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Determinants of Brand Loyalty and Brand Equity in Personal Health Assistant Services for Hypertension Patients of a Private Hospital in Thailand

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Abstract

Purpose: The purpose of this research is to investigate the determinants of brand equity in personal health assistant services for hypertension patients. **Research design, data and methodology:** Research conceptual framework was constructed with six variables, namely, perceived service quality, satisfaction, word-of-mouth, brand image, brand loyalty, and brand equity. Samples of 500 patients with hypertension symptoms were collected for the analysis. Sampling techniques of purposive sampling, quota sampling, and convenience sampling were used to scope the target population, divide samples proportionally between age groups, and collect data from available respondents. Before distribution of questionnaire, Item-Objective Congruence (IOC) and pilot test were conducted to validate the reliability of variables measurement items. Data obtained has applied Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) for analysis. **Results:** Brand loyalty is the strongest indicator of brand equity. Perceived service quality significantly impact satisfaction, which leads to preferences and continual behavior on brand loyalty. Brand image that formulated from word-of-mouth from other consumers also significantly impact brand loyalty. **Conclusions:** Marketers and brand managers should emphasize on building superior service quality and experience, the fundamental ground, in order to create satisfaction, positive word-of-mouth, branding assets of image, loyalty and ultimately brand equity in personal health assistance service.

Keywords : Brand Loyalty, Brand Image, Brand Equity, Hypertension, Health Assistant Services

JEL Classification Code: I10, L86, M10, O30

1. Introduction

Digital health is the use of technology to engage patients for clinical purposes such as obtain, compile, interpret clinical data for clinical outcomes management and other purposes for clinical care. Digital health tools can potentially increase the accuracy of diagnose, medical treatment, and delivery of healthcare to individuals (Food and Drug Administration [FDA], 2020). From 2016 to 2019, the adoption of digital health tools has grown dramatically, particularly for tele-visits and remote monitoring and management for improved care (AMA Digital Health Study, 2020). Healthcare Virtual Assistant (HVA) in this context of study is one of digital health tools to remotely monitor and manage patients care.

HVA is an innovative approach for patient engagement through tailored touchpoints and digital concierge services. HVA technology enables the integration of key information to deliver more effective patient support, critical care update and tracking via a patient's mobile device. Hypertension is a prime condition for the practical application of digital health management because it is prevalent and under controlled symptoms when healthcare process has interdisciplinary cooperation and adherence of patients' treatment (Ruiz-Fernández et al., 2017; Yatabe et al., 2020).

Individual chances of having hypertension increases with age (NHS, 2019). Thailand is heading towards an aging

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society or high proportion of citizens aged over 60. By 2045, aging society of Thailand is forecasted to be larger than the United States and Europe (Thailand Board of Investment, n.d.). Also, number of Thai adults with hypertension are increasing. One of the four Thai adults have hypertension, and barely one of three adults with hypertensions have their blood pressure under control as usually there is no symptom or warning sign of high blood pressure. It is important for Thailand to have strong foundation of health care system with universal health coverage in order to improve hypertension care nationwide such as standard hypertension measurement and care across health facilities (World Health Organization [WHO], 2019). Hence, Thai government has encouraged the development and innovation of health care system, capability of health data usage, and other resources by taking advantage of digital health technologies such as Thailand 4.0 strategy and the eHealth Strategy (2017-2026) (Koh, 2021). However, challenges on development and innovation of health care system still remain such as the equality of medical and health services for individuals in terms of accessibility and affordability, and adaptation to digital health technology advancement. This is where HVA comes into action to address the challenges.

To promote the usage and optimization of this HVA services, it is important to understand consumer-based measures of brand equity. This study aims to investigate the determinants of brand equity in personal health assistant services with patients who have hypertension symptom. It will result to valuable insights for marketing and brand managers to enhance innovative products and brand strategies that response to market situation and behavioral of patients with hypertension.

2. Literature Review

2.1 Perceived Service Quality

In various business industries, quality can influence the satisfaction and retention of customers. Grönroos (1982) has defined perceived service quality as the customer's subjective perception on service quality based on the comparison between his or her expectation against actual service performance received. In another words, the evaluation of service received (perceived service quality) is determined from the discrepancy of the service level a customer has encountered (perceived performance) versus their anticipation from rendering the service (expectation) (Parasuraman et al., 1988). Similarly in the healthcare industry that quality of healthcare services is crucial to determine the patients' satisfaction, behavior, and their decision on selecting healthcare providers (Andaleeb, 2001; Asenso-Okyere et al., 1998). Thus, healthcare has given importance on the improving the quality of healthcare service to satisfy and retain patients (Pakdil & Harwood, 2005).

