

A Comparative Study of International Guidelines for the Management of Hypertension

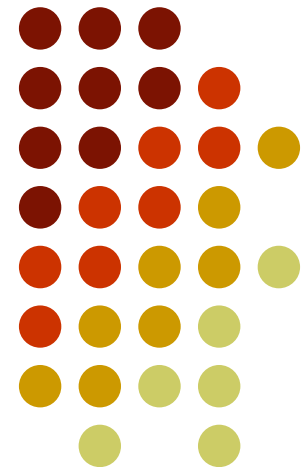
Gersende Georg^{1,2,3}, Pierre Meneton^{1,2,3}, Isabelle Colombet^{1,2,3,4}, Pierre Durieux^{1,2,3,4}, Joël Ménard²

¹INSERM U 872, Eq. 20, SPIM;

²Université Paris Descartes, UMR S 872;

³Centre de Recherche des Cordeliers, Université Pierre et Marie Curie – Paris 6, UMR S 872, Paris;

⁴AP-HP, Hôpital Européen Georges Pompidou, Département d'Informatique Hospitalière, Paris



Outline



- Context of the work
- Method
- Findings
- Conclusions and Perspectives

Rationale



- Is there a variation in guidelines' contents for similar topics across different countries?
- Which recommendations can be used by health professionals?
- What is the relationship of each guideline to the underlying scientific literature?

Key Ideas



- Characterize differences in terms of structure and contents
 - Between national guidelines from different countries
 - Between national guidelines and international guidelines
- Analyzing differences
 - Selection of references
 - Interpretation of the literature
 - Authoring process

Hypertension Guidelines



- Hypertension is a major risk factor of cardiovascular morbidity and mortality
- Choice of guidelines
 - Published within the same time period (2003 – 2006)
 - English guidelines or English versions
 - Study limited to 4 guidelines (3 from national agencies and 1 from international associations)
 - HAS (French National Authority for Health, 2005)
 - NICE (National Institute for Health and Clinical Excellence, United Kingdom, 2006)
 - JNC 7 (Joint National Committee, United States 2003)
 - ESH/ESC (The European Society of Hypertension (ESH) and the European Society of Cardiology (ESC), 2003)



Part I

Method for comparing guidelines

Overview



- Various type of documents
 - Clinical guidelines (recommendations)
 - Full versions (rationale)
 - Guideline's Summary
- Comparison of clinical guidelines and their full versions in terms of documents' structure
- Comparison of clinical guidelines in terms of content
 - In case of contents' discrepancies, we analyze the full versions

Identification of common sections



- Definition of hypertension and blood pressure stratification
- Blood pressure measurement methods
- Cardiovascular risk estimation
- Indication and role of lifestyle modifications
- Generic and specific drug therapies
- References

Comparison of references



- Similarities and discrepancies in the selection of the references in the full versions
- Identification of the types of references
 - Meta-analysis
 - Randomized controlled trials
 - Observational prospective and cross-sectional studies
- Number of references common to 2 or more guidelines
- Description of common references using the citation index of Google Scholar



