Original Article

A Clinical Study About Difference Between Recognition of One's Own Body Figure and the Real Body Shape

Hee-Seung Lee, Seong-Sik Park

Dept. of Sasang Constitutional Medicine, College of Oriental Medicine, Dongguk University

Objectives : The purpose of this study is to evaluate if the answers of questionnaires correlate with real body shapes and to evaluate if there are any differences between different types of questionnaires.

Methods : We hand-measured body circumferences and body widths to analyze statistically answers of 9 questions from 2 different questionnaires. Also we compared two different types of questionnaires with Pearson product-moment correlation coefficient and two way ANOVA test.

Results : There are significant correlations between answers of questions and all measured body circumferences and most body circumferences except for iliac width. Also answers of questionnaires even about the same chest part are not quite the same according to the opposite type of questionnaire after we compared grouping two of eight questions. Patients seem to have difficulty to recognizing if their necks are well-developed or not especially when the question asks about body shape when comparing two parts such as neck vs waist or chest vs buttock.

Conclusions : There is general tendency of recognizing one's body shape properly. But also there are differences of recognition according to the type of questionnaire about the same body. So it is recommended to study more about the questionnaires.

Key Words : body figure, body shape, questionnaire

Introduction

A body figure is one of the most important factors to diagnose *Sasang* constitution with facial figure, personality and disease symptoms. Comprehension about the character of body figure according to each constitution is an important factor to fill in a questionnaire which is used to diagnose constitutions clinically. Many doctors who diagnose *Sasang* constitution for treatments refer to the *Sasang* constitutional diagnostic questionnaire. Therefore, there are many studies to test reliability and validity of this questionnaire[1~7] and to develop different kinds of questionnaires[8~11].

There are many subjects consisting addressed in questionnaire like appearances, personality and usual symptoms. In most of cases, patients used to fill in the questionnaire by themselves so that they answer as they recognized questions relating about themselves. Therefore, it is their recognition which determines *Sasang* constitutional diagnosis not real figures so that it is necessary to assure they understand themselves properly.

In this article, we selected several questions

Table 1. Age Distribution

	≤ 19	20 ~ 39	40 ~ 59	≥ 60	total
Male	0	79(44.6 %)	10(5.6 %)	4(2.3 %)	93(52.5 %)
Female	5(2.8 %)	59(33.3 %)	17(9.6 %)	3(1.7 %)	84(47.5 %)
total	5(2.8 %)	138(77.9 %)	27(15.3 %)	7(4.0 %)	177(100.0 %)

about body shapes from two different questionnaires because body shape is able to be examined and compared objectively and statistically. So to examine if patients recognize their body shapes properly, we measured 7 body circumferences and 5 body widths[12] to match the same part of body in the questionnaire and compared the actual measured results with answers of questions.

Methods

1. Subjects

To get the data of body shape, we measured 7 parts of body circumferences and 5 widths of 177 patients who volunteered and participated in 2 kinds of questionnaires[8,9,10] about their body shapes at Dongguk University Oriental Medical Hospital from August 2007 to October 2007.

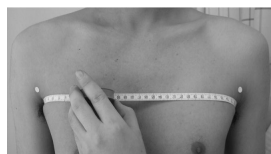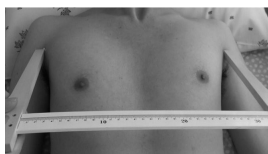### 2. Experimental Procedures

1) How to get the data

(1) Measurement

Body circumferences are measured with Measuringtape (Hoechstmass, Germany) in standing position (Fig. 1, 3). Body widths are measured with Large Sliding Caliper (Samhwa, Seoul) in while patients lay face-up (Fig. 2, 4). Only brassiere and panty are allowed for female participants for measurement. In male's case, a panty was worn.

(2) Questionnaire

There are 2 types of questionnaires, Questionnaire for patients[10] and Decision tree methods[8,9] and 9 questions asking what the participants think about their body shapes. Questionnaire for patients ask which is the weakest or most developed part of one's body and give 8 specific questions about each part: waist, pelvis, neck, chest, upper back, abdomen and buttock. The answers are numbered as "yes" to be 3, "so-so" to be 2 and "no" to be 1.(Table 3) The last questionnaire from Decision tree methods is "To which type does your body shape belong?" and
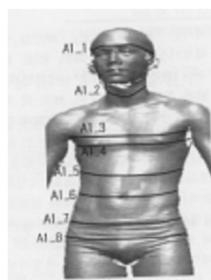

Fig. 1. How to measure circumference

Fig. 2. How to measure widths
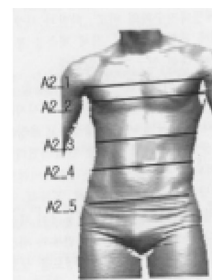

Fig. 3. body circumferences[12](Table 2)

