

A Study on the Acceptance Factor for Telehealth Service According to Health Status by Group

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Abstract

The purpose of the study is to find out the causal relationship of the factors to telehealth service adoption based on Technology Acceptance Model (TAM) and practically demonstrate the difference of adoption factors according to health conditions. 608 valid samples excepting questionnaires which were judged to respond unfaithfully and exceed the answering time were collected among 1165 adult respondents with the online panel survey method using structured questionnaires. Reliability analysis and factor analysis were performed to verify the reliability and validity of the measurement items and structural equation modeling were performed to confirm the causal relationship among latent variables respectively. In addition, two-step cluster analysis regarding the health factors was performed to analyze the difference of the factors influencing the adoption intention of telehealth service according to customer segmentation. As for the structural relationship of the adoption factors using structural equation modeling, service quality, innovativeness of medical technology, and social influence had statistically significant effects on perceived ease of use and perceived usefulness on the use of telehealth service. As a result of customer segmentation using two-step cluster analysis regarding the health factors, they were divided into two groups, the group who showed high health involvement and good health practice and the opposite group. The analysis results according to the two groups showed the statistical significant difference of innovativeness of medical technology and perceived ease of use. The study has important significance in empirically analyzing the structural relationship regarding how the related external variables influence the intention to use telehealth services through perceived ease of use and perceived usefulness. In addition, it provides academic basis of the necessity of the development of various telehealth services by identifying the difference of the influencing factors on the intention to use according to the segmentation groups formed by the characteristics of health factors, and will contribute to the vitalization of future telehealth service based on it.

Keywords: Health-Related Factor, TAM (Technology Acceptance Model), Telehealth Service, Two-Way Cluster Analysis

1. Introduction

Information and communication technology (IT) provides useful means to overcome limitations of distance and time. When combined with Biomedical Science and Technology, IT can create opportunity to provide new high quality medical services. As the result, IT can be innovate existing methods or provide new methods in numerous areas such as health care management, medical checkup, diagnosis and treatment in medical services and it is expected that current methods of providing medical services will undergo groundbreaking changes^{1,2}. Major

causes of this changing trend are rapid development of medical technology, extension of average life span, increase in the number of single households and, in addition, the diversification in the standards of value spread across society also helps accelerate aging of society. With this aging trend, telehealth service based on IT is gathering worldwide attention as an effective way to respond to the health and medical demand in the aging society³.

Along with aging trend, although prevalence rate of chronic diseases, which are generally called life-style diseases, caused by wrong eating habits and decrease in physical activities is rising, cure rate of chronic diseases

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is strikingly low even with the development of medical technology. Failures in management of chronic diseases can lead to disabilities due to complications, which eventually lead to deaths, decreasing life expectancy⁴. The purpose of treatment of a chronic disease, once developed, is to manage the disease through lifelong medication or correction of lifestyles and prevent side effects or complications rather than to completely eradicate the disease. Therefore, in order to effectively manage chronic diseases, it is vital for patients and medical staff to closely cooperate with each other⁵. As an alternative, telemedicine services have been provided based on telecommunication network for medical service and the technology which can measure bio-electronic information.

Telemedicine service ranges from long-distance diagnosis and prescription of patients' diseases to health management service which focuses on maintaining health and prevention of diseases. Formed at the point of contact between IT and health care, telemedicine service means not only using IT in health care but also new development of health care based on IT which can be used anytime and anywhere⁶. Through telemedicine service, medical institutions can provide medical service more conveniently, precisely and effectively while users can enjoy the benefit of quality medical service beyond (a certain) limitation in space and time^{7,8}. Many advanced countries in welfare such as Western European countries, U.K., Japan and Singapore have implemented various policies and projects utilizing IT in health care. The scale of world health care market reached U\$ 3,834 billion as of 2005 and is expected to rapidly grow to U\$ 5,292 billion as of 2015. Accordingly, many global companies like IBM, Intel and Google chose telemedicine service as a future strategic business and have intensively invested in it.

