pISSN: 1906 - 3296 © 2020 AU-GSB e-Journal.
eISSN: 2773 – 868x © 2021 AU-GSB e-Journal.
http://www.assumptionjournal.au.edu/index.php/AU-GSB/index

Determinants of Satisfaction and Loyalty in Innovative Personal Health Assistant Services for Potential Hypertension Patients: A Case Study on a Private Hospital in Thailand

Ruengrong Ongpattanakit*

Received: March 22, 2023. Revised: September 4, 2023. Accepted: August 20, 2023

Abstract

Purpose: The objective of this research is to explore the determinants of satisfaction and loyalty in innovative personal health assistance services for patients with potential hypertension symptoms. **Research design, data and methodology:** Research framework was constructed based on previous studies and composed of six variables, reliability, trustworthiness, service quality, hospital image, satisfaction, and loyalty. Quantitative data was collected from target respondents using questionnaires. Item-Objective Congruence (IOC) and pilot test have been tested with questionnaires to ensure the reliability on item measurement. Questionnaires were distributed to 500 respondents by applying sampling methods of purposive sampling, stratified random sampling, and convenience sampling. Data obtained was statistically assessed using Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) for model validity and hypothesis testing. **Results:** Loyalty in personal health assistant services for potential hypertension patients was directly impacted from satisfaction. Satisfaction was determined from service quality and hospital image. Reliability and trustworthiness were irrelevant towards satisfaction on the service. **Conclusions:** Marketers, management of hospital, and developers of HVA should focus on building superior service quality such as quality health tracking and educating on hypertension, and stimulate hospital image through positive service experience to enhance satisfaction, that ultimately lead to loyalty in the service.

Keywords: Service Quality, Satisfaction, Loyalty, Hypertension, Health Assistant Services

JEL Classification Code: I10, L86, M10, O30

1. Introduction

Ageing in Thailand's population is on the rise. In 1995, 5% of total population in Thailand were people who aged above 65 years, however in 2016, the number has rose to 11% or 7.5 million people and its rapid growth is forecasted to reach up to 17 million people by 2040 (World Bank, 2016). This posits Thailand to have highest portion of elderly among developing countries in East Asia and Pacific. The demographic transaction in Thailand has pressured the society and government to establish policies and supportive health programs accommodate healthy aging in elderly. Besides the growth of ageing society, number of Thais with hypertension or high blood pressure also

1 *First Author, Ph.D. Candidate in Technology, Education and Management, Graduate School of Business and Advanced Technology Management, Assumption University, Thailand.
Email: ruengrong@vitallifecorporation.com

ⓒ Copyright: The Author(s)
This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (http://Creativecommons.org/licenses/by-nc/4.0/) which permits unrestricted noncommercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

AU-GSB E-JOURNAL

increases gradually over the years. Hypertension in Thais are consistently increase from 21% in 2003 to 25% in 2014, and age group that hypertension symptoms should be aware is at or above 45 years old, especially for elderly from age 60 years old (World Health Organization [WHO], 2019). Although the healthcare process of hypertension has continuously improved over the years, not all individuals with hypertension are aware, treated, or controlled for blood pressure. Therefore, improvement on clinical care and blood pressure control for hypertension patients is still needed. Patients with controlled and monitored blood pressure would lessen the risk of evolving symptoms to life-threaten health conditions or cardiovascular disease (WHO, 2021).

Demand in health system not only projected to grow domestically, but also internationally from medial tourism. Thailand is one of the medical tourist destinations in emerging countries that was impacted by the pandemic, however, medical tourism has started to recover in 2022 due to the eased of COVID-19 (Bangkok Post, 2022). In each year, millions of medical tourists travelling to Thailand for treatment which have stimulates healthcare service providers to enhance the quality of medical services with premium healthcare physicians and specialist to satisfy the demands. Private hospitals were mainly healthcare service providers of foreign medical tourist by 92.7% (Ninkitsaranont, 2020). The market value of medical tourism has projected to increase from USD 9.1 million in 2019 to USD 24.4 million in 2027 (Statista, 2020). Hence, improvement of health care system through digital health technology would not only benefit local patients but attract foreign patients.

Personal health assistant service is a health virtual assistant (HVA) or digital health tool that aims to provide health services to patients digitally. It is easily accessible on a mobile device or desktop via a digital platform and provides patients with immediate and direct access to the medical services. This study focuses on personal health assistant services for hypertension patients. Blood pressure measurement and continuous monitoring are vital in managing blood pressure to control hypertension. Therefore, the personal health assistant service can address these health procedures for hypertension control. The research is conducted to understand the determinants of satisfaction and loyalty of potential hypertension patients. For business to turns innovation into success and long-term profits, gaining customer satisfaction and loyalty are keys to sustain performance and profitability. Patient satisfaction is the outcome of fulfilling patients' expectation of healthcare services with actual service performance (Strauss et al., 2013), while loyalty portrays the customers' willingness to continue their service with the same service provider (Rauyruen et al., 2009). Findings of the study can help marketers, management of hospital, and developers of HVA to gain insights on the important factor that causes patients' pleasure and commitment to the services.