Fig. 4. body widths[12](Table 2)

Table 2. Variable of Body Circumferences and Widths

abbreviation	Meaning and the lines in picture 3, 4
NC	Neck Circumference: the shortest circumference of neck passing by the inferior Thyroid cartilage(A1_2)
AC	Axillary Circumference: the horizontal circumference passing by the Axillas (right and left)(A1_3)
CC	Chest Circumference: the horizontal circumference passing by the Nipples (right and left)(A1_4)
UAC	Upper Abdomen Circumference: the horizontal circumference passing by the junctions of the 7-8th Costal cartilages(A1_5)
WC	Waist Circumference: the horizontal circumference passing by the Umbilicus(A1_6)
IC	Iliac Circumference: the horizontal circumference passing by the Anterior Superior Iliac Spines(A1_7)
PC	Pubic Circumference: the horizontal circumference passing by the Superior Pubic Symphysis(A1_8)
AW	Axillary Width: distance between the right and left origins of Preaxillary line(A2_1)
CW	Chest Width is at the level of Nipples(A2_2)
UAW	Upper Abdomen Width is at the level of junctions of the 7-8th Costal cartilages(A2_3)
WW	Waist Width is at the level of umbilicus(A2_4)
IW	Iliac Width: distance between the right and left lateral edhes of the Anterior Superior Iliac Spine(A2_5)

the answers are ①"I have a well-developed neck and poor waist", ②"I have a well-developed chest and poor buttock", ③"I have a well-developed waist and poor neck" and ④"I have a well-developed buttock and poor chest" (Table 4).

2) Statistical Analysis

We analysed the data using SPSS 12.0[13] for Windows. All the data about body shape are analyzed with Pearson product-moment correlation coefficient and two-way ANOVA test.

This analysis is to know (1) if recognition about one's own body shape has proportional relation, (2) if there is any difference of one's answer according to a type of questionnaire, (3) if there is relation with BMI and body shape. Pearson correlation analysis is used for (1) and (3), when we want to prove that two parameters

Table 3. Variable of Questionnaire Q1~Q8

Questions	abbreviation	Meaning	
Which is the weakest part of your body?	Q1	My waist is slim.	Answers
	Q2	My pelvis is small.	
	Q3	My neck is slim.	
	Q4	My chest is poor.	Yes : 3
Which is the most developed part of your body?	Q5	My upper back and shoulder is broad.	So-so : 2
	Q6	My chest is well-developed.	No : 1
	Q7	My abdomen is broad.	
	Q8	My buttock is wide.	

Table 4. Variable of Questionnaire Q9

abbreviation	Meaning
Q9	To which type does your body shape belong?
Answer 1	I have a well-developed neck and poor waist.
Answer 2	I have a well-developed chest and poor buttock.
Answer 3	I have a well-developed waist and poor neck.
Answer 4	I have a well-developed buttock and poor chest.

have positive or negative linear relationships. Two-way ANOVA test is used for (2) to find there is any difference of answers of questionnaire according to answers of other type of questionnaire about the same body part. Body circumferences and body widths are used as actual value as unit of millimeter (mm).

Results

1. Relation between actual measurement and recognition

1) Actual measured body circumferences and questionnaire

As the results say, there are significant correlations between actual body measurement value and recognition according to the body part and questions as Q1&WC, Q2&IC, Q3&NC, Q4&CC, Q5&AC, Q6&CC, Q7&UAC, Q8&PC (Table 5). However, there are significant links between actual body measurement value and the questionnaire which is about other body parts as well as that of the same part. In Q1's case, there is inverse proportional relation not only with WC but also AC, CC, UAC, IC and PC. In Q2's case, AC, CC, UAC, WC are also proportioned. Q3 and Q4 make significant inverse proportional relations with all the body circumferences. So we can say that most of people who have large body circumferences have a tendency to think their necks and chests are not poor.

In Q5's case, about broad upper back and shoulder, it shows proportional relation with NC, AC, CC and UAC but not with WC, IC and PC so that we can find some tendency of recognition about their upper part of body. Most upper body parts seem to have the same tendency to answer for the questions from 3 to 6 but

Table 5. Correlation Coefficient and P-value of Body Circumferences and Questionnaire

	NC	AC	CC	UAC	WC	IC	PC
Q1	-.132	-.276(**)	-.431(**)	-.428(**)	-.486(**)	-.367(**)	-.238(**)
Q2	-.106	-.155(*)	-.186(*)	-.177(*)	-.172(*)	-.179(*)	-.143
Q3	-.231(**)	-.333(**)	-.418(**)	-.424(**)	-.326(**)	-.291(**)	-.173(*)
Q4	-.192(*)	-.385(**)	-.517(**)	-.426(**)	-.405(**)	-.168(*)	-.264(**)
Q5	.157(*)	.250(**)	.217(**)	.150(*)	.076	.081	.138
Q6	.214(**)	.335(**)	.417(**)	.328(**)	.216(**)	.098	.079
Q7	-.001	.186(*)	.252(**)	.198(**)	.247(**)	.158(*)	.237(**)
Q8	-.068	-.019	-.039	-.081	.020	.056	.198(**)

