

National Survey on Excellence Centers and Reference Centers for Hypertension Diagnosis and Treatment: Geographical Distribution, Medical Facilities and Diagnostic Opportunities

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Abstract

Introduction Blood pressure (BP) control is poorly achieved in Western Countries, including Italy. Several interventions have been proposed at national and local level to improve BP control rate.

Aim This survey of the Italian Society of Hypertension (SIIA) is aimed at analysing the number and the distribution of reference centers and excellence centers for the diagnosis and treatment of arterial hypertension (hypertension centers) in Italy.

Methods In October 2011, a specifically designed survey questionnaire was developed by SIIA National Committee, both to evaluate geographical distribution of the reference hypertensive population and to assess general requirements

(days of activity, number of active physicians, medical facilities, diagnostic opportunities, use of electronic support), deemed necessary to identify an outpatient clinic as hypertension center in Italy. This questionnaire was locally distributed by regional coordinators of the Society and all collected data were centrally analysed by two independent study coordinators.

Results From October 2011 to September 2012, 89 centers with clinical expertise in the diagnosis and treatment of hypertension provided data on their own activity. Among these, 45 (50.5 %) centers are located in the North, 20 (22.5 %) in the Center and 24 (27.0 %) in the South of Italy. Approximately 50 % of the hypertensive outpatients who are referred from general practitioners to hypertension centers are living in the province and about one third in the region. More than half of the centers is active for 3–5 days per week, and approximately 40 % of the centers have 3–5 active physicians. Beyond outpatient visits for hypertension, these centers are able to organize day hospital (25 %), day service (29 %), or hospital admission (29 %) for

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advanced diagnostic evaluation or therapeutic interventions. All centers collect data from clinic and 24-hour ambulatory BP measurements, and almost all (95 %) centers are able to perform a standard 12-lead electrocardiogram. In addition, the majority of the centers are able to perform advanced diagnostic examinations, including echocardiography (74 %) or carotid Doppler ultrasound (71 %) analysis. Finally, 78 % of the centers use an electronic case report form, specifically designed for the clinical management of hypertensive patients.

Conclusions Although with some limitations related to the study methodology applied for data collection, the survey illustrates a quite unbalanced distribution of the hypertension centers, the majority of which are located in the North of Italy, with a medium-high standard of quality of care. This analysis may provide useful elements for a rational and effective use of existing resources, in order to improve BP control in our Country.

Keywords Hypertension · Hypertension centers · Hypertension units · Excellence centers for hypertension · Reference centers for hypertension · Italy

1 Introduction

Arterial hypertension is a major modifiable risk factor, which is significantly related to an independent and progressive increase of risk of developing major cardiovascular (CV), cerebrovascular and renal complications [1]. In contrast, an effective treatment of high blood pressure (BP) levels substantially reduces the risk of developing such complications [2–5]. Despite the availability of these

evidence, however, BP control remains largely unsatisfactory in most Western Countries, including Italy.

Recent analysis of data collected at the European level on BP control rate have, in fact, reported that only 20–30 % of treated hypertensive patients achieved the recommended BP targets [6–9]. For example, in our Country an analysis of observational studies, made available between 1995 and 2005 in more than 52,000 patients confirmed this trend, showing that about 39 % had grade 1 hypertension (140–159/90–99 mmHg) and about 32 % of grade 2 hypertension (160–179/100–109 mmHg) [10]. An update of this analysis, which considered observational studies made available from 2005 to 2011 and included clinical data from about 160,000 hypertensive outpatients mainly followed in a context of primary care, showed that only 57 % of these hypertensive patients were adequately treated and among these only 37 % reach effective BP control on therapy [11], while in almost all studies reported in this analysis the average systolic BP levels were greater than 140 mmHg [11]. These observations confirm that BP control in the general population of hypertensive patients is still largely insufficient and highlight the need to undertake several multidisciplinary interventions, aimed at improving BP control in Italy.

Since hypertension is an ideal target for identifying patients with high CV risk and reduce the burden of hypertension-related CV and renal diseases, it is quite evident that the improvement of strategies aimed at early identifying and promptly treating high BP levels can be considered a key element for achieving an effective CV prevention in our Country, with large benefits for the National Health Service in the medium-to-long term.