In the study of Bellio and Buccoliero (2021), the perception of patients regarding service quality can be divided into three dimensions of physical environment, empowerment and dignity, and patient-doctor relationship. By delivering these qualifications to the patients, favorable impression on the services of healthcare can be adopted and further leads to satisfaction. The characteristics of service quality that positive influences perceived service quality were physical environment and technical competence (Gonçalves et al., 2020). Ampaw et al. (2020) and Boakye et al. (2017) have supported that there was a significant relationship between perceived service quality and patient satisfaction. Fatima et al. (2018) also pointed out that perceived service quality was a strong predictor of patient satisfaction in the private hospitals in terms of physical environment, customer-friendly environment, communication, privacy and safety, and responsiveness. Therefore, the hypothesis is proposed for this study as the following:

H1: Perceived service quality significantly impacts satisfaction.

2.2 Satisfaction

Satisfaction is the value and pleasure judgement from customers' experience (Oliver, 1981). It is the emotional response to the product or service experienced (Spreng & Singh, 1993). Customers will be satisfied if the product performance or service quality fulfilled their expectation, whereas customers will be dissatisfied if the performance does not meet. Likewise, patient satisfaction is achieved when the results of health service quality meet their expectation. Customer satisfaction is also said to be the results of customer experience, and one factor the determine customer experience is the customers' perception on service quality (De Keyser et al., 2020; Do & Vu, 2020). Hence, the organization that seeks for customer satisfaction improvement usually measure the customers' perception toward quality of service and service processes from their preliminary expectation to post-experience assessment (Almsalam, 2014; Polegato & Bjerke, 2019). Satisfaction is one of the significant factors that forms customer loyalty as accumulated satisfactory experience can convert to repeated purchase, service rendering, or so-called customer loyalty (Kotler et al., 2017).

In the context of healthcare study, developing marketing strategy to build patient satisfaction is necessary as satisfaction is also proven to relates with loyalty (Martínez-Caro et al., 2013). Zhou et al. (2017) stresses that superior service quality leads to patient satisfaction and later driven

patient loyalty. Positive experience from using the hospital service and turns to loyalty overtime (Gonçalves et al., 2020). Dayan et al. (2022) has also concluded in the study of outpatients in healthcare that patient satisfaction mediates the association between service quality and patients' loyalty, and patient satisfaction has direct association with patients loyalty. Therefore, the hypothesis is proposed for this study as the following:

H2: Satisfaction significantly impacts brand loyalty.

2.3 Word-of-mouth

Word of mouth is the consumer behavior of giving information regarding the product, service, brand, or firm to the other consumers (Rosario et al., 2016). The information given to other consumers is an informal communication on the experience, usage, and quality of the product, service, or the service provider, which may require the consumers to analyze and interpret on the product or service attributes (Westbrook, 1987). Due to the characteristic of service, word-of-mouth is deemed to be vital for service organization as it helps spreading the positive feedback, experience and recommendation on the quality of service for new customers attraction (Datta et al., 2005). Word-of-mouth in services can reduce customers' perception of risk, product complexity, reluctance, and help stimulate their intention to render the service (Maru File et al., 1992).

Word-of-mouth can transmit the reliable and credible brand's key message perceived by patients to other people for their awareness and understanding on the brand. Therefore, word-of-mouth can significantly persuade the patients' thought on brand image and subsequently leads to purchase intention or brand equity (Bambauer-Sachse & Mangold, 2011; Jalilvand & Samiei, 2012). Cham et al. (2016) and Cham et al. (2021) have signified the importance of word-of-mouth communication on hospital brand image, which can further develop behavioral intention, re-purchase intention, or loyalty. Therefore, the hypothesis is proposed for this study as the following:

H3: Word-of-mouth significantly impacts brand image.

2.4 Brand Image

The perception of the organization in the mind of customers is called brand image (Keller, 1993). Brand image of service-related product refers to image of the service provider in facilitating the service process or value creation to customers (Powers et al., 2016). It is based on an individual subjective consideration, feelings and impression after customers have experienced directly or indirectly with the brand (Cho & Fiore, 2015). Dimitriadis and Zilakaki (2019) has categorized brand image into two dimensions of functional and emotional. The functionality or tangible brand image such as the organization's assets, services, and competency that also links to individual subjective assessment and feelings with the product. Brand image can portray the overall information of the product and service, so positive brand image can enhance the customers' confidence in the product value, quality, and their purchasing decision (Chih-Chung et al., 2012). An effective brand image in the hospital service can increases customers' confidence in the professionality of medical services and reduce uncertainty in decision making.