Part II

Results of the structure comparison

Overall structure



- Total length (in pages, not including annexes) differed substantially

Clinical Guidelines

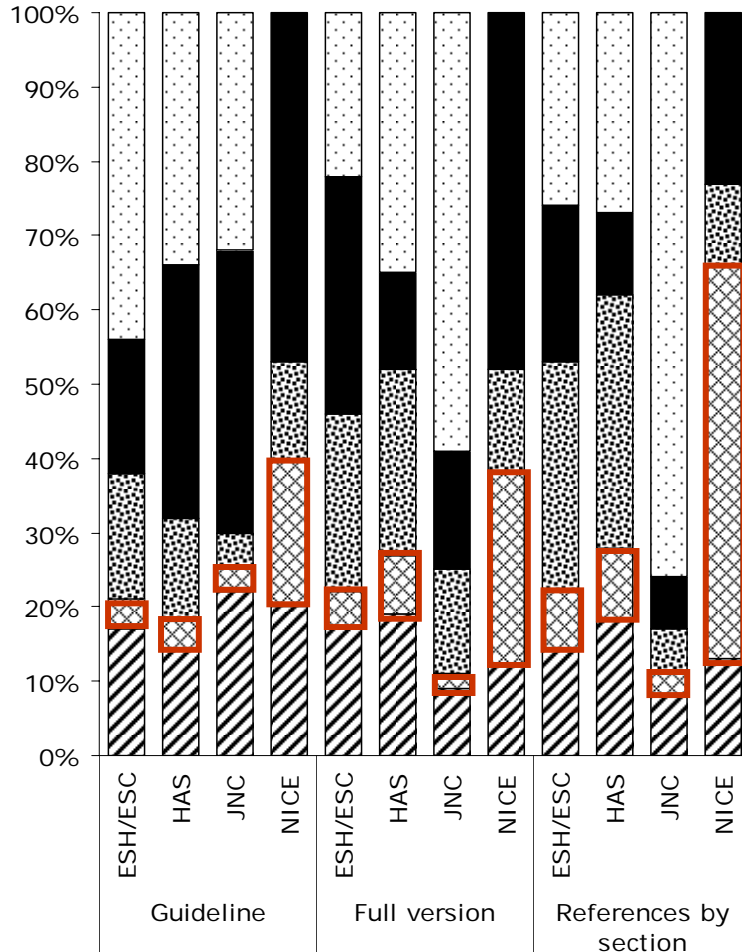
- 8 for ESH/ESC
- 28 for NICE
- 20 for HAS
- 21 for JNC

Full versions

- 29 for ESH/ESC
- 100 for NICE
- 98 for HAS
- 65 for JNC

- The ratio between the number of pages in the guidelines and in the full versions tends to be similar across guidelines (0.2 for ESH/ESC, HAS and NICE guidelines), slightly higher for the JNC guidelines (0.4)

Differences in the relative importance of each section



- Large differences in the relative proportion of each section in the number of references in guidelines and their full versions
 - Role of lifestyle in NICE guidelines
 - No discussion of specific drug therapy (for NICE guidelines) versus lengthy section on the topic (JNC guidelines)
- Elaboration of guidelines from the rationale is associated to great variability of the following sections
 - Lifestyle interventions
 - Definition and measurements of blood pressure

▣ Specific drug therapy

▣ Cardiovascular risk assessment

▣ Lifestyle interventions

▣ Definition and measurement of blood pressure

■ General drug therapy



Part III

Results of the content comparison

Protocols of blood pressure measurement



- Similar recommendations for the 4 guidelines:
 - The number of measurements (≥ 2)
 - The position of patients (sitting)
- Differences
 - HAS and NICE guidelines recommend 2-3 visits at monthly intervals for establishing the diagnosis of hypertension
 - ESH/ESC and JNC guidelines do not mention any number of visits
 - The delay before and between measurements (2-5 min)
 - NICE guidelines do not provide recommendations for the delay before and between measurements
 - HAS and NICE guidelines recommend selection of the arm for blood pressure measurements
 - ESH/ESC full version mentions side selection but this information is not present in the guideline
 - Only HAS guidelines provide indications for the interpretation of multiple blood pressure measurements

Definition of hypertension



- Blood pressure measurement settings (office, ambulatory and home) are similar for ESH/ESC, HAS and JNC guidelines
 - Office: SBP ≥ 140 and/or DBP ≥ 90
 - Ambulatory (Day): SBP ≥ 135 and/or DBP ≥ 85
 - Ambulatory (night): SBP ≥ 120 and/or DBP ≥ 75
 - Ambulatory 24 hours: SBP ≥ 130 and/or DBP ≥ 80
 - Home: SBP ≥ 135 and/or DBP ≥ 85
- NICE guidelines have the same definition of hypertension in the office setting, but it does not mention ambulatory and home settings for the diagnosis of hypertension
 - This is a conspicuous choice, justified in the full version
- The “white coat hypertension” has the same definition in the ESH/ESC and HAS guidelines
 - For the NICE and JNC guidelines this information is not present but it is mentioned in the full versions