2. Literature Review

2.1 Reliability

Reliability refers to "the state of being trustworthy" or "the ability of a tangible product or intangible product (service) to perform a required function under stated conditions for a stated period of time" (Patterson, 1976). The framework or measurement parameters of reliability is not standard and depend on how one assesses the performance based on the knowledge, information, and perception that they have, especially in high credence service like healthcare. Reliability in credence service cannot be easily evaluated by average consumer even after consuming the product or service from lack of technical skills or expertise in some specific area such as medicine and healthcare services (Zeithaml et al., 2006). Service reliability concern on whether the service is correctly provided according to its specification and attribute. It portrays the service performance and quality, which can be interpret during or after consuming the service (Van Raaij & Pruyn, 1998). Hence, reliability is studied in number of researches as one of the service qualities attributes that impact on satisfaction. Regardless of hospital groups, public hospitals and private hospitals, reliability was positively related to satisfaction despite diverse characteristics of patients (Javed & Ilyas, 2018; Javed & Liu, 2018). Similarly, to the study of Ratnawati et al. (2021) that reliability significantly influences patient satisfaction in both groups of large and small hospitals. Consistent with the findings explored by Meesala and Paul (2018) that reliability was one of the two factors affecting patient satisfaction. Therefore, the hypothesis is proposed for this study as the following:

H1: Reliability has significant impact on satisfaction.

AU-GSB E-JOURNAL

2.2 Trustworthiness

Trustworthiness is the confidence of both parties that the interest exchange does not exploit the vulnerabilities of counterparty (Sabel, 1993). Trustworthiness of an individual or organization is generated from past behaviors that consequently inspired trust and confidence on their future actions. Trustworthiness comprises of three dimensions, which are competence, integrity, and benevolence (Caldwell & Clapham, 2003). While Doney and Cannon (1997) has explained trust in two dimensions of credibility and benevolence. In the service industry, trustworthiness is critical for purchasing behavior engagement as it can help build confidence, reduces consumer's perceived risk and uncertainty on the purchase (Gefen & Straub, 2004). Padma et al. (2010) proven that trustworthiness is an attribute of service quality that contributes to satisfaction for both patients and their attendants. Satisfaction can be gained from trust as patients' expectation is achieved when health professionals provided confidence or made patients felt confidence during the course of medical treatment (Kwateng et al., 2017). Van Den Assem and Dulewicz (2014) and Yeo et al. (2021) also determined that trustworthiness has direct relationship with patient satisfaction. Therefore, the hypothesis is proposed for this study as the following:
H2: Trustworthiness has significant impact on satisfaction.

2.3 Service Quality

Lewis and Booms (1983) have assessed service quality from the discrepancy of service level against expectation of customers. Grönroos (1990) has defined service quality as the results of organizations' effort in striving to deliver services according to or beyond customers' expectation. Berry et al. (1988) has described service quality as the firms' ability to manage and meet expectation of the customers. Service quality and customer expectation are closely related as service quality depends on whether the service performance perceived by customers meet or exceed their expectation (Marimon et al., 2019). When the service performance met their expectation, service quality directly influences customer satisfaction and their behavioral intention to purchase or repurchase (Agyapong et al., 2018). Positive outcome of service quality perceived by satisfaction tends to create patient satisfaction towards the healthcare (Khan et al., 2013). Healthcare service quality perceived by patients significantly relates with their satisfaction (Chen & Fu, 2015; Shabbir et al., 2016). Ladhari and Rigaux-Bricmont (2013) and Moreira and Silva (2015) also confirmed the relationship between service quality and satisfaction in hospital services.

Service quality is also one of the factors that help shape hospital image. Hospital image does not occur in an instance. It is takes time to build with accumulative experience from patients. Singh (2013) has recommended that hospitals should stabilize their positive image, which can be done by providing consistent and satisfy service qualities to the patients. Supported with Coutinho et al. (2019) and Durrah et al. (2015), all service quality attributes significantly driven hospital image. Favorable image of the hospital can be gained from repetitive encounters of good service quality perceived by patients (Batra & Taneja, 2021). Therefore, the hypotheses are proposed for this study as the following:
H3: Service quality has significant impact on satisfaction.
H4: Service quality has significant impact on hospital image.

2.4 Hospital Image

Image conceptualized by Theory of Planned Behavior is the behavioral beliefs of an individual that causes a positive or negative attitude on the brand (Bernstein, 1984). It is the impression that patients have toward the hospital from their experience and interactions with the services, health professionals, facilities, visual communications, and other activities. Kotler and Clark (1987) that has explained hospital image as the perception, belief, impressions, and idea of the hospital in the public view. Hospital image is the overall perception about the hospital in the mind of patients (Keller, 1993). Hospital with favorable image can facilitates the marketing positioning, healthcare attractions from its reputations, and create positive impact on their impression (Eckert, 2017). Corporate image influences emotional satisfaction (Rahman et al., 2018). Gürses and Kiliç (2013) has claimed that image significantly relates to customer satisfaction, especially in the field of healthcare as the quality of service can be hard to evaluate based on patients' medical knowledge. Khodadad Hosseini and Behboudi (2017) has identified image as the strongest influencer on customer satisfaction. Similarly, Coutinho et al. (2019) that supported the direct and positive relationship between image and outpatient satisfaction. Therefore, the hypotheses are proposed for this study as the following:
H5: Hospital image has significant impact on satisfaction.

AU-GSB E-JOURNAL

2.5 Satisfaction

Satisfaction is one of the vital factors that healthcare organizations should measure to derive with an effective business strategy. Satisfaction can be defined as the post evaluation of user experience regarding the service quality, which the result can be favorable, neutral, or unfavorable (Kumar et al., 2020). Kotler and Armstrong (2014) have defined customer satisfaction as the evaluation and comparison of customer expectation and perceived service performance. Patients will be satisfied when their needs and expectations are achieved or exceeded (Ahmed et al., 2019). Faezipour and Ferreira (2013) has defined patient satisfaction as the pleasurable fulfillment of patients from patient well-being, cost, resources, and services accessibility. Yeo et al. (2021) has stated that to enhance patient loyalty, the expectation and needs of patients must be responded and fulfilled. Satisfied patients is expected to be loyal to the service (Abekah-Nkrumah et al., 2021). Nguyen and Nagase (2021) and Vimla and Taneja (2020) has proven that satisfaction plays a key role in maintaining loyalty from its significant and direct correlation. Therefore, the hypotheses are proposed for this study as the following:

H6: Satisfaction has significant impact on loyalty.

