



Ohasama has become a common global term in the medical world.

Messages from key opinion leaders (1)

These days, clinical and epidemiological studies using home blood pressure monitoring, which was pioneered by the Ohasama Study, are conducted at the forefront of medicine around the world. The major examples include the Didima Study in Greece, the PAMELA Study in Italy, Finn-Home Study in Finland, and the Belgian Population Study. Regardless of nationality, all people in the world share a desire to be healthy. We have received enthusiastic messages of support for the “Ohasama Study” from the world’s key opinion leaders who have conducted various studies using home blood pressure monitoring.



Teruo Omae, MD, PhD,
President Emeritus of the
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“Scientific achievements of the Ohasama Study”

As blood pressure readings markedly vary depending on measurement, psychological, and physical conditions, it is difficult to determine which measurements should be adopted as criteria. The issue that had already been raised at WHO conferences regarding blood pressure held in Geneva in the 1970s, which the author often attended, still remains unsolved. By whom and under what conditions should blood pressure be measured? According to studies on blood pressure measurement performed on a large number of subjects using a mercury manometer in various regions of the world, the final digit of the measured values was zero in most cases, e.g., 140/90 mmHg. For this reason, the necessity of the development and promotion of an automated sphygmomanometer, which provides objective measurements, was pointed out at the conferences. Attention should be paid to these points when discussing the prevalence of hypertension and percentage of normal blood pressure.

Japan has been the world’s leader in the development and promotion of instruments for the measurement of blood pressure. I have had a deep respect for Professor Yutaka Imai, a leading expert in the field, and been interested in his group’s Ohasama Study. Research involving community residents and medical institutions requires more effort and adequate preparations, compared to clinical studies, since their understanding and cooperation based on mutual trust - the foundation of preventive medicine and medical care, are essential. Professor Imai and his research group deserve to be praised for their research achievements over a long period of time. Finally, the Division of Blood Pressure at Home (chairperson: Professor Yutaka Imai) of the Japanese Society of Hypertension has published the “Guidelines for Self-monitoring of Blood Pressure at Home (second edition: September 2011).

“The largest and most influential population study”

In 1986, Professor Yutaka Imai had the vision to start the Ohasama Study, which to date remains the largest and most influential population study on the self-measured blood pressure at home. A team of Japanese investigators led by Professor Imai’s study were the first to demonstrate that blood pressure self-monitoring offers several well recognized advantages of the more complex approach of ambulatory monitoring and that home blood pressure is a more accurate predictor of outcome than office blood pressure. In a large number of publications in top-ranking journals, the Ohasama investigators proposed and refined diagnostic thresholds for home blood pressure and carefully defined the modalities for its use in clinical practice. The work of Professor Imai and his team inspired many subsequent studies on the classification of high blood pressure into white-coat, masked, and sustained hypertension and on blood pressure variability as a potential cardiovascular risk factor. The Ohasama results importantly informed current guidelines on blood pressure measurement and led to the first trial ever, also coordinated by Professor Imai, of antihypertensive drugs guided by home blood pressure. Ohasama will continue to generating exciting results in the foreseeable future and has already entered textbooks as a landmark study.



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●●●● Ohasama has become a common global term in the medical world.

●●●● Messages from key opinion leaders (2)



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“The Importance of the Ohasama Study in Hypertension Research”

Since 1993, when the first of more than 100 original papers was published on blood pressure characteristics at home by subjects in the Ohasama region of northeastern Japan, researchers and practicing physicians have been following the important work carried out by Professor Yutaka Imai and colleagues at Tohoku University School of Medicine in Sendai. The first papers in the early 1990s from Ohasama provided a frame of reference for home (self), 24-hour, daytime, and nighttime blood pressure in middle-age and older people in Japan. However, the results of a 6.6 year follow-up of the cohort of 1789 subjects demonstrating that home blood pressure, but not ‘screening’ blood pressure, predicted cardiovascular mortality was a very novel and important finding in the field of blood pressure monitoring research. The work in Ohasama continued to provide data on the relationships between out-of-office blood pressure and stroke morbidity using ambulatory recordings and showed that nighttime blood pressure was superior to daytime blood pressure for predicting strokes. Valuable data from the general population in Ohasama has also been incorporated into the International Database on Ambulatory Blood Pressure and Cardiovascular Outcomes (IDACO).

From 2000 to the present day, a number of interesting observations relating to blood pressure, pathophysiology, and genetic polymorphisms have arisen from the Ohasama population including, but not limited to, renin-angiotensin system genes, epithelial sodium channel gene mutations, and haplotypes of aldosterone synthase, an enzyme which has become a new target for antihypertensive therapy.

During the years that the Ohasama population study has been ongoing, investigators from Sendai have presented their research findings to audiences all around the globe and have hosted interna-

tional meetings at their own institution bringing together many active researchers in clinical hypertension from Europe, Japan, and North America. This is a real credit to my colleagues in Sendai who have demonstrated such long-term dedication to their work. Studies in the Ohasama region have made a significant impact and have greatly enhanced our understanding of out-of-office blood pressure measurements and cardiovascular outcomes, particularly as it relates to genomics, the environment, and the management of hypertension.

“Congratulations on the Ohasama Study”

The establishment of the Ohasama Study in 1986 by Professor Yutaka Imai was a brilliant and far sighted initiative that has influenced the way hypertension is evaluated and managed worldwide and continues to improve our knowledge of this most important preventable risk factor.