While it is expected that enormous benefits can be reaped through telemedicine system, there have been studies on policies and technology in terms of socio-economic problems, legal problems, protection of privacy, medical licenses and pricing of insurance premium⁹. And yet, there is lack of studies on the acceptance among different groups. However, even the services developed by fusing high-technologies cannot secure success without consideration of characteristics of groups using them¹⁰. Therefore, for telemedicine services to be vitalized, services should be developed based on the understanding of the characteristics of users who receive them.

2. Theoretical Background and Research Model

World Medical Association defines telemedicine as medical practice of deciding and recommending intervention, diagnosis and treatment in the distance based on clinical data, documents and information delivered through telecommunication system¹¹. WHO defined it as using digital data (which are electronically delivered, stored and retrieved) to support health care in local regions and in the distance¹². Putting together these concepts on telemedicine, this study defines telemedicine as, unlike traditional medical services in which doctors and patients meet in person, providing medical services such as diagnosis and treatment or delivery of medical information using telecommunications technology.

Based on the definition of telemedicine, this study aims to achieve study goal by using Technology Acceptance Model (TAM). Developed by Davis in 1986 to explain the behaviors of users on the acceptance of computers which was innovative technology that time, TAM was made public in 1989 (Davis et al.)¹³. Studies using TAM have been developed in many areas and recently there have been also studies using TAM in health care and medical field.

Typical study on acceptance in medical field was a study on acceptance of doctors and radiologists who use classic hospital computerized system PACS (picture archiving and communication system)¹⁴. Studies on technology acceptance factors of MHS (mobile health-care system) in medical professionals revealed that they recognize the importance of accepting technologies which are rapidly developing¹⁵. While the studies mentioned above focused on the acceptance of innovative technologies already widely spread, this study has meaning in that it elucidates acceptance factors in the process of formation of recognition on acceptance and provides implications on effective acceptance in the future.

Based on expanded Technology Acceptance Model, this study aims to confirm causal relationship through structural equation model by setting characteristics of service quality and characteristics of telemedicine as exogenous variables and conduct empirical analysis on the causal relationship among major variables of Technology Acceptance Model proposed by Davis et. al¹³ and their effect on intention to use. In particular, this study, by adding health-related factors (health

involvement, health practice behavior, health level) among acceptance factors of telemedicine service, aims to identify the characteristics of segmented groups divided by variables and clarify the effect on the acceptance of service by group.

Health has steadily been the object of human interest throughout history and its concept has been constantly changed with the change of society. Studies on the relationship between health status and health behavior practice^{16,17} and studies on the relationship between health habits and health behavior practice¹⁸ maintain that health status of an individual depends on the activities and preventive health behaviors of the individual. Therefore, in order to maintain and enhance health, it is critical not only to find out diseases and treat them in early stages but also voluntarily and actively sustain beneficial activities for health.

Practicing beneficial behaviors for health determines the purpose, habit, type and times of visiting medical institutions by affecting patterns of using medical services, and understanding and analysis on health care service not only helps enhance health of individuals but also works as a useful tool to develop systematic device which can improve the efficiency of health care finance. In addition, since health status as subjective health index which one voluntarily recognizes comprehensively reflects general level of health and severity of diseases, it has been widely used in deciding health care policies in terms of cost effectiveness, validity of clinical test and treatment and assessment index for new treatment for individuals, groups and patients as well as healthy people¹⁹.

Although investigating chronic diseases and acute diseases has the defect that it cannot consider severity of the diseases, it has been used as a practical variable to indicate the level of health in the studies related to use of medical institutions or quality of life²⁰.

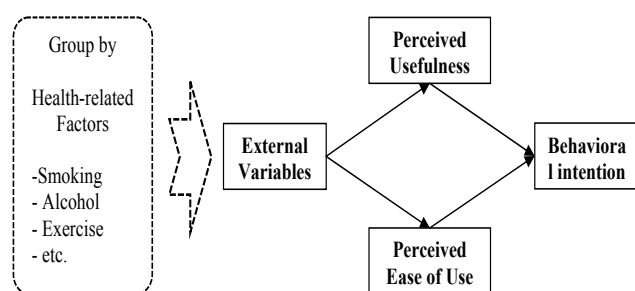


Figure 1. Conceptual framework.

