

A Study of *Hie* and LBP: The First Step to Improve Subjective Well-Being

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Abstract

Backgrounds: Health does not only physical health, therefore, we need to study it from various viewpoints. Many Japanese female complain of a *Hie* or a low back pain (LBP), which they reduce their subjective well-being. We analyze. Those patients often have acupuncture therapy. In this study, we analyze the characteristics of *Hie* and LBP, the satisfaction level of alternative therapy and we pursue a tip to improve subjective well-being. **Methods:** Of 1000 women, *Hie* (+)/*Hie* (-) or LBP (+)/LBP (-), we compared their body temperature (BT) (axilla) and body mass index (BMI). Furthermore, the Chi test identified ten factors of “body” and seven “mind” information. **Results:** In the result of BT (axilla) while LBP indicated a significant difference. Both *Hie* and LBP showed difference in the opposite direction. *Hie* did not show such clear differences in “body” information. However, interestingly, all seven questions in the “mind” information showed statistical difference. **Discussion and conclusion:** One reason why those patients have acupuncture therapy may acupuncture therapy traditionally has not separate “mind” and “body” and it has the concept of “mind-body unity”. To improve subjective well-being, first we need to focus on “Mind” as well as “mind-body unity”. Mental-health support is important for patients with *Hie* or LBP to reduce physiological stress.

Keywords

Hie, Low Back Pain (LBP), Subjective Well-Being, Body Temperature (BT)

1. Introduction

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity [1] [2]. As health does not only physical health, therefore, we need to study it from various viewpoints. Recently researchers started to study subjective well-being [3].

In Japan there are many people who are complaining that their subjective well-being is not good: 246.7/1000 (male), 304.2/1000 (female) in 2022 [4]. Their major complains are *Hie* and LBP and they do not always go to medical institutions. However, medical doctors do not recognize them diseases because they are subjective complaint. Doctors cannot obtain their objective finding.

Those people often select alternative medicine such as acupuncture in Japan. Acupuncture researchers reported “They rely on acupuncture therapists” [5], therefore, those therapists need to improve “relationship-building effort between acupuncture therapist and patient” [6]. However, the association between such trustful relationship and characteristics are still unknown. Moreover, whether their that kind of therapy is effective to improve their subjective well-being.

In this study, we analyze *Hie* and LBP, which reduce subjective well-being of female, the satisfaction level of alternative therapy, such as acupuncture. And we pursue a tip to improve subjective well-being.

2. Methods

2.1. Participants

Our study used data from a Japanese survey company’s computerized database (Cross Marketing Inc., Tokyo, Japan). The subsample of 5000 individuals was selected by stratified random sampling from the database of 300,000 individuals. Stratification was by region (47 prefectures) and age (20 - 29, 30 - 39, 40 - 49, and 50 - 59 years). The final sample size of 1000 participants was selected by the same stratified random sampling from the subsample. The survey results were tabulated in a computer database and statistical analysis was performed. We included participants who answered all questions perfectly. The exclusion criteria were the absence of an infrared (contact-type) thermometer and the use of specific medicines or supplements without a prescription. An internet-based survey was administered to all participants (a web-based questionnaire-answering system provided by the survey company). Prior to study initiation, the participants were informed that the data collected would be used for research purposes only and that strict confidentiality would be maintained. Informed consent was obtained from the participants before the investigation commenced. The participants were additionally informed about their right to withdraw from the study at any time. This study was approved by the Medical Ethics Committee of Ibaraki Prefectural University of Health Sciences (Ibaraki, Japan, e300-r120209).

2.2. *Hie* and Low Back Pain (LBP)

In traditional medicine, *Hie* is called chilly sensation in English and is known to

induce low back pain (LBP) [7]. Hitherto the “*Hie*” parameter has been uninvestigated; therefore, we incorporated it with regard to LBP into our new questionnaire. In traditional medicine, *Hie* is known to induce pain, including in LBP patients [7]. Local or small-scale studies have been conducted; however, these cannot be considered sufficient evidence to explore the effect of *Hie* on LBP [8] [9] [10]. We quantified *Hie* by measuring BT and body mass index (BMI) according to recently published studies, *Hie* may be influenced by multiple factors, including mental status [11]-[17]. Other information that may affect both BT and *Hie*, including status, was obtained through the questionnaire. Our 1000 participants with or without *HIE* were divided into two groups: *Hie* (-) or *Hie* (+).