Based on these considerations, the Italian Society of Hypertension (SIIA) aims to generate, promote and share a number of interventions to improve BP control in Italy. Among these various initiatives, integrated and concerted actions with General Practitioners, the implementation of hypertension awareness in the general population through a more extensive use of new media and social networks, a larger use of home BP measurements, and the production of consensus documents [12, 13] and practical recommendations covering specific and controversial issues of the clinical management of hypertension, including coronary artery disease [14], resistant hypertension [15], renovascular hypertension [16], hypertension during pregnancy [17], and echocardiography in hypertension [18], that can complement those presented by the main international societies [19–22], have been accomplished.

In the present document, we report the main findings of a survey aimed at identifying the number and general characteristics of reference centers and excellence centers for diagnosis and treatment of arterial hypertension (hypertension centers) distributed throughout the whole

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national territory. This analysis may provide useful elements for a rational and effective use of the currently available resources, in order to improve BP control in Italy.

2 Materials and Methods

2.1 Aims of the Study

The primary aim of the present survey was to evaluate the number and the distribution of hypertension centers in the whole national territory and in the three main macro-areas (North, Central and South) of Italy.

Secondary aims of this survey were: 1) to evaluate geographical distribution of the reference hypertensive population; 2) to analyse the characteristics of the individual centers (days of activity per week, number of active physicians, type of medical facilities), the availability of diagnostic opportunities (availability of clinical data from clinic and 24-hour ambulatory BP measurements, 12-lead electrocardiogram, echocardiogram, carotid Doppler ultrasound, ankle-brachial index, arterial tonometry, pulse wave velocity, 24-hour Holter ECG) and the use of an electronic case report form for medical database collection and evaluation in hypertension.

Additional aims of the survey were the following ones: 1) to evaluate the distribution of excellence centers for the diagnosis and treatment of arterial hypertension, officially recognized by the European Society of Hypertension (ESH) (also see the following hyperlink: <http://www.eshonline.org/Communities/CentresList.aspx>) in our Country; 2) to assess the fundamental requirements deemed necessary to identify an outpatient clinic as a “reference center for the diagnosis and treatment of arterial hypertension”, certified by SIIA; 3) to provide for hypertensive outpatients, as well as for citizens, an updated and comprehensive list of excellence centers for the diagnosis and treatment of hypertension in Italy; 4) to emphasize the importance of an integrated network of hypertension units, specifically aimed at improving poor BP control rate, which still represents a major and emerging problem for Public Health Care in Italy.

2.2 Methodology of the Study

In October 2011, a specifically designed survey questionnaire was developed by the SIIA National Committee, and aimed to evaluate the geographical distribution of the reference hypertensive population and to assess several requirements (days of activity, number of active physicians, medical facilities, diagnostic opportunities, use of electronic support), deemed necessary to identify an outpatient clinic as an “excellence center for the diagnosis and

treatment of arterial hypertension” certified by SIIA. These criteria have been established in accordance with the requirements of the ESH, whose certification of “European center of excellence for the diagnosis and treatment of hypertension” has also been adopted in the present survey.

These criteria were arbitrarily established and cover the following aspects: 1) days of activity (less than 3, between 3 and 5, more than 5 days per week); 2) number of active physicians (less than 3, between 3 and 5, more than 5 doctors); 3) medical facilities (outpatient visits, day-hospital, day-service, hospital admission); 4) diagnostic opportunities (clinic BP measurement, 24-hour ambulatory BP measurement, 12-lead electrocardiogram, echocardiogram, carotid Doppler ultrasound, ankle-brachial index, arterial tonometry, 24-hour ECG Holter); 5) use of electronic support for clinical data collection and evaluation. In addition, the survey questionnaire analysed type and distribution of reference outpatient population (district, province, region, or inter-regional area).

The questionnaire was sent to all regional coordinators, so that each of them would give maximum distribution to all accredited centers at the regional or local level with known expertise for the clinical management of hypertension.