2.6 Loyalty

Loyalty is the intention of customers to continue their relationship with the organization, brand, or service (Cyr et al., 2006). It reflects the attitude of customers toward the product, brand or service (Mosahab et al., 2010). Not only repetitive purchase of product, service, or brand over time, loyalty can also mean their preferences and willingness to recommend the product, service, or brands to the others. Therefore, loyalty can be expressed by behavioral loyalty and attitudinal loyalty (Reichheld, 1994). In marketing of service industry, target strategy on building loyalty is crucial. Loyalty is one of the factors that can contribute to business success, sustain performance and profitability (Rauyruen et al., 2009). Therefore, the determinants of customer loyalty are widely study for development of marketing plans (Nyadzayo & Khajehzadeh, 2016).

3. Research Methods and Materials

3.1 Research Framework

The conceptual framework was constructed to study the determinants of satisfaction and loyalty in innovative personal health assistant services for potential hypertension patients. The framework was adapted from four theoretical frameworks of Padma et al. (2009) that studied the relationship between trustworthiness and satisfaction, Dayan et al. (2022) that examined the correlations between service quality, satisfaction, and loyalty of outpatients, Ratnawati et al. (2021) that determined the association of reliability, satisfaction, and loyalty, then Coutinho et al. (2019) that studied the relationships between service quality, hospital image, and satisfaction. The study of these literatures has formulated six variables in the conceptual framework, which are reliability, trustworthiness, service quality, hospital image, satisfaction, and loyalty. The conceptual framework for the study is illustrated in figure 1.

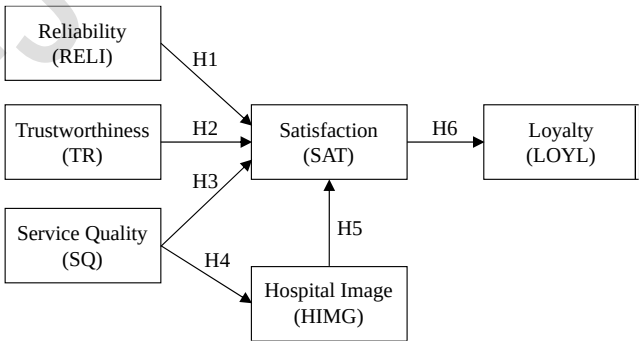

Figure 1: Research Framework

3.2 Methodology

The research has applied quantitative approach to investigate determinants of satisfaction and loyalty of potential hypertension patients. Data was collected by using questionnaire as a tool and sampling techniques of probability and non-probability were used to reach target respondents. Respondents targeted for data collection were patients of a private hospital who are having potential hypertension symptoms. The questionnaire was distributed online with Microsoft form link, in which consist of three parts for completion. First part is screening questions to screen respondents to target group for the study only. Second

AU-GSB E-JOURNAL

part is variable measurement items using five-point Likert scale, from 1 (strongly disagree) to 5 (strongly agree). Third part is demographic questions to collect characteristics of questionnaire respondents. The variable measurement items in the questionnaire have been verified for reliability with three experts under Item-Objective Congruence (IOC) and 50 respondents under pilot test before actual distribution. IOC ratings given by three experts are rated at and above 0.67 and Cronbach's Alpha coefficients from pilot test were above the minimum threshold of 0.6, hence the reliability was considered as pass (Hambleton, 1978; Nunnally & Bernstein, 1994). Data collected was analyzed with SPSS and AMOS statistical program by applying confirmatory factor analysis (CFA) to evaluate the construct validity, discriminant validity, and fitness of measurement model, then structural equation modeling (SEM) to determine the associations among variables.

3.3 Target Population and Sample Size

Target population for the study was potential hypertension patients of a private hospital with age at or above 40 years old. Potential hypertension patient is classified using blood pressure level. Those patients with consistent blood pressure level between 120/80 mmHg to 139/89 mmHg are classified as elevated or pre-hypertension level (Bumrungrad International Hospital, n.d.). The patients were targeted at the age of 40 years old and above as chance of having hypertension increases with age (NHS, 2019). The population group was also clustered to four generations of Generation Y (40-49 years-old), Generation X (50-59 years-old), Baby Boomer (60-69 years-old), and Senior Citizen (70 years-old and above).

The recommended sample size was determined by using A-priori Sample Size Calculator for Structural Equation Models (Soper, n.d.). The parameter values used were 6 latent variables, 24 observed variables and a probability level of 0.05. As a result, the recommended sample size was at least 403 sets and therefore the author has decided the collect 500 valid sets to exceed the minimum sample size.

3.4 Sampling Procedure

Sampling techniques of probability and non-probability were used to reach target respondents. Purposive or judgmental sampling was firstly applied for the author to choose sample group of respondents who are patients at a private hospital, currently experiencing potential hypertension symptom and age at 40 years old and above. Stratified random sampling was secondly applied to proportionately divide samples among clusters of four generations, Generation Y (40-49 years-old), Generation X (50-59 years-old), Baby Boomer (60-69 years-old), and Senior Citizen (70 years-old and above). The allocation of sample size to each cluster is presented in table 1. Then, convenience sampling was lastly applied to engage participants who are available and willing to respond at the time of questionnaire distribution. Microsoft form link to online questionnaire was distributed to patients at the hospital site.