Stratification of blood pressure categories and hypertension



- ESH/ESC and JNC guidelines provide the same stratification of blood pressure values:
 - Normotensive patients
 - Optimal: $SBP < 120$ and $DBP < 80$
 - Normal: $120 \leq SBP < 130$ and/or $80 \leq DBP < 85$
 - High Normal: $130 \leq SBP < 140$ and/or $85 \leq DBP < 90$
 - Hypertensive patients
 - Grade I: $140 \leq SBP < 160$ and/or $90 \leq DBP < 100$
 - Grade II: $160 \leq SBP < 180$ and/or $100 \leq DBP < 110$
 - Grade III: $SBP \geq 180$ and/or $DBP \geq 110$
- HAS and NICE guidelines: no stratification

Cardiovascular risk assessment



- Similar risks factors are taken into account in the 4 guidelines
- Differences exist for estimating the cardiovascular risk
 - NICE guidelines mention the existence of the Framingham calculator
 - ESH/ESC guidelines classify the risk according to Framingham and/or SCORE scales
 - HAS guidelines consider the sum of risk factors
 - JNC guidelines propose a stratification of the risk without further precisions
- The 4 guidelines recommend to include the cardiovascular risk for the management of hypertension as well
- In addition the ESH/ESC, HAS and NICE guidelines recommend specific strategies in first intention depending on the risk
 - Lifestyle interventions and/or drug therapies



Lifestyle interventions

- ESH/ESC and JNC guidelines consider lifestyle interventions for the primary and secondary prevention of hypertension
- Recommended lifestyle interventions are similar for the 4 guidelines, except for a few differences in NICE guidelines and its full version
 - No mention of increase in fruit and vegetable intake
 - Mentions limiting coffee intake

General therapeutic strategy



- Common antihypertensive therapeutic class considered by the 4 guidelines
 - Diuretics or (more specifically) thiazide-type diuretics
 - Beta-blockers
 - Calcium-channel blockers
 - Angiotensin converting enzyme inhibitors
 - Angiotensin receptor blockers
- Only the JNC guidelines indicate the usual dose range, and frequency of administration

General management of hypertension and first intention drug therapy



- Management
 - HAS and NICE guidelines base their recommendations on the cardiovascular risk
 - Lifestyle interventions alone
 - Lifestyle interventions associated to a monotherapy
 - ESH/ESC guidelines recommend lifestyle interventions associated to a monotherapy
 - JNC guidelines recommend lifestyle interventions only
- Drug therapy
 - HAS and ESH/ESC guidelines do not promote a specific antihypertensive therapeutic class
 - NICE guidelines recommend
 - < 55 years: angiotensin converting enzyme inhibitors (or beta-blockers in case of intolerance)
 - > 55 years: calcium-channel blockers or diuretics

General management of hypertension and second intention drug therapy



- Management
 - The 4 guidelines contain similar recommendations for treatment adaptation
 - Dose optimization
 - Therapeutic class substitution (in case of intolerance)
 - Addition of another therapeutic class
- Drug therapy
 - HAS and ESH/ESC guidelines do not promote a specific antihypertensive therapeutic class
 - NICE guidelines recommend
 - Age < 55 years: angiotensin converting enzyme inhibitors (or beta-blockers in case of intolerance)
 - Age > 55 years: calcium-channel blockers or diuretics
 - JNC guidelines recommend
 - Thiazide-type diuretics associated to lifestyle intervention
 - SBP \geq 160 mm Hg and/or DBP \geq 100 mm Hg: thiazide + 1 additional therapeutic class

