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Research Article

# Questionnaire with Acupuncturists to Investigate the Relationship Between the Governor Vessel and Dementia

Wen S. Zhou [1,*], Jane F. Wilson [2]

[1] Chisense Clinic, London, United Kingdom
[2] Department of Life Sciences, University of Westminster, London, United Kingdom

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ABSTRACT

The prevalence of elderly dementia and work-related back neck pain is high, and so is the associated cost. Is dementia, which can take 20–30 years to develop, linked to musculoskeletal problems earlier in life? Classic Chinese Medicine Governor Vessel (GV) theory has in fact detailed a correlation, but its acceptance appears to be influenced and even limited by some inconsistences in the literature. This study involved a nationwide online questionnaire of 381 practicing acupuncturists to investigate GV's usage and impact on brain function. The survey covers areas of the acupuncturist's experience, perception of GV usage, related symptoms, needling concerns and correlations with brain function. 39 completed questionnaires were returned, of which 38 were GV users, and nearly three quarters of respondents accepted that GV influences brain function. Only two respondents rejected this influence, but here several inconsistencies were found. The associations with GV were predominately found to be with the spine, kidney, and brain. Indications from practitioners suggested numerous forms of clinical usage of GV, predominately on spinal, cognitive and qi-blood movement issues. GV influence on the brain was accepted by most respondents with only a few expressing uncertainty. Further worldwide, larger population, in-depth studies and trials are needed to fully establish and expand upon these findings.


## 1. Introduction

The risk factors of dementia often appear at a young age, and although people in their early thirties with memory and attention issues might not be aware of any dementia risk, Alzheimer's Disease International [1] declared that noticeable symptoms can take 20–30 years to develop, whereupon its cure or improvement rate is very disappointing; for these reasons effective prevention approaches by health professions are urgently required.

Poor memory, concentration, and sharpness are defined as early signs of dementia (ESoD) by the British National Health Service [2]. The authors and their colleagues have clinically observed such ESoD as being often experienced by many young patients with back neck pain (BNP) and that these disappeared soon after BNP recovered. Recent studies [3,4] have observed a correlation between cervical vertebrae and brain function. The prevalence of both BNP and dementia among the working population and elderly, respectively, is high: in the UK 2013, lower back and neck pain was the biggest morbidity cause for the age group between 15 and 49 [5]; in 2016 musculoskeletal problem is the largest reason for workers sick-leave after cold/flu [6]; In 2015, 50 million dementia patients cost almost 1.1% of global gross domestic product, by 2050, global dementia prevalence is expected to reach 152 million [7,8].

In fact, Chinese Medicine (CM) Governor Vessel (GV) theory has recognized the connection between BNP and ESoD long ago in the *Neijing and Nanjing* [9-11]. The character (governor) initially signified an upright line of the noon-sun and appeared during divination in oracle bone inscriptions [12]. *Zhuangzi*'s remark of *yuan du yi wei jing* (follow backbone as guidance for both physical and spiritual life) conceptualized the embryonic form of GV (GV and GV1, GV2, GV3…GV28, and so on are used) for self-cultivation before the *Neijing* medical era [13].

However, the interpretation of GV and its collaterals are not always consistent over the last few thousand years. In *Neijing*, the description of GV collaterals was scattered in different chapters, which may have led to incomplete interpretations by later scholars. For instance, *Yang Shangshan, Wang Bing, Zhang Jiebin, Gao Shishi,* and *Zhang Zhicong* annotated the concept of paravertebral channel

* Corresponding author. Chisense Clinic, 62 Green Dragon Yard, London, E1 5NJ, United Kingdom.
*E-mail address:* chisenseclinic@gmail.com (W.S. Zhou).

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as, sides of GV, Bladder meridian (BM), Five-*zang-shu*-points, and the hidden-thoroughfare vessel, respectively. Until *Qing* dynasty, *Yao Shaoyu* contradicted all previous partial explanations and suggested that GV refers to the entire back [9]. Nonetheless, the importance of GV collaterals appears to be still overlooked. Furthermore, GV flowing *within* the spinal canal was clearly stated in *Neijing* [9], whereas some literature used the word along instead [14-20] which might confuse acupuncturists as to what depth of needle insertion can impact the channel, or even reduce the perceived value of needling spinal GV points for improving brain function.

