



## Research paper

## Application of propensity scores to estimate the association between cardiovascular disease and meridian energy

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## ABSTRACT

**Introduction:** Based on Traditional Chinese Medicine (TCM) theory, the heart is regarded as the main internal organ governing the body and mind. TCM doctors believe that abnormalities in the organ may be reflected on the meridians. However, there are few studies linking meridian energy to cardiovascular disease (CVD). The aim of the study was to explore the net impact of CVD on the balance of yin and yang and overall meridian energy.

**Methods:** In this retrospective study, health examination data was obtained from patients at a university hospital between 2005–2012. Adult participants who underwent physiological health and meridian energy examinations on the same day were recruited into the study. The physiological examination consisted of blood tests and diagnostic data from the patients' medical charts. Meridian energy was examined using a meridian energy analysis device. We compared the differences of meridian energy between participants with and without CVD, having adjusted for the propensity scores.

**Results:** The mean meridian energy of 2875 adult participants was 24.5  $\mu$ A (SD=18.1). Eighty-six participants (2.99%) had cardiovascular disease. The regression model showed that current cardiovascular disease was negatively associated with overall, yin, and yang meridian energy (overall: adjusted  $\beta$ =−6.03, 95% CI: −9.95 to −0.21; yin: adjusted  $\beta$ =−6.16, 95% CI: −10.35 to −1.97; yang: adjusted  $\beta$ =−5.89, 95% CI: −9.67 to −2.12).

**Conclusion:** These findings suggest that the occurrence of CVD was associated with low meridian energy. Further studies on the mechanisms linking CVD and meridian energy are recommended.

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## 1. Introduction

According to the Visceral Manifestation Theory of TCM, five viscera (the heart, liver, spleen, lungs, and kidneys) and six bowels (gallbladder, stomach, large intestine, small intestine, urinary bladder, and triple energizers) are the basis of the

internal organs. Blood and qi are viewed as energy triggers of the internal organs. Among the internal organs, the heart is the chief of the body and mind. The heart qi is the physical substrata and dynamic force behind the functional activities of the heart. Heart qi exuberance or deficiency indicates a pathological state showing hyper- or hypofunction of the heart, respectively. Heart blood is the blood governed by the heart, which flows all over the body, particularly that part of the blood serving as the basis for physiological activities of the heart and mental activities. Both heart blood stasis and deficiency are pathological changes of the heart. Heart blood stasis means the blood flow in the heart vessels is impeded; heart blood deficiency causes dizziness, insomnia, palpitations, thready weak pulse and other signs, and symptoms [1,2].

**Abbreviations:** CVD, cardiovascular disease; TCM, Traditional Chinese Medicine; AST, aspartate aminotransferase; ALT, alanine aminotransferase; BUN, blood urea nitrogen; ICD, International Classification of Diseases.

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Based on TCM theory, both qi and blood are regarded as meridian energies, which run throughout the body via 12 main, bilateral meridian vessels. TCM practitioners believe that the physiological functions and pathological changes of the internal organs, as well as their interrelationships and external manifestations, are controlled by the meridian and collateral vessel system through which qi flows [3–5]. The left and right meridians are symmetrical to the center of the body and influence each other through the interconnected meridian vessels. The 12 main meridians are composed of six yin meridians and six yang meridians for the hands and the feet, respectively. The yin meridians include the lung, heart, pericardium, spleen, kidney, and liver meridians. The yang meridians include the large intestine, small intestine, triple energizer, stomach, bladder, and gallbladder meridians [3–6].

The meridians comprise a previously unknown system that integrates the attributes of the cardiovascular, nervous, immune, and hormone systems [7]. Investigators of TCM believe that electrical conductivity measurements of meridians provide information about meridian energy [7–11]. Many researchers have used Ryodoraku to measure meridian energy levels [12–14]. With this method, the meridian energy is determined by taking 24 electrodermal measurements on the 12 main bilateral meridians [14,15]. Low meridian energy indicates problems in the internal organs [15–18] and may be treated by TCM or acupuncture or both to modulate and balance the meridian energy.