Specific therapeutic strategy



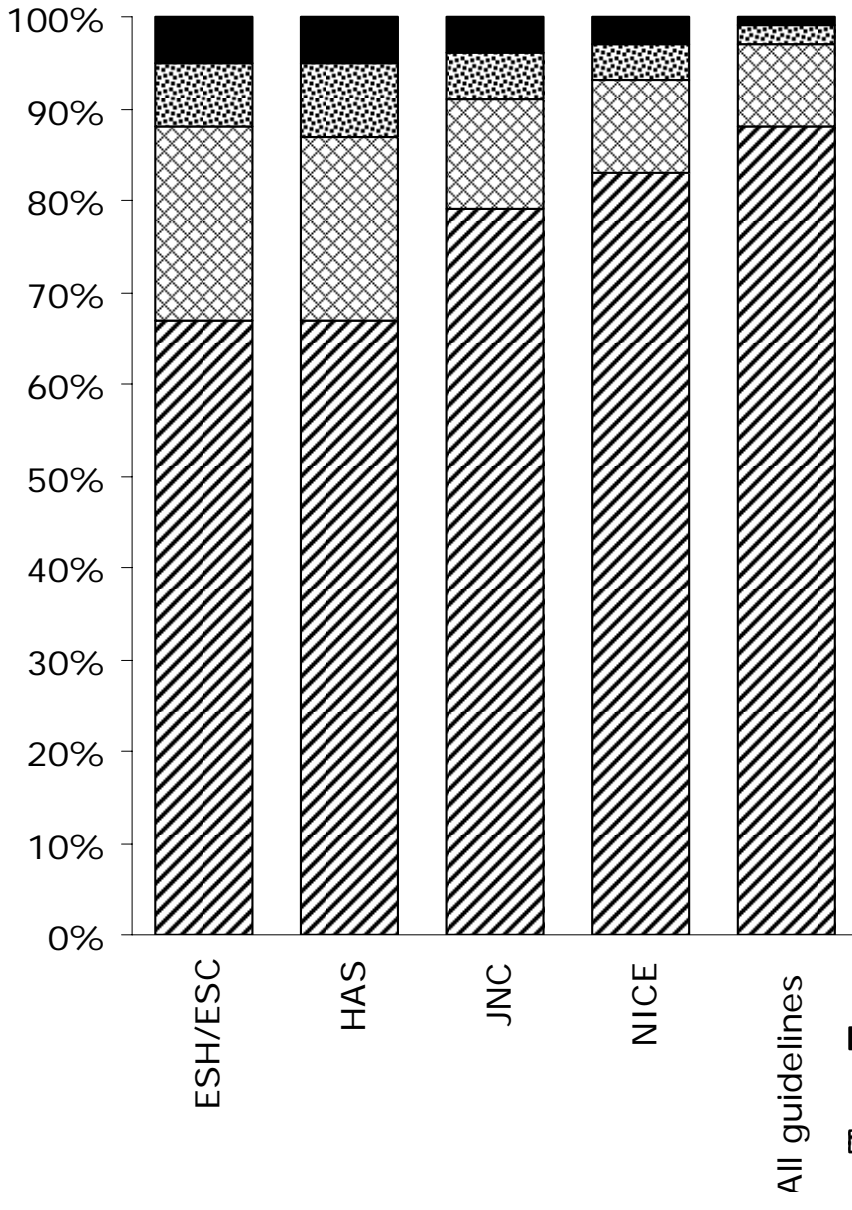
- The NICE guidelines do not include specific antihypertensive therapeutic strategies for patients with multiple pathologies
- HAS, JNC and ESH/ESC contain similar recommendations therapeutic strategies in specific circumstances
 - Diabetes, acute myocardial infarction, congestive heart failure, renal dysfunction, previous stroke
- JNC guidelines include 7 additional special conditions
 - Obesity and metabolic syndrome, left ventricular hypertrophy, peripheral arterial disease, dementia
 - Postural hypotension, hypertension in children and adolescents, hypertensive emergencies

References analysis in the full versions of the guidelines



- The overall number of references is similar
 - 341 for ESH/ESC
 - 343 for JNC
 - 386 for HAS
 - 530 for NICE
- In addition to the level of scientific evidence (A, B, C), NICE guidelines introduce another gradation
 - A* Recommendation – robust evidence recommending a pattern of care
 - B* Provisional recommendation – on balance of evidence, a pattern of care is recommended with caution
 - C* Consensus opinion - evidence being inadequate, a pattern of care is recommended by consensus