Today, a fair number of practitioners favor distal style needling such as the eight confluent points for opening eight extraordinary vessels [21]. Ren [22] and Lee [23] praised distal needling for being more advanced than localized needling because of the former reaching *zangfu* root issue and later addressing physical symptoms. Conversely, the opening points creator, *Yang Jizhou* warned that these points only have an interim effect, and the vessels themselves still need to be acupunctured [24], an opinion with which even the recent distal needling master *Tung* (*Shandong-Taiwan*) never disagreed [25].

CM principally targets *weibing* (not-yet-illness), before it develops into *yibing* (already illness) such as the irreversible illness dementia [9]. Targeting reversible ESoD to prevent irreversible dementia might be of great value. This research aimed to investigate GV and its preventive significance in dementia so as to inform clinical practice, education, and further research. An online questionnaire survey of GV clinical usage via practicing acupuncturists in the UK was conducted to compare with the literature.

## 2. Method

Web-based surveys are cost-effective, flexible, and response-set-reachable, which is appreciated by highly educated professional participants [26,27]. This online questionnaire contains three themes with nine questions: (A) participant's personal details and experience in using GV; (B) recognition of GV's connections; (C) a view of GV influencing brain function (GIBF). The questionnaire was piloted by three acupuncturists for comprehension and by a native English speaker but CM-outsider. After the pilot, the personal question of participant age group and some opening questions were removed.

The selection criteria were as follows: the email addresses extracted from practitioners' websites advertised on Google-Business found with keywords "acupuncture in" + "location" within UK regions. Registered acupuncturists were the inclusion criteria. Acupuncturists who, as advertised, offer no general CM consultation but specialized areas only, such as pain control or fertility only were the exclusion criteria.

Four hundred six questionnaires were distributed electronically via Google Form, of which three hundred eighty one were successfully delivered. Two weeks later, reminder emails were sent and an extra 18 responses arrived in addition to the original 21. An explanation email with relevant website screen-capture was sent to a potential participant who inquired how his email address had been obtained, who then replied positively toward the survey. The data from 39 questionnaire forms were collated in an Excel sheet.

The survey aimed to be free from leading or loaded questions, and simply to reach participant's opinions rather than knowledge testing. The explanation of each participant's rights is presented at the beginning of the form, and the option of collecting respondent's emails is omitted from the retained form. All email addresses and response forms were kept confidential. The survey is pledged to be for academic use only, with no incentive promised for participants. The survey's ethical approval application (Code: Ethics ETH1718-1143) was made to University of Westminster before it commenced.

The data analysis process was divided into two kinds in accordance with the question type: closed questions data were tabulated and grouped for collating and summarizing; open questions data were thematically categorized and some data were conceptualized for word-cloud visualization.

## 3. Results

Thirty-eight respondents were in private practice with four doing home visits, two in the community, and one in hospitals. The percentage of participants' patients aged more than 60 was never beyond 60%. One respondent claimed nonuse of GV without explanation. The GV usage data were from thirty-eight respondents. Thirty-three respondents declared "*No concern raised*" by their patients for needling spinal points.

The indicated reasons given for not using GV by respondents are as follows: the location of spinal points led acupuncturists and patients to fear needling so alternative meridians/points such as BM and *Huatuo-Jiaji* points (HJP) or distal opening points were applied; patients position was normally facing up so only head points were conveniently selected; the location of GV1 also raised safety concerns for lone-working acupuncturists as being too intimate to needle while being alone with patient(s).

Thirty-two respondents stated that the BM helps GV flow, thirty-four stated HJP help GV-*qi* flow. GV20, GV24, GV4, and GV14 are the top four *often* used points by 54–83% respondents. GV28, GV1, GV27, and GV25 are the top four *never* used points by 46–56% of respondents. *Mingmen* GV4 was the most responded point, with the fewest blank responses, and has no respondent opting for "*Never used*". GV25 and GV27 have no respondents who ticked "*Often used*" (Table 1). No respondent disagreed with GV helping spinal problems (Table 2).