* $p < 0.05$, ** $p < 0.01$

Table 6. Correlation Coefficient and P-value of Body Widths and Questionnaire

	AW	CW	UAW	WW	IW
Q1	-.334(**)	-.346(**)	-.271(**)	-.530(**)	-.251(**)
Q2	-.181(*)	-.151(*)	-.137	-.242(**)	-.135
Q3	-.295(**)	-.369(**)	-.283(**)	-.373(**)	-.149(*)
Q4	-.323(**)	-.411(**)	-.276(**)	-.405(**)	-.012
Q5	.231(**)	.208(**)	.183(*)	.132	.131
Q6	.176(*)	.325(**)	.265(**)	.268(**)	-.020
Q7	.191(*)	.183(*)	.213(**)	.277(**)	.110
Q8	.042	.011	.056	.032	.121

* p < 0.05, ** p < 0.01

the pelvis part have speciality with its question 8.

In this result, we can find the tendency of general recognition about their body parts, but not the speciality about each part matched with questions.

2) Actual measured body widths and questionnaire

In most of the cases, for waist (Q1), chest (Q4, Q6) and abdomen (Q7), proper recognition about one's body shape seems to be assured but there is not significant suitable answers about pelvis (Q2). To know about recognition of pelvis, we checked the result between IW and Q2. Also there is tendency that someone who has wider body widths answers they don't think that they have poor neck (Q3). There is not any relation between body widths and the question about buttock region (Q8) (Table 6).

2. Difference between different types of questionnaire

1) Comparison between questionnaires

There is tendency to reply to questionnaire in the same way about slim parts of body (Q1, Q2, Q3, Q4). But there are significant correlation answering similarly between questionnaire about body parts which is connected to each other as shoulder and chest, chest and abdomen and abdomen and buttock (Q5&Q6, Q6&Q7, Q7& Q8).(Table 7)

Q4 and Q6 are giving opposite descriptions about chest as poor chest and well-developed chest. But when we take a look at comparisons of Q1&Q4 vs Q1&Q6, Q1&Q4 have significant proportional relation while Q1&Q6 have no relation. Also Q2&Q4 vs Q2&Q6, Q4&Q5 vs Q5&Q6, Q4&Q7 vs Q6&Q7 don't make correspondent results. But in case of Q4&Q7 and Q6&Q7, the results match each other. So it seems to answer differently for questions asking about the same part of body but in a different way.

2) Difference between different types of questionnaires

This analysis is to know if there is any difference between answers of Q9 and Q1~Q8. We compared each answers of Q9 grouping two of them with other 8 questions about body parts. So we can get the results if there are significant differences about recognitions of each body parts as groups who chose different answers about their development of body shapes (Q9).

Table 7. Correlation Coefficient Between Questionnaire

Comparison between	Correlation coefficient
Q1&Q2	.302(**)
Q1&Q3	.372(**)
Q1&Q4	.285(**)
Q1&Q5	-.113
Q1&Q6	-.056
Q1&Q7	-.361(**)
Q1&Q8	-.070
Q2&Q3	.427(**)
Q2&Q4	.233(**)
Q2&Q5	.108
Q2&Q6	.064
Q2&Q7	-.146
Q2&Q8	-.365(**)
Q3&Q4	.359(**)
Q3&Q5	-.163(*)
Q3&Q6	-.157(*)
Q3&Q7	-.105
Q3&Q8	-.095
Q4&Q5	-.092
Q4&Q6	-.565(**)
Q4&Q7	-.171(*)
Q4&Q8	.101
Q5&Q6	.216(**)
Q5&Q7	.033
Q5&Q8	-.106
Q6&Q7	.149(*)
Q6&Q8	-.078
Q7&Q8	.319(**)

* $p < 0.05$, ** $p < 0.01$

Answer 1 and 3 is quite opposite examples about neck and waist and answer 2 and 4 is about chest and buttock. To know if there is consistency between different types of questionnaires, we need to compare Q1 and Q3 about Answer 1 or 3. But there is only significant correspondence of Q1 but not of Q3. However, in case of answer 2 or 4, consistency about Q4, Q6, and Q8 is assured.