The compilation of the survey questionnaire was anonymous and confidentiality of the data of individual subjects who filled the survey questionnaire, as well as of the hypertension center, was preserved during each phase of the study.

Once completed, each questionnaire was sent by regular mail or fax to the regional coordinator, who centrally transmitted the results for data collection and verification by two independent members of the SIIA National Board, who act as study coordinators (N.D.L. and R.S.).

2.3 Statistical Analysis

For each of the five proposed criteria, a minimum score of 1 point up to a maximum of 19 points was considered, according to the scheme reported in Appendix A (online available). Therefore, valid questionnaires were considered only those that had a minimum score of 6 points and no more than 19 points.

Given the descriptive nature of the survey, any specific statistical analysis was applied to collected data. The data are presented as percentage of total observations conducted.

3 Results

From October 2011 and September 2012, 89 centers with clinical expertise in the diagnosis and treatment of

hypertension provided data from their own medical activity. The full list of hypertension centers, that are active in our Country and that have been included in the present survey, is reported in Appendix B (online available). Among these, 45 (50.5 %) centers are located in the North, 20 (22.5 %) in the Center and 24 (27.0 %) in the South of Italy.

The distribution of the hypertension centers for each region is shown in Fig. 1. In particular, the largest number of centers is located in *Regione Lombardia* (n = 21, 23.6 %), followed by *Campania* (n = 10, 11.2 %), *Piemonte*, *Lazio* and in the macro-area of *Triveneto*, including the three regions of *Trentino-Alto Adige*, *Veneto* and *Friuli-Venezia-Giulia*. Smaller numbers of hypertension centers are located in the remaining regions, including *Liguria*, *Emilia Romagna* and *Puglia* (n = 7, 7.0 % respectively), *Sicilia* (n = 4, 4.5 %), *Abruzzo* and *Molise* (n = 3), *Calabria* (n = 2), *Val d'Aosta*, *Marche*, *Toscana* and *Sardegna* (n = 1, 1.1 % respectively).

Geographical distribution of reference hypertensive population is reported in Fig. 2. Approximately 50 % of the hypertensive outpatients who are referred from general

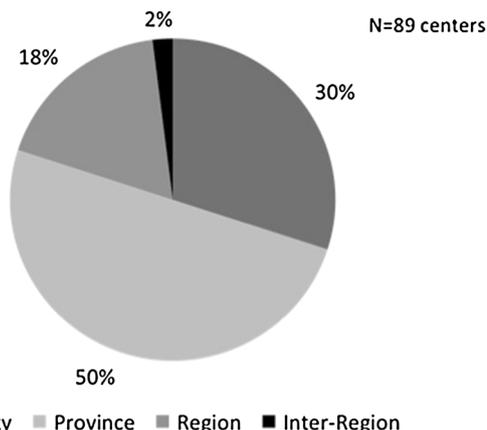


Fig. 2 Geographical distribution of reference hypertensive population

practitioners to hypertension centers, are living in the province and about one third in the region. A negligible percentage of hypertensive outpatients come from different regions or areas, while approximately 18 % of the patients are living in the local (city) area of the hypertension center.



Fig. 1 Distribution of excellence centers and reference centers for the diagnosis and treatment of hypertension in Italy

The amount of time devoted to hypertension diagnosis and treatment, expressed as days of medical activity by each hypertension center, is shown in Fig. 3. More than half of the centers are active for 3–5 days per week, while about 20 % is available for more than 5 days, and only 20 % of the centers are available for a period less than 3 days.

The availability of specifically dedicated medical doctors, expressed in number of active physicians for each hypertension center, is shown in Fig. 4. About 35 % of the hypertension centers has a number of active physicians between 1–2, while 40 % of the centers reported to have 3–5 active physicians and approximately 25 % of the centers reported to have more than 5 active physicians.

Medical facilities provided by Italian hypertension centers is shown in Fig. 5. In all hypertension centers outpatient visits are regularly performed. In about half of the centers other facilities can be also offered, including day hospital (25 %) or day service (29 %). A relatively small percentage (29 %) of hypertension centers is also able to dispose hospital admissions for advanced diagnostic evaluation or therapeutic interventions.