Table 1: Sample Size of Patients by Generations

Generation	Patients with Potential Hypertension	Proportion Percentage	Sample Size
Generation Y	2,641	49	247
Generation X	1,856	35	174
Baby Boomer	658	12	62
Senior Citizen	189	4	18
Total	**5,344**	**100**	**500**

Source: Constructed by Author (Based on the data obtained from BH)

4. Results and Discussion

4.1 Demographic Information

Demographic characteristics of 500 respondents are summarized in table 2. Respondents consist of male at 46.8 percent (234) and female at 53.2 percent (266). They were Thais at 78.4 percent (392) and non-Thais at 21.6 percent (108). Patients were age between 40-49 years old at 49.4 percent (247), 50-59 years old at 34.8 percent (174), 60-69 years old at 12.2 percent (62), and 70 years old and up at 3.6 percent (18). The highest education was below bachalor's degree at 4.8 percent (24), bachelor's degree at 44.6 percent (223), master's degree at 32.8 percent (164), and doctorate's degree at 17.8 percent (89). The average monthly income earned by patients was below 50,000 THB at 8.6 percent (43), 50,001-100,000 THB at 25.6 percent (128), 100,001-150,000 THB at 22.8 percent (114), 150,001-200,000 THB at 25.2 percent (126), 200,001-250,000 THB at 12 percent (60), and above 250,000 THB at 5.8 percent (29).

AU-GSB E-JOURNAL

Table 2: Demographic Information

Demographic and Behavior Data (N=500)		Frequency	Percentage
Gender	Male	234	46.8
	Female	266	53.2
Nationality	Thai	392	78.4
	Non-Thai	108	21.6
Age	40-49 Years-old	247	49.4
	50-59 Years-old	174	34.8
	60-69 Years-old	62	12.2
	70 Years-old and up	18	3.6
Education	Below Bachelor's Degree	24	4.8
	Bachelor's Degree	223	44.6
	Master's Degree	164	32.8
	Doctorate's Degree	89	17.8
Income	Below 50,000 THB	43	8.6
	50,001-100,000 THB	128	25.6
	100,001-150,000 THB	114	22.8
	150,001-200,000 THB	126	25.2
	200,001-250,000 THB	60	12.0
	Above 250,000 THB	29	5.8

4.2 Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis or CFA was tested to affirm the validity and reliability of data gathered by using convergent validity and discriminant validity. Convergent validity measures the association between the variable with a similar measure to test whether the variables are related as intended (Bruce et al., 2008). Strong positive relationship between the results, would consider as a high convergent validity. Convergent validity is measured by composite reliability (CR), Cronbach's alpha reliability (CA), factor loadings, and average variances extracted (AVE). Hair et al. (2018) has suggested CR at minimum value of 0.60 and Nunnally and Bernstein (1994) has suggested minimum threshold of CA at 0.6. Further, Hair et al. (2010) has suggested that factor loading, and AVE should be at least 0.4. The result of CFA is presented in table 3.

Discriminant validity tests the constructs through its correlation (Campbell & Fiske, 1959). Fornell and Larcker's (1981) criterion is used for this study where the square root of average variance extracted or AVE is calculated for each items and compare with correlation of other constructs in the model. The greater number of square root AVE represents discriminant validity as shown in table 4.

Table 3: Confirmatory Factor Analysis (CFA), Composite Reliability (CR), and Average Variance Extracted (AVE) Results

Variable	Source of Questionnaire (Measurement Indicator)	No. of Item	Cronbach's Alpha	Factor Loading	CR	AVE
Reliability (RELI)	Dayan et al. (2022)	5	0.826	0.685 – 0.713	0.826	0.487
Trustworthiness (TR)	Padma et al. (2009)	4	0.878	0.761 – 0.845	0.880	0.648
Service quality (SQ)	Dayan et al. (2022) and Aagja and Garg (2010)	5	0.839	0.639 – 0.793	0.841	0.515
Hospital image (HIMG)	Dayan et al. (2022)	3	0.750	0.658 – 0.755	0.752	0.503
Satisfaction (SAT)	Dayan et al. (2022)	3	0.774	0.706 – 0.744	0.775	0.535
Loyalty (LOYL)	Dayan et al. (2022)	4	0.767	0.643 – 0.710	0.769	0.454

Note: CR = Composite Reliability, AVE = Average Variance Extracted

Table 4: Discriminant Validity

Variable	Factor Correlations					
	RELI	TR	SQ	HIMG	SAT	LOYL
RELI	**0.698**					
TR	0.195	**0.805**				
SQ	0.544	0.195	**0.718**			
HIMG	0.551	0.146	0.617	**0.709**		
SAT	0.157	0.100	0.374	0.332	**0.732**	
LOYL	0.542	0.218	0.566	0.572	0.444	**0.674**

Note: The diagonally listed value is the AVE square roots of the variables

4.3 Structural Equation Model (SEM)

Structural equation model or SEM is a multivariate statistical technique applied to determine the relationship of variables in the structural model (Boslaugh & McNutt, 2008). In order to measure the extent to which structural model is supported by the data, goodness-of-fit is an indicator to evaluate the model. Table 5 showed the indices of good-of-fit used to evaluate structural model fitness. The model was modified until the fitness is ensured. The values of modified model were CMIN/df = 1.944; GFI = 0.928; AGFI = 0.911; NFI = 0.904; CFI = 0.951; TLI = 0.944; RMSEA = 0.043 as demonstrated in table 5.

Table 5: Goodness of Fit for Structural Model

Index	Criterion	Statistical Value after Model Adjustment
CMIN/DF	< 3.00 (Hair et al., 2006)	1.944
GFI	≥ 0.90 (Hair et al., 2006)	0.928
AGFI	≥ 0.90 (Hair et al., 2006)	0.911
NFI	≥ 0.90 (Arbuckle, 1995)	0.904

AU-GSB E-JOURNAL

Index	Criterion	Statistical Value after Model Adjustment
CFI	≥ 0.90 (Hair et al., 2006)	0.951
TLI	≥ 0.90 (Hair et al., 2006)	0.944
RMSEA	< 0.05 (Browne & Cudeck, 1993)	0.043

Note: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, NFI = normalized fit index, CFI = comparative fit index, TLI = Tucker Lewis index and RMSEA = root mean square error of approximation

4.4 Research Hypothesis Testing Result

The strength of correlations between variables are measured by regression coefficients or standardized path coefficients at p-value<0.05. From the illustration in table 6 and figure 2, the result of hypothesis testing has revealed that four out of six hypotheses were supported with empirical data. The determinant of loyalty was satisfaction, and satisfaction was impacted from service quality and hospital image.