There are 4 parts of the body which are mentioned in Q9 as neck, waist, chest and buttock. 5 of 8 questions from Q1 to Q8, Q1, Q3, Q4, Q6 and Q8, are using the same vocabulary as Q9 used. Q2 used 'pelvis', Q5 used upper back and shoulder and Q7 used abdomen. And there is not significant probability between answers of Q9 about Q5 and Q7 even though upper back is related to neck or chest and abdomen is related to chest or buttock. But in the pelvis's case, there is significant probability between answer 2 vs 3 and answer 2 vs 4. So people who think they have developed chest and poor buttock show the tendency to recognize their pelvis to be not small.(Table 9)

So we can say that it is difficult to understand the same part with different vocabulary even if it describes the same region. And there would be different recognition about body shape according to type of questions. Especially the question

Table 8. Distribution About Answers of Q9

	Female	Male	total
Answer 1	6(3.4 %)	16(9.0 %)	22(12.4 %)
Answer 2	24(13.6 %)	25(14.1 %)	48(27.1 %)
Answer 3	15(8.5 %)	18(10.2 %)	33(18.6 %)
Answer 4	37(20.9 %)	32(18.1 %)	69(39.0 %)
none	2(1.1 %)	2(1.1 %)	4(2.3 %)
total	84(47.4 %)	93(52.5 %)	177(100 %)

Table 9. Significant Probability(p-value) of Answers

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Answer 1 vs 2	.184	.348	.260	.549	.893	.070	.650	.099
Answer 1 vs 3	.028	.734	.428	1.000	.377	.904	.075	.988
Answer 1 vs 4	.596	.533	.219	.036	.248	.009	.432	.002
Answer 2 vs 3	.670	.010	.995	.435	.659	.002	.359	.015
Answer 2 vs 4	.666	.0001	.000	.000	.466	.000	.982	.000
Answer 3 vs 4	.125	.997	.994	.011	1.000	.027	.508	.001

comparing two parts seems to be more confusing than questions asking about body parts separately because there is proper recognition about neck circumference with Q3(Table 5) but not the answer of Q9 (Answer 1 vs 3) with Q3 (Table 9).

3. Relation of questionnaire and BMI

There is significant recognition as someone has a bigger body mass index thinks their body parts are well-developed only in cases of pelvis (Q2) and chest (Q4, Q6). But recognition of other parts don't have significant relation with BMI (Table 10).

Discussion

To diagnose *Sasang* Constitutions appearances, characters and symptoms need to be concerned. And appearances are one of the most important factors to diagnose *Sasang* Constitutions[14]. Therefore further study and objectification about appearances are necessary to develop the diagnostic methods. When we diagnose *Sasang* Constitution based on questionnaire like QSCCII, the questionnaire used is to be filled in by patients under their judgement. So their recognition about themselves is one of the most important factors to determine their constitutions. Until now, there have been so many studies to check the reliability and availability of questionnaire[1-7,9] but not about how patients recognize themselves.

To get clinical data about body shapes we hand measured 177 patients' 7 parts of body circumferences and 5 parts of body widths. And 2 types of 9 questions are filled in by the patients about their body shapes. After it was analyzed using Pearsons correlation coefficient analysis and two-way ANOVA test, we found out some correlation between actual measured body circumferences like neck, chest, upper abdomen, iliac, waist and pubic circumferences or widths like axillary, chest, upper abdomen and waist. But also there are unmatched results about the same parts of body like between iliac width and questions about pelvis.

The questions about slim parts of the body have the same tendency to be answered and also more than 2 questions about body parts which

Table 10. Correlation Coefficient About BMI and Questionnaire

		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
BMI	Correlation coefficient	-.095	-.167**	-.064	-.219**	.039	.170**	.127	.074

** $p < 0.01$

are next to each other have similar answers. But the question about buttock have speciality with pubic circumference.

When we compare the result between two questions about chest, 'my chest is poor' and 'my chest is well-developed', they don't make exact matches to each other. Also the result about question asking to which type one's body belongs shows that there is not proper recognition about their neck part.

So we can say that patients understand their body shape generally, but answers can be changed according to type of questions. It might be because they don't put enough concentration on it or the vocabulary used in the questionnaire is confusing. Also the question is limited when we ask about comparing two parts of body. Therefore, it is necessary to study more about the proper type of questionnaire which can describe better to help patient to understand. Also other ways can assist to explain the meaning of questions like pictures of body parts are recommended to be developed.

However we got some clinical results about the recognition of patients' body shape and its real sizes, the body circumferences and widths data which are used in this article are actual sizes as a unit of millimeter. But in *Sasang* Constitution Medicine, the most important factor of body shape is not actual sizes but it's ratio to each part as neck and shoulder to waist and abdomen, chest to buttock. Also there are differences between female and male patients because females have a larger buttock region than male and males have a wider shoulder than females usually. But in this article we could not examine if there is a tendency according to sexual differences. So we think it is necessary to study more about body shape analyzed in ratio and according to sex.

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