LBP refers to pain, stiffness, decreased lower back movement, and difficulty in straightening one’s lower back. The 1000 participants with or without LBP were divided into two groups, too: LBP (-) or LBP (+).

2.3. Body Temperature (BT) (Axilla) and Body Mass Index (BMI)

As physical features, we asked participants to provide their body temperature (BT) (axilla) and body mass index (BMI). As in previous studies, we calculated the BMI [18] [19] [20] by inquiring about the participant’s weight and height and applying the following formula: $BMI = \text{weight kg} \div \text{height (m)}^2$. Participants were categorized into three groups based on their BMI (<18.5, 18.5 - 24.9, and ≥ 25.0).

2.4. “Body” Information: Analgesics, Acupuncture, Traditional Concepts, Diets (Likes and Dislikes, Cold Food, Liquor)

We also collected “body” Information: frequency of analgesics usage and acupuncture therapy [twice a week = 2(/w), once a week = 1(/w), three times a month = 3/(m), no] as well as their satisfaction level of acupuncture (totally satisfied, partially satisfied, partially unsatisfied, unsatisfied, no experience).

Traditional medicine has a unique conception. We inquired subjects the five the organs (liver, heart, spleen, lung, kidney) as well as the five tastes (sour, bitter, sweet, hot salty). We also asked them “likes and dislikes” (yes, N/A, no).

As, *Hie* (+) is called chilly sensation and LBP (+) showed lower BT, we asked intake of cold food, which might lower BT. We also collected information of “Liquor”, which might increase blood flow raising up BT.

2.5. “Mind” Information: Mental Status/Emotion

As recently researchers reported mental status affects *Hie* or LBP [15] [16] [17], we studied the levels of their “Mind” information (mental statue/emotion): happiness, anger, depression, inferiority, deterioration health, Exhaustion, failure (yes, N/A, no).

2.6. Statistical Analysis

All statistical analyses were performed using IBM SPSS Statistics software for

Windows, version 25.0 (IBM Corp., Armonk, NY, USA). Means (\pm standard deviations) were used to characterize the distributions of continuous variables.

We performed Pearson's chi-squared test was performed to study both groups [*Hie* (-) or *Hie* (+), LBP (-) or (+)]. We also conducted Student's t-test, Mann-Whitney's U test and Welch's t-test. All statistical tests were two-tailed, and a statistical significance was set at $P < 0.05$.

3. Results

3.1. Body Temperature (BT) (Axilla) and Body Mass Index (BMI)

BT (axilla) difference was not found between *Hie* (-) and *Hie* (+) (36.18 ± 0.37 , 36.14 ± 0.40 , $P = 0.058$) while statistical difference was shown between LBP (-) and LBP (+) (36.18 ± 0.36 , 36.13 ± 0.42 , $P < 0.001$).

As for BIM *Hie* (+) showed lower value (21.5 ± 3.4 , 20.5 ± 3.4 , $P < 0.001$) while LBP (+) intended higher value (20.7 ± 3.2 , 21.5 ± 3.9 , $P < 0.001$) than the other group (Figure 1).

3.2. "Body" Information

The equations The In our questions of the "body", half of 1000 subjects them used analgetic and 295 of them had acupuncture therapy. Numbers of women who had every week (twice a week = 2(/w), once a week = 1(/w)) were 18 in *Hie* (+) group and 27 in LBP (+) group. Interestingly *Hie* (+) group showed higher number of unsatisfaction than LBP (+).

Pearson's chi-squared tests showed 0.042 in "traditional five organs" of *Hie* while it was 0.017 in "traditional five tastes" of LBP.