Table 6: Hypothesis Testing Result

Hypothesis		Standardized path coefficients (β)	t-value	Test Result
H1	RELI → SAT	-0.049	-0.714	Not Supported
H2	TR → SAT	0.041	0.780	Not Supported
H3	SQ → SAT	0.355	3.690*	Supported
H4	SQ → HIMG	0.642	9.638*	Supported
H5	HIMG → SAT	0.251	3.016*	Supported
H6	SAT → LOYL	0.585	7.468*	Supported

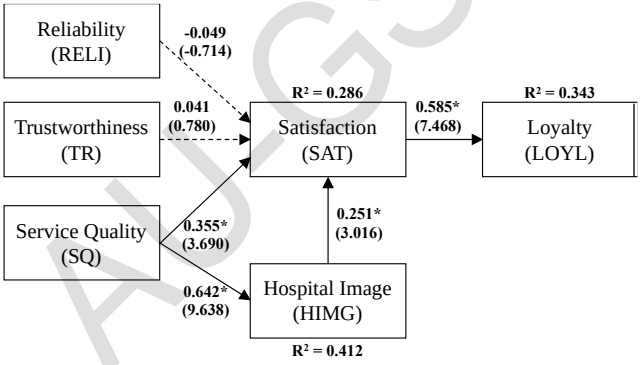

Figure 2: Revised Research Framework
Note: Solid line reported the Standardized Coefficient with *p<0.05, and t-value in Parentheses; Dash line (H1 and H2) reported not significant.

The presentation of table 6 and figure 2 are summarized as the following.

H1: Reliability has no significant impact on satisfaction from standardized path coefficient of -0.049 and t-value of -0.714. The result opposed with the study of Ratnawati et al. (2021) and Meesala and Paul (2018). As mentioned by Zeithaml et al. (2006), reliability in high credence service can be difficult to evaluate by consumers, hence has no impact on their satisfaction.

H2: Trustworthiness has no significant impact on satisfaction from standardized path coefficient of 0.041 and t-value of 0.780. This result also contradicted with the study of Kwateng et al. (2017) and Yeo et al. (2021) that patient satisfaction is achieved when trustworthiness of organization is earned. Their confidence level in the service does not lead to satisfaction.

H3: Service quality has significant impact on satisfaction from standardized path coefficient of 0.355 and t-value of 3.690. This result is consistent with the research of Agyapong et al. (2018), Moreira and Silva (2015), and Shabbir et al. (2016). Service quality perceived positively by patients would consequently lead to satisfactory experience in using the service.

H4: Service quality has significant impact on hospital image from standardized path coefficient of 0.642 and t-value of 9.638. A consistent level of service quality delivered to patients can build positive image of the hospital over time. This result was supported by Coutinho et al. (2019), Durrah et al. (2015) and Singh (2013).

H5: Hospital image has significant impact on satisfaction from standardized path coefficient of 0.251 and t-value of 3.016. The positive perception of patients toward the hospital influences their satisfaction in the service. Supported with study by Coutinho et al. (2019) and Rahman et al. (2018) that hospital image has direct and positive relationship with satisfaction.

H6: Satisfaction has significant impact on loyalty from standardized path coefficient of 0.585 and t-value of 7.468. When their needs and expectations are fulfilled with the service, they would be committed to the service and tends to use again in the future. The results is consistent with findings of research conducted by Abekah-Nkrumah et al., (2021) and Nguyen and Nagase (2021).

AU-GSB E-JOURNAL

5. Conclusions

5.1 Conclusions

The objective of this research is to explore the determinants of satisfaction and loyalty in innovative personal health assistant services for potential hypertension patients. The research was a case study where the population was targeted at potential hypertension patients of a private hospital and age at 40 years old and above. The research conceptual framework was developed from studies of previous research and theoretical framework, in which consist of six variables, reliability, trustworthiness, service quality, hospital image, satisfaction, and loyalty. Data for analysis was obtained from target respondents by using questionnaire. The questionnaire was developed with purpose of screening respondents, measure each variable in the framework, and collect demographic characteristics. The measurement items have ensured internal consistency and reliability with IOC and pilot test. Upon completion of data collection from 500 respondents, data analysis was performed with CFA and SEM to test the validity of data, fitness of measurement and structural model, and test causal relationship of structural path in the framework. With CFA, convergent validity and discriminant validity were affirmed. Further assessment with SEM has revealed that the significant causal impact was supported with four out of six hypotheses proposed. Patients' loyalty in personal health assistant services were determined by satisfaction, their satisfaction was driven by service quality and hospital image, respectively.

The research result has supported the research theory of Dayan et al. (2022) that when the patient is satisfied, it indicates a good level of healthcare services and leads to the development of patient loyalty. Also, the result is consistent with Shabbir et al.'s (2016) theory that healthcare service quality perceived by patients favorably correlated with their satisfaction, and patient satisfaction also mediates the correlation between service quality and patient loyalty. In addition, the theory of Coutinho et al. (2019) is supported with the research that proven the relationship between service quality, hospital image, and satisfaction. A good service quality that meets the expectation of patients can leads to satisfactory experience and form positive perception towards the hospital in the mind of patients. Meanwhile, evaluating the technical services of healthcare can be difficult for the patients, so patients may depend on their perception and opinion towards the hospital and outcome of medical treatment received. Therefore, patient satisfaction is driven by both service quality and hospital image.

