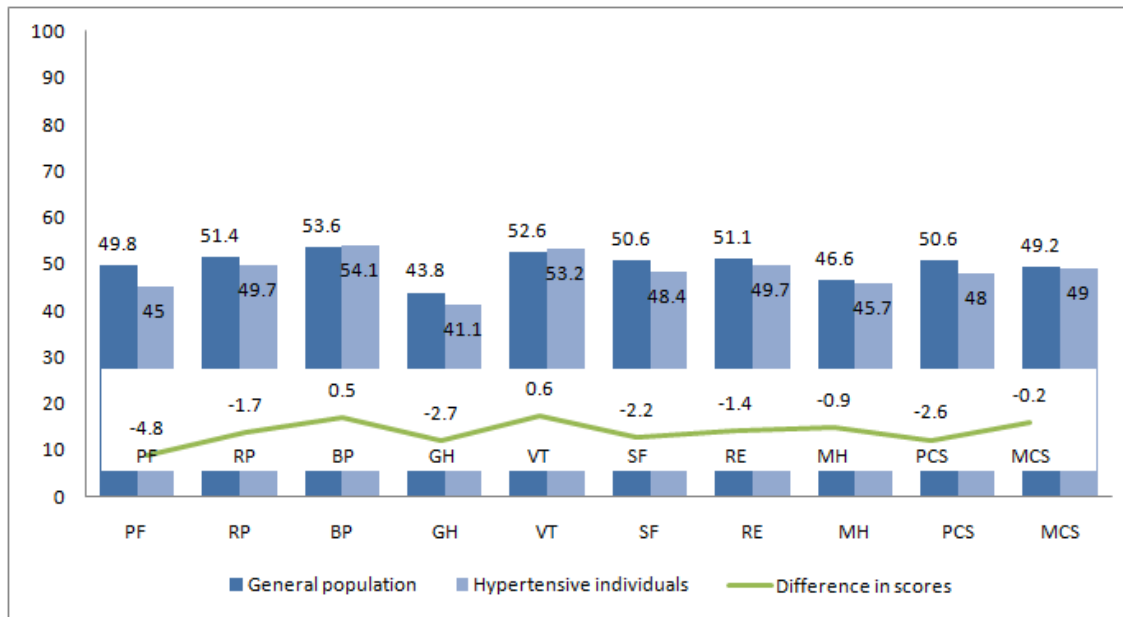


Figure 2 – Difference between the norm-based score of the general population and hypertensive individuals in Porto Alegre.