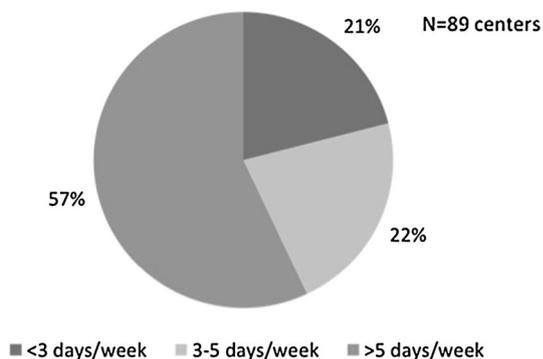


Fig. 3 Days of activities of hypertension centers in Italy

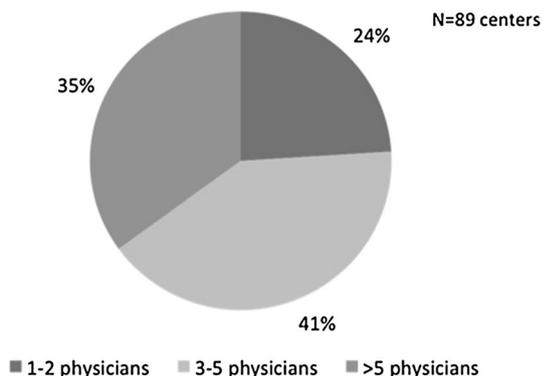


Fig. 4 Number of active physicians available in hypertension centers in Italy

The diagnostic opportunities provided by the hypertension centers are reported in Fig. 6. Beyond clinic and 24-hour ambulatory BP measurements, that can be tested in all included sites, almost all (95 %) hypertension centers are able to perform a standard 12-lead electrocardiogram. Among advanced diagnostic tests, 74 % of the centers is able to assess cardiac organ damage by echocardiography and 71 % of the centers to assess vascular organ damage by carotid Doppler ultrasound. Furthermore, 52 % of the centers is able to evaluate ABI, while about one third of the centers is able to perform the assessment of arterial tonometry or the 24-hour ECG Holter.

Finally, 78 % of the centers used an electronic case report form, specifically designed to the clinical management of outpatients with arterial hypertension.

4 Discussion

This document provides a systematic overview and a comprehensive update of the geographical distribution and of the main features of the hypertension centers in Italy. Albeit with some limitations related to the descriptive nature of the study and to the methodology applied for data collection (survey), some important aspects can be discussed.

First, the main findings of this analysis demonstrate a higher prevalence of hypertension centers in the North than in the South of Italy (particularly in the two largest islands). This imbalanced distribution may contribute to explain, at least in part, the low rate of hypertensive outpatients who achieve an effective and sustained BP control at the national level, particularly in the southern regions of our Country, as observed in previous studies [23]. The prevalence of hypertension and major CV risk factors, including dyslipidemia, obesity, metabolic syndrome and diabetes mellitus, is most pronounced in these southern regions compared to the regions of the Center and the North, leading to an increased CV risk profile global and greater difficulty in reaching the recommended BP goals in the inhabitants of the southern and central regions than in the northern areas [23]. A greater presence of hypertension centers may, therefore, contribute to bridge part of the gap between observed and attained BP control at national level.

Most of the hypertension centers are located in the largest cities, although the majority of the hypertensive outpatients who are referred by general practitioners to hypertension centers are living in the corresponding extra-urban areas (province and region). This finding may be explained by an easier and more rapid access to primary care outpatient centers and hospital divisions and, consequently, a greater willingness to undergo diagnostic tests