**Table 1**
Frequency of GV points used by total of 38 GV users as respondents (R).

| GV points | Total R | | Left blank | | Never used | | Rarely used | | Often used | |
|---|---|---|---|---|---|---|---|---|---|---|
| | R | % | R | % | R | % | R | % | R | % |
| GV1 | 33 | 86.8 | 5 | 13.2 | 21 | 55.3 | 11 | 29.0 | 1 | 3.0 |
| GV2 | 34 | 89.5 | 4 | 10.5 | 11 | 29.0 | 20 | 58.8 | 3 | 7.9 |
| GV3 | 33 | 86.8 | 5 | 13.2 | 8 | 21.1 | 14 | 36.8 | 11 | 29.0 |
| GV4 | 36 | 94.7 | 2 | 5.3 | 0 | - | 13 | 34.2 | 23 | 60.5 |
| GV5 | 33 | 86.8 | 5 | 13.2 | 16 | 42.1 | 12 | 31.6 | 5 | 13.2 |
| GV6 | 34 | 89.5 | 4 | 10.5 | 16 | 42.1 | 12 | 31.6 | 6 | 15.8 |
| GV7 | 34 | 89.5 | 4 | 10.5 | 17 | 44.7 | 13 | 34.2 | 4 | 10.5 |
| GV8 | 33 | 86.8 | 5 | 13.2 | 11 | 29.0 | 14 | 36.8 | 8 | 21.1 |
| GV9 | 34 | 89.5 | 4 | 10.5 | 15 | 39.5 | 15 | 39.5 | 4 | 10.5 |
| GV10 | 33 | 86.8 | 5 | 13.2 | 13 | 34.2 | 14 | 36.8 | 6 | 15.8 |
| GV11 | 32 | 84.2 | 6 | 15.8 | 8 | 21.1 | 14 | 36.8 | 10 | 26.3 |
| GV12 | 32 | 84.2 | 6 | 15.8 | 8 | 21.1 | 10 | 26.3 | 14 | 36.8 |
| GV13 | 34 | 89.5 | 4 | 10.5 | 10 | 26.3 | 10 | 26.3 | 14 | 36.8 |
| GV14 | 33 | 86.8 | 5 | 13.2 | 1 | 2.6 | 11 | 29.0 | 21 | 55.3 |
| GV15 | 28 | 73.7 | 10 | 26.3 | 9 | 23.7 | 10 | 26.3 | 9 | 23.7 |
| GV16 | 32 | 84.2 | 6 | 15.8 | 3 | 7.9 | 17 | 44.7 | 12 | 31.6 |
| GV17 | 32 | 84.2 | 6 | 15.8 | 14 | 36.8 | 15 | 39.5 | 2 | 5.3 |
| GV18 | 31 | 81.6 | 7 | 18.4 | 15 | 39.5 | 14 | 36.8 | 2 | 5.3 |
| GV19 | 32 | 84.2 | 6 | 15.8 | 10 | 26.3 | 17 | 44.7 | 5 | 13.2 |
| GV20 | 35 | 92.1 | 3 | 7.9 | 1 | 2.6 | 0 | - | 34 | 92.1 |
| GV21 | 28 | 73.7 | 10 | 26.3 | 12 | 31.6 | 12 | 31.6 | 4 | 10.5 |
| GV22 | 29 | 76.3 | 9 | 23.7 | 15 | 39.5 | 10 | 26.3 | 4 | 10.5 |
| GV23 | 31 | 81.6 | 7 | 18.4 | 9 | 23.7 | 7 | 18.4 | 15 | 39.5 |
| GV24 | 35 | 92.1 | 3 | 7.9 | 4 | 10.5 | 6 | 15.8 | 25 | 65.8 |
| GV25 | 32 | 84.2 | 6 | 15.8 | 18 | 47.4 | 14 | 36.8 | 0 | - |
| GV26 | 32 | 84.2 | 6 | 15.8 | 11 | 29.0 | 15 | 39.5 | 6 | 15.8 |
| GV27 | 29 | 76.3 | 9 | 23.7 | 19 | 50.0 | 10 | 26.3 | 0 | - |
| GV28 | 30 | 79.0 | 8 | 21.1 | 22 | 57.9 | 7 | 18.4 | 1 | 2.6 |

GV, Governor Vessel.

More than fifty percent of respondents agreed "*poor memory and cognitive issues*" were affected by GV. Seventy-one percent of participants answered "*Yes*" to GIBF.

The factors connected with GV included by the participants are largely related to kidney, spine, blood vessel flow, with brain, emotion and internal cosmic orbit also being mentioned (Fig. 1, generated by Wordclouds).