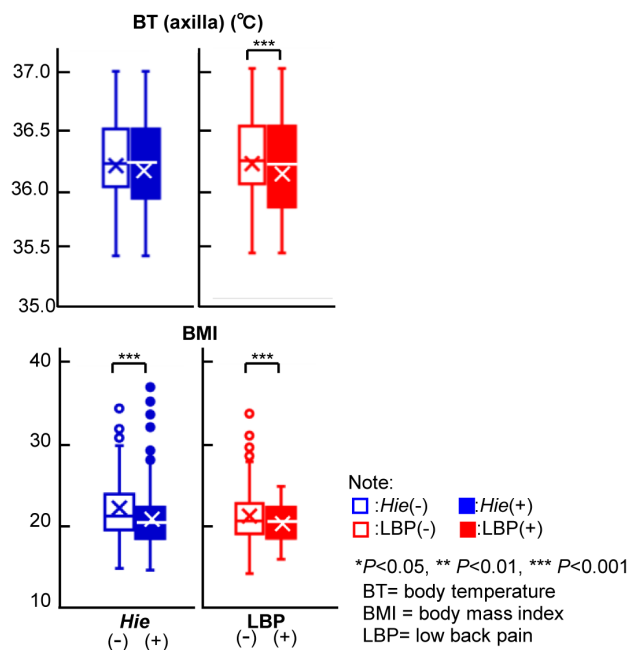


Figure 1. To understand the difference between *Hie* and LBP (low back pain), we compared results of BT (axilla) and BMI between *Hie* (-)/*Hie* (+) and LBP (-)/LBP (+).

The result of “likes and dislikes”, 107 (62.9%) of *Hie* (+) answered “yes” and 314 (67.0%) of LBP (+) selected “no” with differences: *Hie* ($P = 0.009$) vs LBP ($P = 0.001$).

As for “liquor”, 421 women took it. 508 (67.6%) of LBP (-) answered “no liquor”. At that time majority of them selected “hardly” both in “Japanese sake (cold)” and “Japanese sake (hot)” (Table 1).

3.3. “Mind” Information

In our “mind” questionnaire, *Hie* (+) mainly answered “no” in “happiness”, “yes” in “anger” and “depression”. Three panels (deteriorating health, exhaustion, failure) showed the same P value ($P < 0.001$) (Figure 2).

4. Discussion

At first glance, both *Hie* and LBP, which are uncomfortable sense, are induced by the “body”. In the result of BT (axilla), *Hie* did not show difference, though they complain chilly sensation. On the other hand, LBP indicated a significant difference. That may be attributed to the fact that LBP (+) participants are not as physically active as LBP (-) participants. Such sense of pain may weaken muscular action and muscle pumping, which circulates warm blood from the heart to the axilla.