Telemedicine is predicted to bring innovation in the medical delivery system and, through this, to be used increasingly more often as a means to treat diseases and manage health^{1,21}. Therefore, in order to effectively study acceptance of telemedicine service as a new means of medical delivery system, it is necessary to grasp and analyze health factors of potential customers who will use the service. Hence, judging that health intervention, health practice behaviors and level of health are important factors which determine health and there are structural differences in acceptance among segmented groups depending on these factors and characteristics of telemedicine recipients, this study established following hypothesis;

- Hypothesis: There are structural differences in acceptance of telemedicine service by segmented groups depending on health factors (health intervention, health practice behavior, level of health).

3. Methodology

3.1 Instrument

In order to secure validity of the contents of questions, this study selected questions verified by literature reviews of the preceding studies. Some of them are partially modified for this study. Each question in the questionnaire is based on Likert's 5-point scale from "absolutely not" to "very much so." Operational definitions for each variable used in this study are presented in Table 1.

3.2 Sample

Collection of data for this study was conducted by a professional survey agency which holds professional panel. Questionnaire survey was conducted on adult men and women over the age of 19 after showing video(s) to help them better understand telemedicine. Promotion was performed to encourage subjects of the survey to participate in the email survey considering internet user rate by age and distribution of regional population. Out of a total of 1,165 respondents, 608 subjects were finally determined except those who exceeded response time and those who abandoned in the middle.

3.3 Analysis and Result

Using 2-stage cluster analysis technique included in SPSS 17.0, this study classified subjects into separate groups

Table 1. Operational definitions of variables

Construct	Definition	Item	Reference
Social Influence (SI)	Degree of an individual's perception of the fact that important acquaintances around believe that using telemedicine is natural and reasonable	3	Venkatesh, et al(2003) ³⁰
Medical Technology Innovation (MTI)	Degree of voluntary will to use new medical technologies	5	Agarwal and Prasad(1998) ³¹ Goldsmith(2001) ³²
Service Quality (SQ)	Degree of expectation for trustworthiness, responsiveness, certainty and empathy of telemedicine services	16	Kettinger and Lee(1997) ³³ Roses et. al(2009) ³⁴
Privacy Concern (PC)	Degree of sensitivity to opening of personal information	4	Culnan and Armstrong(1999) ³⁵ Chellappa and Sin(2005) ³⁶
Perceived Usefulness (PU)	Degree of perception that use of telemedicine will provide an effective and efficient help	6	Venkatesh and Davis(2000) ³⁷
Perceived Ease of Use (PEU)	Degree of perception that use of telemedicine is convenient for maintenance and management of health	5	Venkatesh and Davis(2000) ³⁷
Use Intention (UI)	Degree of recipient's will to use telemedicine service in the future	5	Venkatesh and Davis(2000) ³⁷
Health Involvement	Degree of importance which an individual places on health	5	Zaichkowsky(1985) ³⁸ Olsen(2007) ³⁹
Health Practices	Proper practice on BMI index, smoking, drinking, exercise and sleeping	5	Belloc and Breslow(1972) ¹⁷
Health Status	Subjective status of health, whether or not a subject has disease (chronic, acute)	3	

with similar health factors. 2-stage cluster analysis is a very effective method for clustering, and clustering can be performed for large-scale data and when using both continuous variables and categorical variables. This technique enables data to be clustered using log-likelihood distance based on probability. BIC (Bayesian Inference Criterion) is known to be the most useful and objective standard that can avoid the weakness of voluntary decision on number of clusters which traditional cluster analysis has (Huang and Han, 2008)²². Therefore, judging that the above cluster analysis method is suitable for

classifying potential groups of study subjects, this study analyzed the difference in acceptance model of telemedicine service among groups drawn out by using two-way cluster analysis in which the number of clusters is automatically determined on the standard of Schwarz's BIC (Schwarz's Bayesian Inference Criterion). Variables used for cluster analysis were health intervention, Body Mass Index (BMI), whether or not smoking, high-risk drinking, number of times of exercise, hours of sleeping, subjective health status and whether or not the subjects have chronic diseases and acute diseases. As the result of the analysis, it turned out that when the number of clusters is two, the change in BIC was the biggest Table 2.