Of all deaths in Taiwan, deaths due to heart disease and hypertension rank second and eighth, respectively, in mortality. Deaths due to heart disease and hypertension in 2012 were 47.9 and 13.3 per 100,000 people, respectively, in Taiwan [19]. Hypercholesterolemia, anemia, hypertension, and other diseases are associated with coronary heart disease risk [20,21]. Comorbidities also exist in patients with heart failure. Adjusting for the impacts of these comorbidities on CVD is important for discriminating their effects on meridian energy [22]. Nonetheless, there are few studies linking meridian energy to CVD. We explored the net impact of CVD on yin, yang, and overall meridian energies.

## 2. Materials and methods

### 2.1. Data source and sampling

A retrospective research design was carried out in this study. Selected health examination records dating from 1 August 2005 through 31 December 2012 from a university hospital in Taipei were examined and analyzed. The health check-up package included a meridian energy examination offered by the Department of Traditional Medicine while the modern medical examination was offered by the Department of Family Medicine. The study was approved by the human subjects committee at the hospital (approval number TMU-JIRB-201204024). This study involved no contact with patients. After data abstraction had been completed,

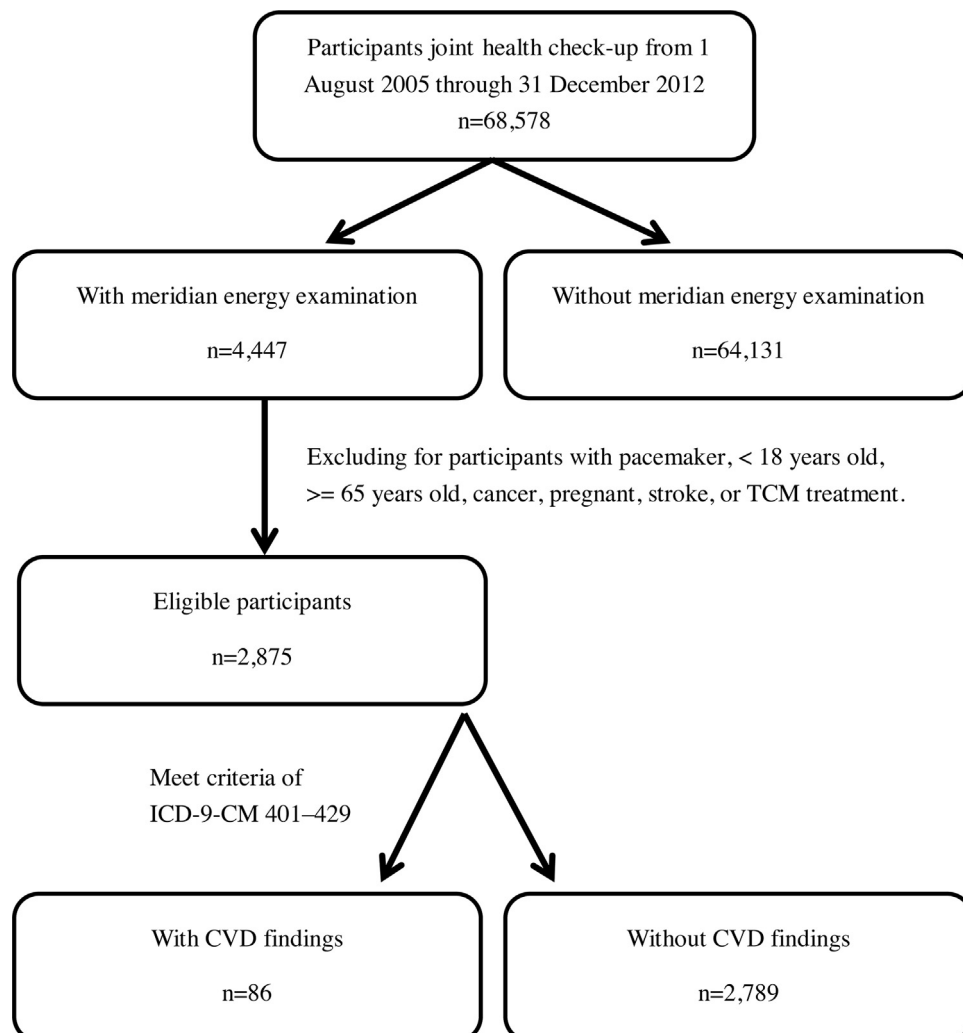


Fig. 1. Flow chart indicating recruitment of participants.

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