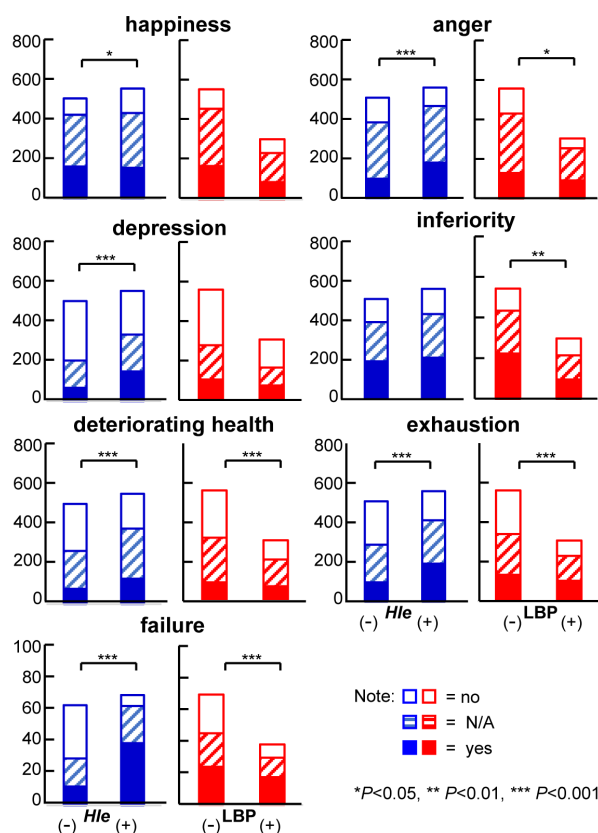


Figure 2. Mind' information (emotion/emotion): Differences of BT between *Hie* (-)/*Hie* (+) and LBP (-)/LBP (+). * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

Table 1. Body information: Differences *Hie* (–) and *Hie* (+) and LBP (–) and LBP (+) Note: **P* < 0.05, ***P* < 0.01, ****P* < 0.001.

Characteristic	<i>Hie</i>				<i>P</i>	LBP			
	(–)		(+))			(–)		(+))	
Total (n = 1000)	476	47.6	524	52.4		646	64.6	354	35.4
“Body” Information									
Analgetic					0.001**				
2 (/w)	8	20.5	31	79.5		20	51.3	19	48.7
1 (/w)	30	48.4	32	51.6		28	45.2	34	54.8
3 (/m)	50	43.9	64	56.1		65	57.0	49	43.0
sometimes	111	43.9	142	56.1		140	55.3	113	44.7
no	277	52.1	255	47.9		393	73.9	139	26.1
Acupuncture Satisfaction					0.001**				
totally satisfied	30	52.6	27	47.4		30	52.6	27	47.4
partially satisfied	76	49.0	79	51.0		83	53.5	72	46.5
partially unsatisfied	20	30.3	46	69.7		26	39.4	40	60.6
unsatisfied	2	11.8	15	88.2		6	35.3	11	64.7
no	348	63.0	204	37.0		501	71.1	204	28.9
Acupuncture Frequency (n = 295)					0.802				
2(/w)	4	40.0	6	60.0		0	0.0	10	100.0
1(/w)	11	47.8	12	52.2		6	26.1	17	73.9
3(/m)	14	40.0	21	60.0		13	37.1	22	62.9
sometimes	46	40.0	69	60.0		59	51.3	56	48.7
not so often	53	47.3	59	52.7		67	59.8	45	40.2
Traditional Five Organs					0.042*				
liver	209	52.3	191	47.8		260	65.0	140	35.0
heart	76	45.2	92	54.8		102	60.7	66	39.3
spleen	13	36.1	23	63.9		18	50.0	18	50.0
lung	95	49.5	97	50.5		131	68.2	61	31.8
kidney	83	40.7	121	59.3		135	66.2	69	33.8
Traditional Five Tastes					0.527				
sour	58	46.0	68	54.0		80	63.5	46	36.5
bitter	8	40.0	12	60.0		6	30.0	14	70.0
sweet	242	46.2	282	53.8		347	66.2	177	33.8
hot	96	53.0	85	47.0		121	66.9	60	33.1
salty	72	48.3	77	51.7		92	61.7	57	38.3

Continued

Likes and dislikes				0.009**				0.001**
yes	63	37.1	107	62.9	88	51.8	82	48.2
N/A	184	51.0	177	49.0	244	67.6	117	32.4
no	229	48.8	240	51.2	314	67.0	155	33.0
Cold food				0.391				0.004**
frequently	203	45.5	243	54.5	265	59.4	181	40.6
N/A	144	50.7	140	49.3	202	71.1	82	28.9
hardly	129	47.8	141	52.2	179	66.3	91	33.7
Liquor type				0.597				<0.001***
Japan sake etc	93	45.4	112	54.6	122	59.5	83	40.5
aqua vitae	23	53.5	20	46.5	16	37.2	27	62.8
no liquor	360	47.9	392	52.1	508	67.6	244	32.4
Japanese sake (cold) (n = 421)				0.190				0.010*
frequently	53	53.0	47	47.0	48	48.0	52	52.0
N/A	38	40.4	56	59.6	52	55.3	42	44.7
hardly	112	49.3	115	50.7	148	65.2	79	34.8
Japanese sake (hot) (n = 421)				0.753				0.001**
frequently	32	44.4	40	55.6	28	38.9	44	61.1
N/A	43	47.8	47	52.2	54	60.0	36	40.0
hardly	128	49.4	131	50.6	166	64.1	93	35.9