According to the automatic determination on the number of clusters through BIC, the subjects were divided into 2 groups and validity of cluster analysis were verified with variables used in cluster analysis and cross tab analysis on segmented groups. The results of the analysis are presented in Table 3. If the result of average aggregate of observed variables on health intervention was less than 4 points, the group was defined 'not very involved' group and if more than 4, the group was defined 'highly involved.'

As for the characteristics of segmented groups, most members of segmented group 1 were highly involved in health intervention. Besides, high-risk drinking rate

Table 2. Results of automatic determination for the number of clusters through BIC

Number of Clusters	BIC	Change in BIC	Change Ratio of BIC	Measurement Ratio of Distance
1	10294.755			
2	9884.810	-409.944	1.000	1.678
3	9697.574	-187.236	0.457	1.239
4	9573.764	-123.810	0.302	1.007
5	9451.764	-121.999	0.298	1.030
6	9337.343	-114.421	0.279	1.232
7	9270.983	-66.360	0.162	1.066
8	9217.378	-53.605	0.131	1.054
9	9173.829	-43.549	0.106	1.011
10	9132.341	-41.487	0.101	1.035
11	9097.107	-35.235	0.086	1.020
12	9065.369	-31.737	0.077	1.188
13	9060.970	-4.399	0.011	1.076
14	9066.798	5.827	-0.014	1.050
15	9079.122	12.324	-0.030	1.025

Table 3. Results of validity analysis on the results of cluster analysis

Variable		Group1		Group2		χ^2	p
		N	%	N	%		
Health Involvement	Not very involved	12	3.54	262	97.40	533.70	<0.001
	Highly involved	327	96.46	7	2.60		
BMI	Underweight	29	8.55	27	10.04	1.86	0.76
	Normal weight	177	52.21	131	48.70		
	Overweight	56	16.52	48	17.84		
	obese	68	20.06	52	19.33		
	Highly obese	9	2.65	11	4.09		
Smoking	Not smoking	250	73.75	198	73.61	0.00	1.00
	smoking	89	26.25	71	26.39		
Heavy Drinking	Don't drink	103	30.38	92	34.20	13.93	0.01
	Less than once a month	73	21.53	74	27.51		
	Once a month	77	22.71	35	13.01		
	Once a week	66	19.47	60	22.30		
	Almost everyday	20	5.90	8	2.97		
Exercise	Don't exercise	81	23.89	114	42.38	44.65	<0.001
	Less than once a week	105	30.97	91	33.83		
	Twice a week	55	16.22	31	11.52		
	3~4 times of week	79	23.30	18	6.69		
	Almost every day	19	5.60	15	5.58		
Sleeping	Less than 6 hours	143	42.18	91	33.83	19.02	<0.001
	7~8 hours	186	54.87	147	54.65		
	Over 9 hours	10	2.95	31	11.52		
	Very unhealthy	13	3.83	7	2.60	37.89	<0.001
	unhealthy	80	23.60	96	35.69		
Health Status	Average	162	47.79	144	53.53		
	Healthy	74	21.83	14	5.20		
	Very healthy	10	2.95	8	2.97		
Chronic Disease	Yes	49	14.45	22	8.18	5.73	0.02
	No	290	85.55	247	91.82		
Acute Disease	Yes	45	13.27	38	14.13	0.09	0.81
	No	294	86.73	231	85.87		
Total		339	100.00	269	100.00		

was relatively higher than segmented group 2. The rate of exercise of more than 2 times a week is higher than group 2. Hours of sleeping were normal or relatively short. Subjective health status was higher in group 1. Group 1 has low rate of acute diseases but higher in chronic diseases. To sum up the results, segmented group 1 knows the importance of health and hence, has higher level of

health and practices health behaviors. On the contrary, group 2 has lower level of health and lower degree of health behavior practice.