Studies in the context of healthcare has proven that past experiences of patients that formulate hospital brand image significantly impact the patient's decision when choosing the hospital for treatment in the time ahead (Chahal & Bala, 2012; Wang et al., 2013). Brand image perceived by the patients have significant influence on continual behavioral or loyalty in the hospital and its services (Dayan et al., 2022). Erden et al. (1999) also mentioned that brand image can ultimately attract new customers and improve the market position from customers' recognition of product and service, brand awareness, and reputation, which these elements help creating brand value or so-called brand equity. Brand image can have a direct positive influence on brand equity, and indirect positive influence on brand equity through mediating effect of brand loyalty (Altaf et al., 2018; Chahal & Bala, 2012; Yasin et al., 2007). Brand image can enhance the patients' commitment on using the same hospital services and at the same time enhance its value or equity. Therefore, the hypotheses are proposed for this study as the following:

H4: Brand image significantly impacts brand loyalty.

H5: Brand image significantly impacts brand equity.

2.5 Brand Loyalty

Brand loyalty is profound commitment to consistently purchase the same brand, product, or service in the future, regardless of any marketing effort or other persuasion that can lead to switching behavior (Oliver, 1999). The extent of loyalty does not only mean repetitive purchase of the same brand over period of time, but also the brand preference and their willingness to recommend the brand to other consumers (Oliver, 1997). Customer with brand loyalty would continue to purchase the particular product or the series of product or service in the same brand and oppose to switch to other suppliers (Chaudhuri, 1997). Brand loyalty is the customers' attachment to the brand, so it is a critical factor for service firms to earned in order to sustain long-term relationship with the customers (Sierra & McQuitty, 2005).

Chahal and Bala (2012) argued that brand loyalty is said to be the core dimension of brand equity. Brand loyalty has found to be the strongest predictor on brand equity

comparing to perceived quality, and brand image. Similarly to Atilgan et al. (2005) and Shekhar Kumar et al. (2013) that confirmed the significant dimension of brand loyalty towards hospital brand equity. Das and Mukherjee (2016) also proven that long-term sustainability of the medical tourism destination brands significantly impacted by both attitudinal and behavioral loyalty. Loyalty is required for the service brand and to formulate brand equity for the healthcare providers. Therefore, the hypothesis is proposed for this study as the following:

H6: Brand loyalty significantly impacts brand equity.

2.6 Brand Equity

Farquhar (1989) has further described brand equity as the values of the brand, product or service that incorporates with the opinion, feeling, and purchase intention of the customers. It portrays the overall brand's value that the customers have positioned against the other service providers or competitors (Boo et al., 2009). Brand equity has a multi-dimensional concept that consist of a series of assets related to the brand, which are brand awareness, brand loyalty, perceived quality, brand association, and other proprietary assets (Aaker, 1991). Aaker (1991) believes that a superior brand equity over competitors can advocate customer loyalty with less price sensitivity and help the company in gaining competitive advantage. Keller (1993) has described brand equity as knowledge related to the brand, which are brand image and brand awareness. While Chahal and Bala (2012) argued that the significant factors that formed service brand equity in healthcare consist of perceived quality, brand image, and brand loyalty.

3. Research Methods and Materials

3.1 Research Framework

From the previous studies and theoretical frameworks, the author has selected the variables and the relationship among variables in each framework to formulate the conceptual framework for this study as illustrated in figure 1. The conceptual framework described the relationship between constructs and conceptualized the hypotheses proposed for the study in order to investigate the determinants of brand loyalty and brand equity in personal health assistant services for hypertension patients (Adom et al., 2018). The relationship of perceived quality, satisfaction, and loyalty in healthcare is referred from the research by Gonçalves et al. (2020). The positive correlation of word-of-mouth and brand image in hospital is based on the research conducted by Cham et al. (2021). Lasty, the relationship among brand image, brand loyalty and brand equity are referenced from the study of Chahal and Bala (2012). The constructs in the conceptual framework are thereby consist of perceived service quality, satisfaction, word-of-mouth, brand image, brand loyalty, and brand equity.

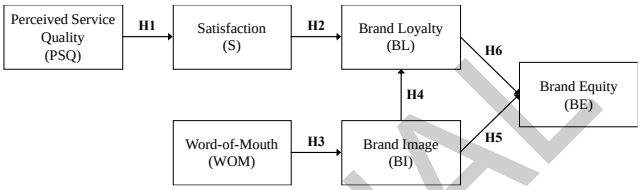

Figure 1: Research Framework

3.2 Methodology

The research used quantitative method for data collection and analysis in order to explore the determinants of brand equity in personal health assistant services for hypertension patients. Data is to be collected from target respondents of patients who have hypertension symptom with aged in the selected four age groups. Therefore, sampling techniques of nonprobability sampling were applied to reach target respondents proportionately, which are purposive sampling, quota random sampling, and convenience sampling.