The main reasons for participants frequently using GV points are for helping issues of spine, kidney *qi*, brain, sense organs of the head, *qi* & blood, *zangfu* organs, as well as some points such as GV20, GV14 being multifunctional. As investigating GIBF was the main aim of the survey, it was asked about directly. Five participants ticked "*Yes*" with supporting messages indicating GV improving brain function. It is worth mentioning that two participants who did not tick "*Yes*" but added comments that appeared very positive: "*If patient is in a lot of mechanical pain then this can impair blood supply to the brain*", "*(GV1 and GV2) will improve blood flow to the head and possibly brain. If you take qi to mean nerve function, oxygen, nutrients and immune function, then bringing more to the brain is very useful*". Some participants explained their uncertainty of GIBF because of insufficient practical experience: "*I'm just not sure that I have needled enough clients with memory issues to be more specific*", "*I don't often needle GV points...don't trust the spine can safely be needled into*". Two respondents who rejected GIBF proclaimed that GIBF is a mechanical or physical issue as a blood flow problem causing nutritional shortage in the brain and consequentially poor brain function.


**Figure 1.** Factors related to GV in accordance with respondents. GV, Governor Vessel.

## 4. Discussion

### 4.1. Main findings

The survey results suggest that the correlation between the brain and GV is straightforwardly accepted by nearly three quarters of responding practitioners. However, spinal problems are the only symptoms which no participant disagreed with as being significantly helped by GV acupuncture. The use of alternative channels/points such as BM, HJP, indicates the existing value of GV collaterals in actual practice. The participants discussed GV pathway and functions in relation to carrying marrow, essence, *qi*, blood from the kidney region, feeding nutrients to the head and brain through the spinal conduit via the cervical vertebrae. The participants observed that brain function can be impacted if *qi* and/or blood flow in the GV pathway was slow or obstructed, but two respondents also argued this has been mechanical as the reason to reject GIBF.

Overall, the survey findings appear to reinforce the connection between GV theory in CM literature and its practical usage. The microcosmic orbit, originated from Daoist *yangsheng* practice in 3rd Century BC [28] was acknowledged as connected with GV in the survey, which demonstrates that Governor as a health concept has a longer history than *Neijing*. The terms *nerve* and *motor* used for GV by respondents implied the GV flowing *within* vertebrae canals but not *along* the spine. For example, GV4 is an often used point located just below the second lumbar vertebra which is medically still within the precautionary area [29]. In *Nanjing*, *mingmen* was the name for the right-side kidney [11], but a debate as to the morphological identity has continued for many years. In *Yuan-Ming* dynasty, *mingmen* was commonly regarded as at GV4 point. Previously, its interpretation was in many forms such as the female uterus, male essence, the kidneys, the fire of *yang*, the moving-*qi*, invisible fire and dominator of *zangfu* organs, innate-*taiji*-*qi*, *qi* of three *jiao*, the minister-*yin*-fire containing gallbladder, liver, kidney and three *jiao*, and so on. Furthermore, *mingmen* is also known as *Jing gong* (palace of essence) which is associated with the BL52, *Zhi shi* (Will Chamber) point, horizontally on the same line together with Kidney-*shu* points [24,30-32]. All these terms have made GV4 a multifunctional point attractive to acupuncturists, unlike other spinal GV points which have not had such high coverage in the classical literature.

Master *Tung* and Master *Manaka* were two styles of distal needling mentioned in the survey as being convenient for dealing with sensitive or mostly upward-facing patients, along with the perception of "*the superior Acupuncturist uses distal points*" by acupuncturists. Lee [23] declared the advantage of needling a few distal points without in-depth diagnosis is to treat a large number of patients per day. Similarly, Master *Manaka* acupuncture is another simple effective distal style originating from whiplash therapy, to open CM channels' *qi* especially in extraordinary vessels which also claimed to be easy to learn and to use [33]. However,

**Table 2**
Respondents' experience on GV-related symptoms.

| Symptoms | Unsure | Strongly disagree | Disagree | Neutral | Agree | Strongly agree | Total responded |
|---|---|---|---|---|---|---|---|
| Spinal stiffness/pain | | | | 1 | 16 | 19 | 36 |
| Arching of back | 4 | 1 | 1 | 6 | 15 | 9 | 36 |
| Backache | | | | | 16 | 21 | 37 |
| Weak back | 1 | | | 2 | 18 | 16 | 37 |
| Headache | | | | 2 | 21 | 12 | 35 |
| Tinnitus | 5 | 1 | 3 | 12 | 4 | 8 | 33 |
| Tremors | 3 | | 2 | 10 | 12 | 6 | 33 |
| Dizziness | | | | 6 | 18 | 12 | 36 |
| Convulsions | 5 | | 2 | 13 | 8 | 5 | 33 |
| Poor memory | 2 | 2 | 1 | 7 | 15 | 8 | 35 |
| Depression | 1 | 2 | | 6 | 13 | 12 | 34 |
| Manic behavior | 3 | 1 | 2 | 8 | 12 | 8 | 34 |
| Cognitive issue | 2 | 2 | 1 | 6 | 14 | 10 | 35 |