For insignificant determinant of reliability towards satisfaction, service reliability concern on whether the service is correctly provided according to its specification and attribute. Reliability in context of healthcare could imply to the interpersonal competencies and professional competencies (Wu et al., 2015). It could be difficult for patients to assess the reliability of personal health assistant service due to lack of expert knowledge in medical profession. Hence, reliability is not a key factor to drive their satisfaction in service. Trustworthiness in this study also insignificantly impact on satisfaction. This could imply that trustworthiness has no influence on patients' satisfaction or their feeling towards the service. Trustworthiness may influence the behavioral attitude of potential hypertension patients or their decision in using the service directly, in which the structural path analysis can be extended in further study.

5.2 Recommendation

Loyalty in personal health assistant services for potential hypertension patients was directly impacted from satisfaction, and indirectly impacted from service quality, and hospital image. Hence, marketers, management of hospital, and developers of HVA should focus on building superior service quality and positive hospital image to ultimately enhance patients' loyalty in the service.

There are diverse dimensions of service quality that potentially lead to overall perceived service quality of consumers, for instance, responsiveness, technical competencies, and service process. Marketers and management of hospital can seek for insights on what service dimensions that patients with potential hypertension deem as crucial in their perspective to develop the personal health assistant service. Insights can be obtained through customer survey for assessment of service level received, positive and improvement feedback. Example of service quality that potential hypertension patients could seek for are quality health tracking and awareness on hypertension. Patients may weight the quality of health tracking and monitor the most to prevent evolving their health conditions to hypertension or hypertensive level. Also, it is important

AU-GSB E-JOURNAL

for patients to understand the cause, potential risk, and precautions that patients should concern to control their blood pressure level. Hence, one of the service deliveries could include educating on facts of hypertension to raise treatment discipline in patients.

Hospital image is also equally important as service quality for satisfaction and loyalty enhancement. Healthcare service can be difficult to evaluated, hence patient sometimes rely in their perception, the reputation and the positioning of the hospital. Hospital image is seen to be built from service quality. Management must ensure that services are provided at their best from the very first service interaction to the end. This includes the service process, the assistance, and promptness. Image can also be sustained by ensuring that the management delivers the service as they are intended or as they promised consistently. Image can be rapidly deteriorated from one single mistake, hence consistency in quality service delivery should be emphasized. Lastly active website and social media presence can help the hospital to delivery their key message and goals that shape the positioning and image. The presence should include activities of interacting and responding to the audience.

5.3 Limitation and Further Study

There are limitations to this study that should be extended in future research. For instance, applying different research theory when develop conceptual framework such as SERVQUAL framework for further insights of service quality attributes that play critical role, or applying UTAUT or the unified theory of acceptance and use of technology to understand user's usage behavior towards information technologies in which in this context is personal health assistant services. The further research can also apply different factor that could potentially contribute to patient loyalty such as perceived value. The research was analyzed based on quantitative data. By extending the approach to qualitative data collection, the researcher may discover different view or root cause of patients' attitude and behavior. Lastly, the scope of population can widen to other geographical region or other sites of healthcare facilities for representation of research findings.

References

Aagja, J. P., & Garg, R. (2010). Measuring perceived service quality for public hospitals (PubHosQual) in the Indian context. *International Journal of Pharmaceutical and Healthcare Marketing, 4*(1), 60-83. https://doi.org/10.1108/17506121011036033

Abekah-Nkrumah, G., Yaa Antwi, M., Braimah, S. M., & Ofori, C. G. (2021). Customer relationship management and patient satisfaction and loyalty in selected hospitals in Ghana. *International Journal of Pharmaceutical and Healthcare Marketing, 15*(2), 251-268.

Agyapong, A., Afi, J. D., & Kwateng, K. O. (2018). Examining the effect of perceived service quality of health care delivery in Ghana on behavioral intentions of patients: the mediating role of customer satisfaction. *International Journal of Healthcare Management, 11*(4), 276-288.

Ahmed, S., Manaf, N. H. A., & Islam, R. (2019). Assessing top management commitment, workforce management, and quality performance of Malaysian hospitals. *International Journal of Healthcare Management, 9*(2), 218-228.

Arbuckle, J. (1995). *AMOS: Analysis of moment structures user's guide*. Small Waters.

Bangkok Post. (2022, January 14). *Medical tourism looking up: Revival in 2022 to drive short-term growth in healthcare markets of key emerging economies*. https://www.bangkokpost.com/business/2247455/medical-tourism-looking-up

Batra, M., & Taneja, U. (2021). Examining the effect of servicescape, perceived service quality and emotional satisfaction on hospital image. *International Journal of Pharmaceutical and Healthcare Marketing, 15*(4), 617-632. https://doi.org/10.1108/IJPHM-04-2020-0026

Bernstein, D. (1984). *Company image and reality: A critique of corporate communications*. Holt, Rinehart and Winston: Advertising Association.

Berry, L. L., Parasuraman, A., & Zeithaml, V. A. (1988). The service-quality puzzle. *Business Horizons, 31*(5), 35-43.

Boslaugh, S., & McNutt, L.-A. (2008). *Structural equation modeling*. Encyclopedia of Epidemiology.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen, & J. S. Long (Eds.), *Testing structural equation models* (pp. 136-162). Sage.

Bruce, N., Pope, D., & Stanistreet, D. (2008). *Quantitative methods for health research: A practical interactive guide to epidemiology and statistics*. Wiley.

Bumrungrad International Hospital. (n.d.). *Hypertension*. https://www.bumrungrad.com/th/conditions/hypertension#

Caldwell, C., & Clapham, S. E. (2003). Organizational trustworthiness: An international perspective. *Journal of Business Ethics, 47*(4), 349-64.