Common references

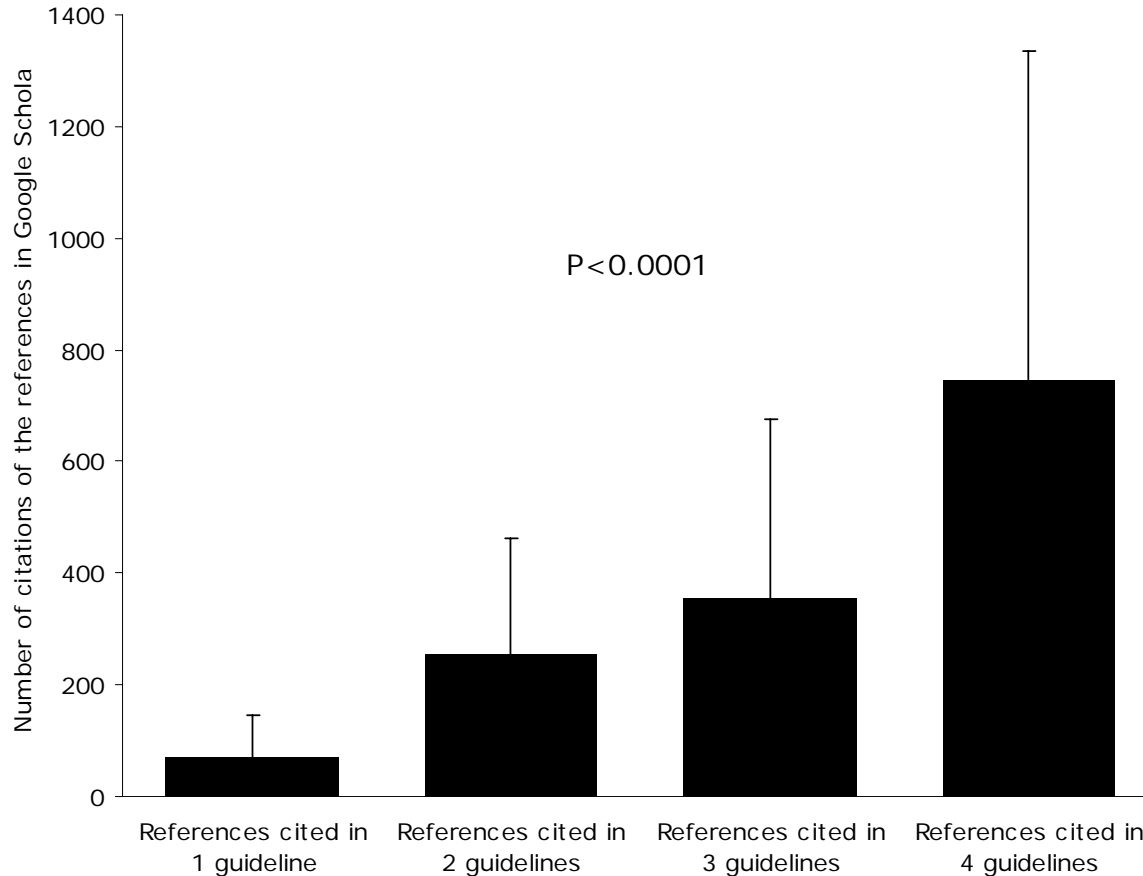


- 1.3% of the references are common to the 4 guidelines
- 2.2% of the references are common to 3 guidelines
- 8.8% of the references are common to 2 guidelines
- 87.7% of the references are cited in only 1 guideline

■ % of references cited in 4 guidelines
▣ % of references cited in 3 guidelines

▤ % of references cited in 2 guidelines
▨ % of references cited in 1 guideline

Description of common references



- Common references (37) to 4 or 3 guidelines are composed of
 - 31 randomized control trials
 - 12 prospective or cross-sectional observational studies
 - 4 meta-analysis

- Association ($P < 0.0001$) between
 - the number of times a reference is cited across the guidelines
 - the number of citations of these references as reported by Google Scholar

Conclusion



- Despite the presence of similarities, there are significant differences in the contents of guidelines

Similarities

- Definition of hypertension
- Blood pressure measurement settings
- Indication and role of lifestyle modifications
- Specific therapeutic strategy

Differences

- Blood pressure stratification
- Protocols of blood pressure measurement
- Cardiovascular risk estimation
- Generic drug therapies
- References

- The differences are equally distributed among the 3 national guidelines and the international guidelines