GV, Governor Vessel;

despite the strength of this argument, simplifying the diagnosis procedure may result in missing early signs of potential illness. For instance, musculoskeletal patients with ESoD might discontinue sessions soon after their pain becomes bearable without realizing their remaining risk of potential cognitive impairment.

### 4.2. Opposing argument

The reason for rejecting GIBF by two participants is actually similar to the reason given by their counterparts for accepting it, but they emphasized a mechanical element: back/neck issues are mechanical, decreasing blood flow into the brain, so the brain lacks nutrition, that is, marrow, *qi*, blood, oxygen, giving rise to poor function in the brain. Being "*mechanical*" and "*physical*" might be alternatively indicating that those minor reversible brain functional issues are not strategically related to the *zang* issues such as *qingzhibing* (emotional illness) or *Jingshenbing* (spirit-wisdom illness) but are musculoskeletal issues [34]. *Neijing* points out, however, that the physical and spirit body, respectively, represent *yin* and *yang* which are the root of illness [9]. The mechanical symptoms unbalance body *yinyang*, although they are reversible *weibing*, without the physician's attention they might possibly develop into *zangfu*-related *yibing*. Therefore, preventing the early signs of illness from developing into more serious illness is the CM approach.

### 4.3. Similar findings

McCaulley and Grush [3] found that brain inflammation causes brain functional deterioration such as Alzheimer's disease (AD). Inflammation associated with tumor necrosis factor (TNF) was found in the brain of patients with AD, as well as patients with traumatic brain injury, spinal disc/cord disease and stroke; but the molecules of TNF inhibitor are too large to cross through the blood–brain barrier. In terms of CM understanding, the inflammation is related to excessive heat caused by obstructing *qi*-tension [35], such as TNF tension obstructing the GV passage, slowing down the delivery of essential *qi*, essence, fluids and marrow to the brain, eventually large enough to degrade brain function. Huang et al. [8] found that people with spinal cord injury (SCI) have an increased likelihood of dementia. There were three findings that were very supportive of GIBF. First, young patients with SCI have a high rate of dementia risk but a low risk of death. Second, SCI impacts the spinal tunnel, as well as brain function and can develop over a much longer period, as Huang et al. [8] cited, a period of at least 40 years. Third, physical inactivity increases the risk of dementia. These three points can be exemplified by the young working population who has long hours at a desk job without much physical movement but also with long-term back/neck pain being more likely to develop dementia in later life than others. However, these study findings were based on already illness, and these researchers made calls for further studies focusing on cost-effective preventive approaches.

### 4.4. Clinical relevance

The findings are not only to draw professional attention to those musculoskeletal patients with ESoD but also to encourage the working population to pay attention to their spinal health.

### 4.5. Limitations

The survey participants were all based in the UK. To meet the aim of determining a preventive approach for such a global health concern, the surveyed respondents may not properly represent a worldwide view. The survey tried to eliminate nonconsultation specialized acupuncturists but still reached a few respondents who worked heavily on fertility issues, which might affect the GV survey overall results. The proportion of more than 60-year-olds of the surveyed practitioners' patients is not any higher than the general population [36] which is not unexpected owing to the habits and beliefs of chosen health practitioners in this group. Hence, it can be observed that this survey has not reached practitioners with a particular focus on patients with dementia.

## 5. Conclusion

This survey suggests ESoD may be associated with musculoskeletal problems and that the connection is GV. Investigation, ultimately leading to recommendations, by the National Health Service could prove a cost-effective strategy for helping with the working population's general health. Further, worldwide large population in-depth GV research and clinical trials would be needed for more accurate and comprehensive results to make progress on this topic. The findings aim to encourage acupuncture practitioners to use GV points more often in their regular practice not only for spinal conditions but also to prevent the predicted future high prevalence of dementia.

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## Declaration of competing interest

The authors declare that they have no conflicts of interest and no financial interests related to the material of this manuscript.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jams.2020.02.001.

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