AU-GSB E-JOURNAL

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 56*(2), 81-105.

Chen, Y., & Fu, F. Q. (2015). The behavioral consequences of service quality: an empirical study in the Chinese retail pharmacy industry. *Health Marketing Quarterly, 32*(1), 14-30.

Coutinho, E. D., Vieira, P. R. d. C., Mattoso, C. L. d. Q., Troccoli, I. R., & Renni, M. J. P. (2019). Influence of service quality and corporate image on the satisfaction of patients with Brazil's National Cancer Institute. *International Journal of Pharmaceutical and Healthcare Marketing, 13*(4), 447-468.

Cyr, D., Hassanein, K., Head, M., & Ivanov, A. (2006). The role of social presence in establishing loyalty in e-service environments. *Interacting with Computers, 19*(1), 43-56.

Dayan, M., Al Kuwaiti, I. A., Husain, Z., Ng, P. Y., & Dayan, A. (2022). Factors influencing patient loyalty to outpatient medical services: an empirical analysis of the UAE's government healthcare system. *International Journal of Quality & Reliability Management, 39*(1), 176-203. https://doi.org/10.1108/IJQRM-11-2020-0373

Doney, P. M., & Cannon, J. P. (1997). An examination of the nature of trust in buyer -seller relationships. *Journal of Marketing, 61*(2), 35-51.

Durrah, O., Allil, K., & Kahwaji, A. (2015). Impact of service quality dimensions on hospital image: the mediating role of patient satisfactions. *International Journal of Applied Business and Economic Research, 13*(9), 6937-6951.

Eckert, C. (2017). Corporate reputation and reputation risk: definition and measurement from a (risk) management perspective. *The Journal of Risk Finance, 18*(2), 145-158.

Faezipour, M., & Ferreira, S. (2013). A system dynamics perspective of patient satisfaction in healthcare. *Procedia Computer Science, 16*(2), 148-156.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39-50.

Gefen, D., & Straub, D. W. (2004). Consumer trust in B2C E-Commerce and the importance of social presence: experiments in E-Products and E-Services. *Omega, 32*(6), 407-424.

Grönroos, C. (1990). *Service management and marketing*. Lexington Books.

Gürses, S., & Kiliç, K. C. (2013). Corporate image aspect of corporate management in healthcare industry: definition, measurement and an empirical investigation. *International Business Research, 6*(12), 31-45.

Hair, J., Black, W., Babin, B., Anderson, R., & Tatham, R. (2006). *Multivariate data analysis* (6th ed.). Pearson Education.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (2010). *Multivariate data analysis* (7th ed.). Prentice Hall.

Hair, J. F., Harrison, D., & Risher, J. (2018). Marketing research in the 21st century: Opportunities and challenges. *Brazilian Journal of Marketing, 17*(5), 666-699.

Hambleton, R. K. (1978). On the use of cut-off scores with criterion-referenced tests in instructional settings. *Journal of Educational Measurement, 15*, 177-290.

Javed, S. A., & Ilyas, F. (2018). Service quality and satisfaction in healthcare sector of Pakistan-the patients' expectations. *International Journal of Health Care Quality Assurance, 31*(6), 489-501. https://doi.org/10.1108/IJHCQA-08-2016-0110

Javed, S. A., & Liu, S. (2018). Evaluation of outpatient satisfaction and service quality of Pakistani healthcare projects: Application of a novel synthetic Grey Incidence Analysis model. *Grey Systems: Theory and Application, 8*(4), 462-480. https://doi.org/10.1108/GS-04-2018-0018

Keller, K. (1993). Conceptualizing, Measuring, and Managing Customer-Based Brand Equity. *Journal of Marketing, 57*(1), 1-22. http://dx.doi.org/10.2307/1252054

Khan, M. U., Khan, A. N., Ahmed, F. R., Feroz, Z., Rizvi, S. A., Shah, S., Hussain, R., & Adil, Z. (2013). Patients' opinion of pharmacists and their roles in health care system in Pakistan. *Journal of Young Pharmacists, 5*(3), 90-94.

Khodadad Hosseini, S. H., & Behboudi, L. (2017). Brand trust and image: effects on customer satisfaction. *International Journal of Health Care Quality Assurance, 30*(7), 580-590. https://doi.org/10.1108/IJHCQA-04-2016-0054

Kotler, P., & Armstrong, G. (2014). *Principles of marketing*. Prentice-Hall.

Kotler, P., & Clark, R. (1987). *Marketing for health care organization*. Prentice Hall.

Kumar, R., Kumar, R., Sachan, A., & Gupta, P. (2020). An examination of the e-government service value chain. *Information Technology and People, 34*(3), 889-911.

Kwateng, K. O., Lumor, R., & Acheampong, F. O. (2017). Service quality in public and private hospitals: a comparative study on patient satisfaction. *International Journal of Healthcare Management, 12*(4), 251-258.

Ladhari, R., & Rigaux-Bricmont, B. (2013). Determinants of patient satisfaction with public hospital services. *Health Marketing Quarterly, 30*(4), 299-318.

Lewis, R. C., & Booms, B. H. (1983). The marketing aspects of service quality. In L. Berry, G Shostack, & G. Upah (Eds), *Emerging perspectives on services marketing* (pp. 999107). American Marketing Association.

Marimon, F., Gil-Domenech, D., & Bastida, R. (2019). Fulfilment of expectations mediating quality and satisfaction: the case of hospital service. *Total Quality Management and Business Excellence, 30*(1/2), 201-220.

Meesala, A., & Paul, J. (2018). Service quality, consumer satisfaction and loyalty in hospitals: Thinking for the future. *Journal of Retailing and Consumer Services, 40*, 261-269.