Fig. 5 Medical facilities available in hypertension centers in Italy

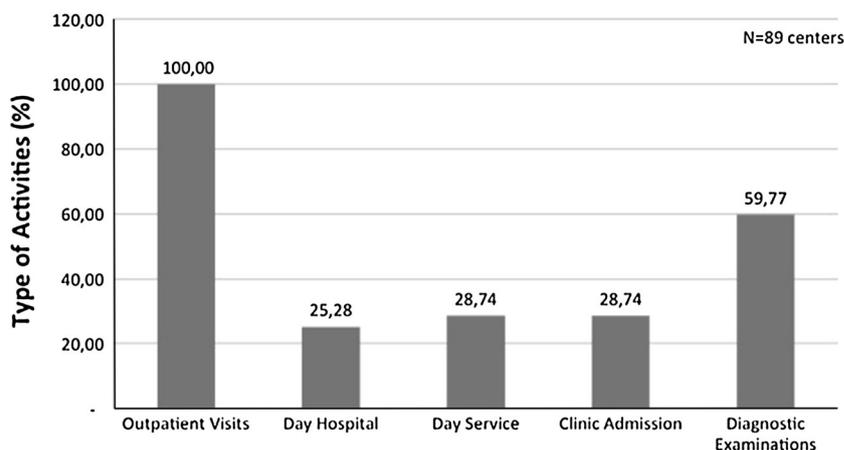
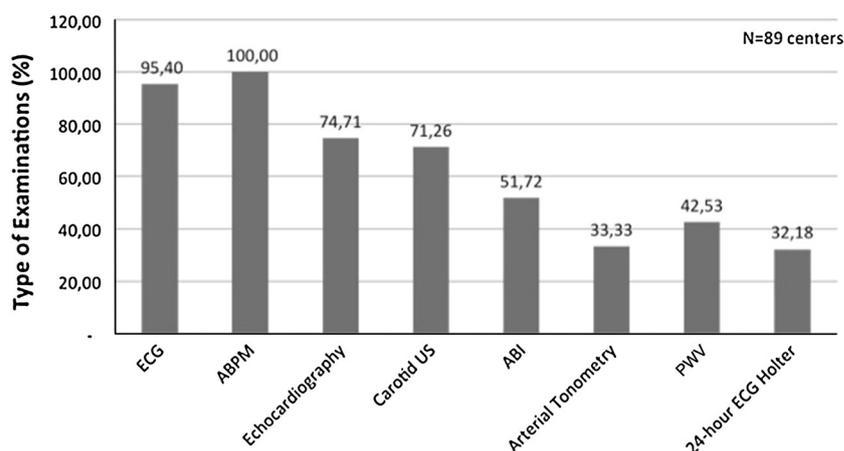


Fig. 6 Diagnostic opportunities available in hypertension centers in Italy. ECG, electrocardiogram; ABPM, 24-hour ambulatory blood pressure monitoring; US, ultrasound; ABI, ankle-brachial index; PWV, pulse wave velocity



and therapeutic prescriptions in hypertension patients who live inside city compared to those patients who live in extra-urban areas. Thus, the relatively preferred way to have access to diagnostic tools and pharmacological and non-pharmacological treatments may also contribute to make the overall global CV risk profile relatively lower in the former than the latter group, thus resulting in a greater prevalence of “difficult to treat” hypertension in the outlying urban areas than in urban areas. This type of selection of patients with “difficult to treat” hypertension in extra-urban areas may explain at least, in part, the greater need to have an assessment by an excellence center for these hypertensive outpatients compared to those who live within the city. In addition, it is also possible to assume a greater impact of social and informative campaigns aimed at improving CV disease prevention and treatment through lifestyle changes in individuals who live in cities than those who live outside of the context of the city.

The availability of personnel, resources and instrumental diagnostic tools in hypertension centers is high on average and tends to cover the entire working week with dedicated medical staff and a wide range of diagnostic and instrumental opportunities. This justifies the ability to

perform an accurate assessment of global CV risk profile of the individual hypertensive patients, as well as the search for potential causes of secondary causes or resistance to pharmacological therapy in certain forms of resistant hypertension by hypertension centers, then referring to the territorial network of primary care the clinical management of the essential forms of hypertension, as already observed in a previous studies [24].