As the result of analysis on structural equation model of two segmented groups, respective test results of goodness-of-fit are presented in Table 4. As the result of goodness-of-fit test on group 1, although $\chi^2 = 1621.956$ ($p < 0.001$) proved statistically inappropriate, goodness-of-fit was also judged through other standards since, as indicated above, the value of χ^2 is very sensitive to the size of the sample. Although GFI = 0.807 and AGFI = 0.781 did not satisfy the standard value in absolute fit index, RMR = 0.029 and RMSEA = 0.058 satisfied the standard value. Increment Fit Index was CFI = 0.920, satisfying standard value while NFI = 0.859 did not satisfy the standard value and TLI = 0.913 satisfied the standard value. Therefore, it was judged that the goodness-of-fit for segment group 1 was reasonable. As the result of goodness-of-fit test on group 2, $\chi^2 = 1956.644$ ($p < 0.001$) turned out to be statistically inappropriate. Absolute fit indexes GFI = 0.722 and AGFI = 0.685 were short of the standard value whereas RMR = 0.029 and RMSEA = 0.076 satisfied standard

Table 4. Results of goodness-of-fit test by segmented group

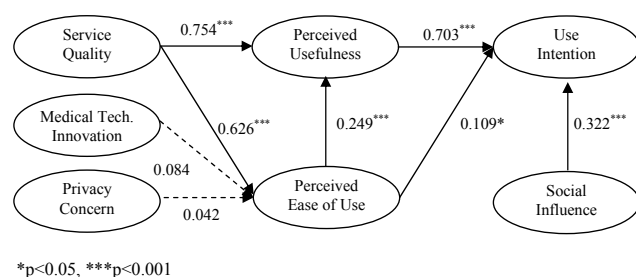
Classification		Group1 (N=339)	Group2 (N=269)	Criteria
	χ^2	1621.956	1956.644	The closer to degree of freedom, the better
	df	761	762	
	p	<0.001	<0.001	
Absolute Fit Index	GFI	0.807	0.722	≥0.9
	AGFI	0.781	0.685	≥0.9
	RMR	0.029	0.041	≥0.05
	RMSEA	0.058	0.076	≥0.08
Incremental Fit Index	CFI	0.920	0.831	≥0.9
	NFI	0.859	0.759	≥0.9
	TLI	0.913	0.824	≥0.9
Parsimonious Fit Index	PGFI	0.713	0.639	The bigger, the better
	PNFI	0.798	0.706	The bigger, the better
	PCFI	0.854	0.777	The bigger, the better

value. Increment Fit Index turned out to be CFI = 0.831, NFI = 0.759 and TLI = 0.824, all falling short of the standard value. Although segmented group 1 and 2 are different in group characteristics and the number of N included in the analysis, as the result of investigation on the brevity of the model with parsimony fit index, all parsimony fit indexes of group 1 proved relatively bigger, showing that the brevity of the model is better.

Verified study model for segmented group 1, which has the characteristics of high level of health and practicing health behavior, is shown in Figure 2. Service quality turned out to have effect on perceived usefulness. Standardized path coefficient was 0.754 and statistically significant. In addition, service quality had significant effect on perceived ease of use with standardized path coefficient of 0.626, which was statistically significant. Privacy concern did not affect perceived ease of use with standardized path coefficient of 0.042, which was not statistically significant. Medical technology innovation did not affect perceived ease of use either with standardized path coefficient of 0.084, showing no statistical significance.

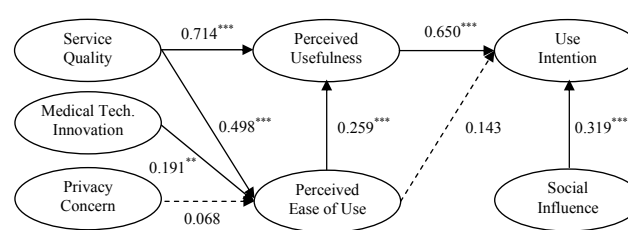
As for the path of internal variables of Technology Acceptance Model (TAM), perceived ease of use had effect on perceived usefulness with standardized path coefficient of statistically significant 0.249. Standardized path coefficient connecting from perceived usefulness to use intention was 0.703, exhibiting statistically significantly positive (+) effect. Perceived ease of use had significant effect on use intention with standardized path coefficient of 0.109. Social influence also had effect on use intention with standardized path coefficient of 0.322, proving statistically significant. Overall analysis on group 1 showed that service quality worked as core factor affecting perceived usefulness and perceived ease of use.