AU-GSB E-JOURNAL

Moreira, A. C., & Silva, P. M. (2015). The trust-commitment challenge in service quality-loyalty relationships. *International Journal of Health Care Quality Assurance, 28*(3), 253-266.

Mosahab, R., Mahamad, O., & Ramayah, T. (2010). Service quality, customer satisfaction and loyalty: A test of mediation. *International Business Research, 3*(4), 72-80.

Nguyen, T. L. H., & Nagase, K. (2021). Patient satisfaction and loyalty to the healthcare organization. *International Journal of Pharmaceutical and Healthcare Marketing, 15*(4), 496-515.

NHS. (2019, October 23). *Overview of high blood pressure (hypertension)*. https://www.nhs.uk/conditions/high-blood-pressure-hypertension/

Ninkitsaranont, P. (2020, September 2). *Industry outlook 2020-2022: Private hospital*. Krungsri Research. https://www.krungsri.com/en/research/industry/industry-outlook/Services/Private-Hospitals/IO/io-Private-Hospitals

Nunnally, J. C., & Bernstein, I. R. (1994). *Psychological theory*. McGraw-Hill.

Nyadzayo, M. W., & Khajehzadeh, Z. (2016). The antecedents of customer loyalty: A moderated mediation model of customer relationship management quality and Brand image. *Journal of Retailing and Consumer Services, 30*, 262-270.

Padma, P., Rajendran, C., & Sai, L. P. (2009). A conceptual framework of service quality in healthcare: Perspectives of Indian patients and their attendants. *Benchmarking: An International Journal, 16*(2), 157-191.

Padma, P., Rajendran, C., & Sai, L.P. (2010). Service quality and its impact on customer satisfaction in Indian hospitals: Perspectives of patients and their attendants. *Benchmarking: An International Journal, 17*(6), 807-841.

Patterson, R. F. (1976). *The university English dictionary*. University Books.

Rahman, M. S., Mannan, M., Hossain, M. A., & Zaman, M. H. (2018). Patient's behavioral intention: public and private hospitals context. *Marketing Intelligence & Planning, 36*(3), 349-364. https://doi.org/10.1108/MIP-08-2017-0155

Ratnawati, A., Mislan Cokrohadisumarto, W. b., & Kholis, N. (2021). Improving the satisfaction and loyalty of BPJS healthcare in Indonesia: a Sharia perspective. *Journal of Islamic Marketing, 12*(7), 1316-1338.

Rauyruen, P., Miller, K. E., & Growth, M. (2009). B2B services: Linking service loyalty and brand equity. *Journal of Services Marketing, 23*(3), 175-186.

Reichheld, F. F. (1994). Loyalty and the renaissance of marketing. *Marketing Management, 2*(4), 10.

Sabel, C. F. (1993). Studied trust: building new forms of cooperation in a volatile economy. *Human Relations, 46*(9), 1133-70.

Shabbir, A., Malik, S. A., & Malik, S. A. (2016). Measuring patients' healthcare service quality perceptions, satisfaction, and loyalty in public and private sector hospitals in Pakistan. *International Journal of Quality & Reliability Management, 33*(5), 538-557.

Singh, P. (2013). Comparison of service quality between private and public hospitals: empirical evidences from Varanasi district in UP. *Paradigm, 17*(1-2), 37-46.

Soper, D.S. (n.d.). *A-priori sample size calculator for structural equation models [Software]*. www.danielsoper.com/statcalc/default.aspx

Statista. (2020, May 11). *Number of foreign patients at Thai hospitals in Thailand from 2010 to 2017, with a forecast for 2018*. https://www.statista.com/statistics/1104422/thailand-number-of-foreign-inpatients/

Strauss, J. L., Zervakis, J. B., Stechuchak, K. M., Olsen, M. K., Swanson, J., Swartz, M. S., Weinberger, M., Marx, C. E., Calhoun, P. S., Bradford, D. W., & Butterfield, M. I. (2013). Adverse impact of coercive treatments on psychiatric inpatients' satisfaction with care. *Community Mental Health Journal, 49*(4), 457-465.

Van Den Assem, B., & Dulewicz, V. (2014). Patient satisfaction and GP trustworthiness, practice orientation and performance: Implications for selection, training and revalidation. *Journal of Health Organization and Management, 28*(4), 532-547.

Van Raaij, W. F., & Pruyn, A. (1998). Customer control and evaluation of service validity and reliability. *Psychology & Marketing, 15*, 811-832.

Vimla, A., & Taneja, U. (2020). Brand image to loyalty through perceived service quality and patient satisfaction: a conceptual framework. *Health Services Management Research, 34*(4), 250-257. https://doi.org/10.1177/0951484820962303

World Bank. (2016, June 01). *Thailand economic monitor: Aging society and economy*. https://documents1.worldbank.org/curated/en/830261469638312246/pdf/107267-WP-PUBLIC-Thailand-Economic-Monitor-2016.pdf

World Health Organization [WHO]. (2021, August 21). *Hypertension*. https://www.who.int/news-room/fact-sheets/detail/hypertension

Wu, Q., Tan, C., Wang, B., & Ping, Z. (2015). Behavioral immune system and ingroup derogation: the effects of infectious diseases on ingroup derogation attitudes. *PLoS One, 10,* e0122794. doi: 10.1371/journal.pone.0122794

Yeo, S. F., Tan, C. L., & Goh, Y.-N. (2021). Obstetrics services in Malaysia: factors influencing patient loyalty. *International Journal of Pharmaceutical and Healthcare Marketing, 15*(3), 389-409. https://doi.org/10.1108/IJPHM-08-2020-0070

Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2006). *Services Marketing: Integrating Customer Focus across the Firm*. McGraw-Hill.

AU-GSB E-JOURNAL