Hie (+) participants, who did not show difference, weighed less. It might induce less BMI values, as indicated in the Japanese government's statistics [21]. *Hie* (+) may have less muscle volume owing to dietary limitations [15]. We may explain BT (axilla) and BMI of *Hie* (+) in this way.

Figure 2 showed P values of $P < 0.05$ for all seven questions in the "Mind" info domain. We may say that "Mind" profoundly affects both *Hie* (+) and LBP (+). Both *Hie* and LBP are felt subjectively, and thus, they may be easily affected their "Mind", mental status.

In the part of "Body", such clear differences were not indicated, especially in *Hie*. Therefore, those results imply that subjective wellbeing, such as *Hie* (+) and LBP (+) is not the problem of "Body", but primarily that of "Mind".

Recently researchers began to investigate "Mind", mental status [17] [22]. Chronic LBP patients might benefit from psychosocial treatment. Recent RCT studies of cognitive behavioral therapy [23] the addition of therapeutic alliance [24] and mindfulness [25] revealed the effectiveness of psychosocial treatment on LBP, for example. Thus, factors of "mind" are important to take into account when examining and treating these patients.

Brain function is also studied, and Nummenmaa L reported that emotions coordinate our physiological status [26]. Nikaido and Konno reported that Chronic LBP (+) present dysfunction of the default mode network and fMRI revealed they have strong activation of the posterior cingulate cortex. Moreover Chronic LBP patients with psychiatric problems have reduced activation of nucleus accumbens [27]. In fact, chronic LBP therapy with liaison approach, for a multidisciplinary pain management with orthopedists and psychiatrists, has been quite successful [28] [29].

In Japan, *Hie* (+) and LBP (+) people often select acupuncture therapy [5] [6] and acupuncture has a unique idea. For example, traditionally, they say *Hie* (+) is affected by “spleen” and “kidney”/“sweet” and “salty” in the viewpoint of five organs/five tastes. *Hie* showed P value of 0.042 in traditional five tastes and LBP showed that of 0.017. However, as total our subjects are limited only 1000 women, further study is needed.

The interest is “likes and dislikes”, which both *Hie* and LBP indicated P value of 0.009 and 0.001 respectively. The sense of *Hie* (+) and LBP (+) may have keen and specific sense.

In this way, this traditional medicine has not separate “mind” and “body” and it has the concept of “mind-body unity”. This may be what acupuncture therapist reported “relationship-building effort between a therapist and a patient”. In short, as mind controls body, we need focus on the reinterpretation of such unity.

Those studies may support that, *Hie* and LBP are affected by “Mind”. Recently the traditional medicine classification chapter, including acupuncture therapy, was incorporated into the ICD-11 [30]. It also might be the emphasis of “mind-body unity”. Therefore, to improve subjective well-being, first we need to focus on “Mind” as well as “mind-body unity”.

Our study has some limitations. The sample size in this study was small; thus, further research on a larger scale is required to confirm our findings. As the invitation for participation in the survey was distributed over the internet, only participants who frequently use the internet could participate; hence, selection bias is an additional concern. The thermometers used were not standardized by us. Hence, errors while measuring temperatures cannot be discarded. Moreover, *Hie* prevalence might be affected by the local Japanese culture and history; thus, in the future, a more inclusive comparative study should be conducted to compare *Hie* across different countries. Therefore, the results of our study may not be representative of the wider population.

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Ethics Approval

This study was approved by the Medical Ethics Committee of Ibaraki Prefectural University of Health Sciences (Ibaraki, Japan, e300-r120209).

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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