The result of analysis on acceptance of telemedicine service of segmented group 2 with lower level of health and health behavior practice than group 1 is presented in Figure 3. Service quality proved to have effect on



* $p < 0.05$, *** $p < 0.001$

Figure 2. SEM model of group 1.



** $p < 0.01$, *** $p < 0.001$

Figure 3. SEM model of group 2.

perceived usefulness. Standardized path coefficient was 0.714 and statistically significant. Besides, service quality had significant effect on perceived ease of use with standardized path coefficient of 0.498, which was statistically significant. Privacy concern did not affect perceived ease of use with standardized path coefficient of 0.068, showing statistically insignificant. Medical technology innovation had effect on perceived ease of use with standardized path coefficient of 0.191, showing statistical significance.

Perceived ease of use had effect on perceived usefulness with standardized path coefficient of 0.259, which is statistically significant. Standardized path coefficient connecting from perceived usefulness to use intention was 0.650, exhibiting statistically significantly positive (+) effect. Perceived ease of use did not have significant effect on use intention with standardized path coefficient of 0.143. Social influence also had effect on use intention with standardized path coefficient of 0.319, proving statistically significant.

The result of analysis on group 2 revealed that, as in the case of group 1, service quality worked as core factor affecting perceived usefulness and perceived ease of use. Privacy concern, like in the case of group 1, did not have significant effect on perceived ease of use. While medical technology innovation was not significant in group 1, it had statistically significant effect on perceived ease of use in group 2. As for the path of internal variables of TAM which is composed of perceived usefulness, perceived ease of use, social influence and use intention, it turned out that perceived ease of use did not affect use intention, showing difference in the analysis result of segment group 1.

Overall analysis on structural equation of segment groups showed that the path from medical technology innovation to perceived ease of use was not significant in group 1 when it was significant in group 2 while the path from perceived ease of use to use intention, on the contrary, was significant in group 1 when it was not significant in group 2. Therefore, it becomes clear that there is difference

Table 5. Results of path analysis by segmented group

Path		Path Coefficient	Standard Coefficient	S.E.	C.R.	P
Group1						
PC	→ PEU	0.043	0.042	0.051	0.855	0.417
MTI	→ PEU	0.083	0.084	0.066	1.263	0.170
SQ	→ PEU	0.684	0.626	0.080	8.524	<0.001
PEU	→ PU	0.218	0.249	0.043	5.105	<0.001
SQ	→ PU	0.720	0.754	0.061	11.842	<0.001
SI	→ UI	0.335	0.322	0.060	5.614	<0.001
PU	→ UI	0.802	0.703	0.101	7.932	<0.001
PEU	→ UI	0.109	0.109	0.064	1.698	0.047
Group2						
PC	→ PEU	0.068	0.068	0.060	1.141	0.254
MTI	→ PEU	0.182	0.191	0.066	2.751	0.006
SQ	→ PEU	0.621	0.498	0.098	6.347	<0.001
PEU	→ PU	0.230	0.259	0.055	4.153	<0.001
SQ	→ PU	0.789	0.714	0.087	9.038	<0.001
SI	→ UI	0.324	0.319	0.071	4.554	<0.001
PU	→ UI	0.739	0.650	0.118	6.279	<0.001
PEU	→ UI	0.144	0.143	0.079	1.825	0.068

in the acceptance process of telemedicine service between segmented group 1 and 2, which supports the hypothesis that segmented groups have difference in the acceptance of telemedicine service.

4. Discussion

4.1 Summary of the Results

As the result of client segmentation through cluster analysis on health factors, the subjects were classified into a group with good health practice and the other group with opposite characteristics, and, as the result of analysis on the acceptance of telemedicine service by group, there were statistically significant differences in medical technology innovation and perceived ease of use. In segmented group 1 which can be summarized as healthy group, although medical technology innovation did not have effect on perceived ease of use as a major explanatory variable, perceived ease of use had positive effect on use intention. In segmented group 2 which does not have healthy behavior practice, although medical technology innovation worked as a major factor for perceived ease of use, it did not have significant effect on use intention. This difference in the acceptance of telemedicine services supports major hypothesis of this

study and implies that approach to telemedicine service should be different according to segmented groups and the contents of the services.