Finally, 78 % of hypertension centers use an electronic support of the clinical management of outpatients with hypertension. There are several reports in the literature showing that computerized clinical management of CV diseases, particularly hypertension, substantially contributes to improving the percentage of patients achieving the recommended treatment goals [25]. This improvement in term of BP control can be explained in part by different options of the management software, including: 1) the ability to automatically generate alert messages on the lack of control of a certain clinical parameter; 2) standardization of diagnostic and therapeutic procedures for the management of clinical diseases with greater adherence to the recommendations from the international guidelines [19–22]; 3) ability to generate a report containing clear and

simple information and requirements, thus resulting in improved patient adherence to diagnostic and therapeutic indications; 4) storage, preservation and easy consultation of a high volume of clinical data; 5) ability to share medical history, diagnosis and treatment of individual patients with arterial hypertension with the local network of primary care. In this regard, the adoption of a computerized clinical management system, which may be shared (network) at regional or national level, may allow to significantly improve BP control rate in Italy and to reach the “Objective 70 %” in a the near future [26].

The improvement in BP control would have consequences not only in terms of reducing the burden of hypertension-related disease, but an important impact in terms of reducing health care costs and optimization of resources and economic health. In a study by Hansson and co-workers [27] published in 2002, in fact, it was calculated the cost resulting from the failure to achieve an effective BP control in some European countries, including France, Germany, Italy, Sweden and the United Kingdom. This study estimated that about 29 million adults (approximately 13 % of the general population) in the five countries had BP above 160/95 mmHg, while 60 million adults (approximately 21 % of the general population) had BP between 140–160/90–95 mmHg [27]. According to the mathematical model used, it would be possible to save 26.1 billion euro in costs for health economic expenses by achieving the recommended BP goals [27]. These economic benefits did not taken into account, however, the costs resulting from the interventions needed to reduce the risk of CV events, although these are quite marginal compared to the costs arising from the management of acute and chronic complications of hypertension.

4.1 Potential Limitations

The survey presents some potential limitations, mainly related to the descriptive nature of the analysis and the methodology applied for data collection, which must be considered when interpreting the observed results. First of all, since it is a survey, it was not possible to perform a systematic and comprehensive verification of the data made available for the analysis, and as such, the results described in this document can only be considered in the context of the descriptive nature of survey. In addition, since the survey was administered to the reference centers and excellence centers for the clinical management of hypertension which have known expertise in this filed and are in contact with the SIIA, it is reasonable to postulate that a certain proportion of outpatient centers for hypertension has not been included in this survey, in part underestimating the distribution of centers for the diagnosis and treatment of hypertension within the whole national

territory. In this regard, the existing regulatory rules in some regions, such as in the *Regione Toscana*, which do not allow the designation or recognition of “reference center” itself for a given disease than the simple outpatient clinic, may explain the low prevalence of hypertension centers in several specific areas of our Country. Although commonly used and currently recommended for the clinical management of hypertension [19–22], the potential availability of clinical data derived from blood tests, hormonal assays, and renal Doppler ultrasound examination, have not been evaluated. The survey questionnaire did not directly mentioned laboratory facilities, in particular the most useful tools to detect secondary forms of hypertension, including neuro-hormonal assays for both serum and urine analysis [16]. Also, the questionnaire did not information on those centers able to directly perform renal artery denervation for resistant forms of hypertension [15]. Finally, no data were collected about the volume of medical activity of each involved center (number of hypertensive outpatients included in the database, number of outpatient visits or diagnostic examinations per week), as well as no data were collected regarding the percentage of patients receiving pharmacological or non-pharmacological treatment and the percentage of treated hypertensive outpatients who achieve adequate BP control. These aspects may eventually be addressed in a further analysis, aimed at characterizing the hypertension centers according to the volume of medical activity performed and the percentage of hypertensive outpatients who reach the recommended therapeutic targets.

5 Conclusions

The results of this survey show that in the Italian national territory there is a prevailing distribution of hypertension centers in the North, followed by South and Center of Italy. While these hypertension centers tend to be located in the main cities, the majority of patients who are referred to these centers are living in the extra-urban areas (provincial and regional areas). The relatively high number of physicians dedicated to the clinical management of hypertension, as well as the relatively high availability of diagnostic options in use at the hypertension centers may help to improve the diagnostic workup of patients with high BP, and to perform a proper stratification of global CV risk profile and, therefore, to improve BP control in Italy.

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