The Ohasama Study more than any other has helped demonstrate the importance of measuring blood pressure not only in the clinic but also using ambulatory and home blood pressure recorders. These are now established in the clinical armamentarium of physicians treating hypertension and have become a gold standard in clinical research on hypertension.

Important information derived from the study has defined the distribution of a whole range of blood pressure parameters in a rural community in Japan and the results have held up when tested in other populations around the world. Reference values for these blood pressure measurements were established as well as their predictive capacity for mortality and for the major consequences of elevated blood pressure.

As early as 1997, major findings from the study were incorporated in the influential Report of the Joint National Committee from the United States. From 1999, they were included in the World Health Organization-International Society of Hypertension guidelines on the management of hypertension and have been a component of virtually every important guideline ever since.

Besides the contribution from this study of bringing home and ambulatory blood pressure measurements into the mainstream of clinical medicine, there have been many important co-findings defining, for example, the significance of variations in blood pressure and the relative importance of nighttime and daytime blood pressure.

For this and so much more, we are grateful to Yutaka Imai and his colleagues, the sponsors, and the citizens of Ohasama and look forward to many more important findings and landmark papers from the collaboration.



Garry Jennings MD,
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“The glory of Asia: The Ohasama Study”

I got to know about the Ohasama Study more than 12 years ago when I first met with Dr. Takayoshi Ohkubo in Leuven. Dr. Ohkubo has recently left Sendai. However, nobody can deny that he is a key collaborator of Professor Imai, the father of the Ohasama Study, and is still a key player in the Ohasama Study.

I then started to pay close attention to the publications of the Ohasama Study. A few years later, I met with Professor Imai in Leuven during a meeting of the European Society of Hypertension Blood Pressure Monitoring Working Group. After I returned to China in 2003, I had more opportunities to meet with him at scientific meetings. I learnt a lot and am still learning from him, and from the Ohasama Study, for building my own research team and population cohorts in Shanghai. A few years ago, I was fortunate enough to be invited to join the International Advisory Board by Professor Imai for one of his large projects funded by the Japanese government.

The Ohasama Study is unique for many reasons. To begin with, it is the first, if not the only, large-scale population-based prospective observational study involving three different methods of blood pressure measurement, namely, clinic, home, and ambulatory blood pressure.

Secondly, it is the first population based study on hypertension and cardiovascular disease in Asia in which blood pressure was properly evaluated. Previous population studies in Asia often included blood pressure, but usually only had 1 or 2 readings obtained in the clinic.

Thirdly, the Ohasama Study assessed a large number of cardiovascular phenotypes, such as brain lesions measured by MRI, and investigated genetic determinations of these phenotypic measurements. Genes or genetic variants identified from either genome wide association studies or candidate gene research have to be tested in population studies, such as the Ohasama cohort.

Fourthly, the Ohasama Study is productive not only in enriching our knowledge on blood pressure and other cardiovascular measurements, but also in educating a group of young investigators on cardiovascular epidemiology. These young scientists will elaborate on the concept and spirit of the Ohasama Study wherever they are.

Fifthly, the Ohasama Study has established wide collaborations with several research groups inside and outside of Japan. These international collaborations allow us to do scientific research using a large, cross-ethnicity database.

Among the tremendous scientific contributions of the Ohasama Study, several are especially noteworthy. It helped establish normal or reference limits of home and ambulatory blood pressure monitoring on the basis of prospective data of cardiovascular events. These values had been incorporated in the Japanese hypertension guidelines and other national and international hypertension guidelines.

It helped to identify a number of genes or genetic variants that may be related to blood pressure regulation. A recent publication of the Ohasama Study first reported that a deletion/insertion polymorphism of the adrenomedullin 2 gene was associated with ambulatory blood pressure, renal function, and cerebrovascular lesions (Hypertens Res 2011; 34:1327-32).

The Ohasama Study built the scientific basis for several inventions in blood pressure monitoring. Professor Imai proposed the concept of bedtime blood pressure measurement according to a pre-defined clock time, which finally led to the invention of blood pressure monitors with this special function.



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“Congratulations on the Ohasama Study History Book.”

The Ohasama Study was initiated in 1986 by Professor Yutaka Imai, Tohoku University Graduate School of Pharmaceutical Science and Medicine, Japan, and has become an important milestone in a series of blood pressure (BP) behavioral studies to address the role of home and ambulatory BP in residents of Ohasama to their cardiovascular (CV) diseases for more than 10 years. The study is the first epidemiologic study to shed light on the superiority of home BP measurements and ambulatory BP monitoring over casual clinical BP for the prediction of future CV and cerebrovascular events and established the MUST-use of home BP in diagnosis and management of patients with hypertension rather than just clinical BP. Patients with a cutoff value of greater than 135/80mmHg by 24-hour monitoring and 135/85mmHg by home BP measurements are now classified as having hypertension and this standard is now accepted worldwide. The Ohasama Study also found that white coat hypertension, previously recognized as benign and false, predicts true hypertension 8 years later and higher CV events. They further discovered that higher BP at night, larger BP variability, and greater pulse rates at home are strongly and independently associated with a greater risk of CV mortality. The Ohasama Study has succeeded in providing valuable information on almost every respect of BP behavior in the general population and in patients with hypertension, and the tactics of the MUST-use of home BP has been applied in clinical practice far ahead of time. Thanks, Ohasama Study!



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