4.2 Limitations

This study has following limitations and need careful approach in the interpretation of its results.

First, it is expected that telemedicine service will be implemented on a certain limited special classes with imminent full-fledged revision of law and solution of the problems. Choosing online survey method, this study selects general citizens as its study subjects to verify holistic and universal validity of the acceptance of potential users in the future. Although online survey has the advantages of efficiency of survey progress, overcoming of geographic limitation which is the biggest obstacles of questionnaire survey and questioning together with various contents such as photos and videos, it may have problem of representativeness which cannot reflect the population of study target due to self-selection bias arising in internet users. Even though this study, recognizing this problem, commissioned the survey to professional agency with sufficient panel and national distribution of branches, it still may have structural limitation of online survey. Therefore, it is necessary to take caution in generalizing the result of the study and following studies need to be conducted in various survey methods in the future to verify the validity of this study.

Second, even though this study tried to elucidate structural relationship of effective acceptance factors with expanded technology acceptance model by including various external variables of telemedicine service such as privacy concern and medical technology innovation as well as service quality, there may be more variables to be considered other than these external variables in the acceptance of telemedicine service such as motivation for health, knowledge about health and control of health behaviors. Besides, other than technology acceptance model, following studies based on various academic models²³⁻²⁵ in the areas of cognitive behavior should also be conducted.

Third, although this study, judging that health factors are effective in segmentation of clients, conducted cluster analysis by using health factors and researched the difference in acceptance based on segmented groups, it lacks consideration for socio-demographic variables in segmenting clients. In fact, in many studies, socio-demographic variables such as age, gender, level of education, income and occupation can have as much effect as behavioral

factors such as health factors. Therefore, it is necessary to consider diverse variables in the segmentation of clients for group analysis on the acceptance of telemedicine service in the future.

4.3 Contribution to Theory

Telemedicine is a comprehensive concept including various services and diverse new terms, and more advanced services can be developed with the development of the technology. Therefore, development of services needs to reflect various characteristics of clients using the services and for this purpose, strategic approach through client segmentation is required. For this, this study conducted cluster analysis on health factors in order to investigate the difference in acceptance factors by segmented group.

A health risk behavior can accompany other health risk behaviors and, like this, the case in which actual frequency of occurrence is higher than expected frequency of individual risk factors is called 'clustering phenomenon of health risk factors'²⁶. This 'clustering phenomenon of health risk factors' is useful in planning health promotion program²⁷ and studies on this phenomenon is rarer in Korea than in other foreign countries. As improved disease treatment and health promotion is expected when telemedicine service is disseminated, it is important to develop telemedicine service in line with health characteristics such as health intervention, level of health and whether or not the client has disease as well as health risk behaviors. By using cluster analysis, Park, et al²⁸ investigated the difference of deciding factors in the consumer preference by type of rural tourism accommodations. Besides, Lee²⁹ found out the difference in factors of accepting wearable computers by segmenting consumers. As acceptance factors based on the segmentation of consumers in these studies provide significant implications in the development of services, major achievement of this study is that it empirically researched telemedicine which is a prime innovative technology in the health care area.

4.4 Implications for Practice

Even with excellent performance and innovative characteristics of information technologies, we have witnessed many cases in which these technologies have been neglected or even ignored. Thus, as an acceptance research performed on potential users in the early period of implementation, this study verified positive effect of external variables on perceived usefulness and perceived

ease of use which are core foundations of technology acceptance model and revealed that they ultimately have positive effect on use intention. Since telemedicine services have different factors affecting acceptance by health group, it is necessary to take service-oriented approach rather than technology-oriented one.

5. Conclusion

When revised laws are passed on the population group with dire need for telemedicine services, systems to provide various medical services for the improvement of quality of health care services will be established, although limited. At this juncture, it is meaningful to conduct studies on consumer acceptance of telemedicine services. Using technology acceptance mode, this study empirically verified structural relationship in which external variables have effect on use intention through perceived usefulness and perceived ease of use and, furthermore, provides useful information on the development and implementation of services by analyzing the factors affecting client segmentation based on health factors. Development of differentiated services for specific subject groups and consistent following studies to identify acceptance of those services are required in the future.

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