The author has selected structured questionnaire as a tool of data collect. Questionnaire for this study was generated using MS Form and contained three parts of screening questions, variables measurement items with five-pint Likert scale, and demographic profile of respondents. Before distribution of questionnaire, Item-Objective Congruence (IOC) with three experts and pilot test with subgroup of 50 respondents were conducted to validate the reliability and internal consistency of variables measurement items. Data obtained from respondents will be statistically treated and evaluate model with Confirmatory factor analysis (CFA) and structural equation modeling (SEM) by using SPSS and AMOS statistical tools.

3.3 Target Population and Sample Size

The target population of this research is patients of a private hospital who have hypertension symptom with aged in the selected four age groups. The four age groups of 40-49 years-old, 50-59 years-old, 60-69 years-old, and 70 years-old and above. Patients for the study should consistently have blood pressure at or above 140/90 mmHg to be considered as having hypertension symptoms. Data collected from target population will be used to investigate the determinants of brand equity in personal health assistant services for hypertension patients.

The author has determined the sample size using A-priori Sample Size Calculator for Structural Equation Models from danielsoper's website (Soper, n.d.). The parameters used for

calculation are 6 latent variables and 27 observed variables with a probability level of 0.05. The calculation has recommended minimum sample size at 403. The author has decided to set sample size at 500 respondents to be collected from patients with hypertension symptoms for the study.

3.4 Sampling Procedure

Sampling techniques of purposive sampling, quota sampling, and convenience sampling were applied to reach target respondents of patients who have hypertension symptom with aged in the selected four age groups.

In judgmental or purposive sampling, the author has chosen the respondents who are patients' of a private hospital with hypertension symptom aged in the four age groups of 40-49 years-old, 50-59 years-old, 60-69 years-old, and 70 years-old and above. These four age groups are chosen as chance of having hypertension increases with age (NHS, 2019). Then, quota sampling was applied in the second stage to group the target population. Quota method was used to divide sample size of 500 patients with hypertension symptom based on four age agroups. The calculation of sample size is shown in table 1.

Table 1: Sample Size of Patients by Age Group

Age Group	Patients with Hypertension	Proportion Percentage	Sample Size
40-49 Years-old	4,832	20	102
50-59 Years-old	6,124	26	130
60-69 Years-old	6,025	26	128
70 Years-old and up	6,633	28	140
Total	**23,614**	**100**	**500**

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

Convenience sampling was applied in the third stage. Questionnaires were distributed to the existing patients in the target group via electronic and paper form, and consolidate responses in the electronic questionnaires of MS Form.

4. Results and Discussion

4.1 Demographic Information

Demographic information was collected from 500 respondents who have hypertension symptom. Majority of respondents are females at 57.2 percent (286) and Thais at 68.4 percent (342). Age groups of respondents had no distinct variance where 40-49 years old were at 20.4 percent (102), 50-59 years old were at 26.0 percent (130), 60-69 years old at 25.6 percent (128) and 70 years old and up at 28.0 percent (140). The highest education of respondents is bachelor's degree at 49.2 percent (246), followed by master's degree at 28.8 percent (144), doctorate's degree at 18.4 percent (92), and below bachelor's degree at 3.6 percent (18), respectively. On income, majority of respondents have monthly household income between 200,001 to 250,000 THB at 24.2 percent (121), 150,001 to 200,000 at 23.6 percent (118), and above 250,000 THB at 19.4 percent (97).

Table 2: Demographic Information

Demographic and Behavior Data (N=500)		Frequency	Percentage
Gender	Male	214	42.8
	Female	286	57.2
Nationality	Thai	342	68.4
	Non-Thai	158	31.6
Age	40-49 Years-old	102	20.4
	50-59 Years-old	130	26.0
	60-69 Years-old	128	25.6
	70 Years-old and up	140	28.0
Education	Below Bachelor's Degree	18	3.6
	Bachelor's Degree	246	49.2
	Master's Degree	144	28.8
	Doctorate's Degree	92	18.4
Income	Below 50,000 THB	43	8.6
	50,001-100,000 THB	46	9.2
	100,001-150,000 THB	75	15.0
	150,001-200,000 THB	118	23.6
	200,001-250,000 THB	121	24.2
	Above 250,000 THB	97	19.4

4.2 Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis or CFA was used to measure the convergent validity and discriminant validity of the measurement model (Jöreskog, 1969). Convergent validity is the guaranteed in the study by assessing that values of Cronbach's alpha reliability are greater than 0.6 (Hulin et al., 2001), composite or construct reliability are greater than 0.6 (Hair et al., 2018), factor loading and average variance extracted are greater than 0.4 (Fornell & Larcker, 1981). Table 3 presents results from confirmatory factor analysis in which satisfied the convergent validity.

Discriminant validity was evaluated based on Fornell and Larcker (1981), where square root of average variance extracted (AVE) of each construct is calculated and compare against inter-construct correlations. Discriminant validity was proven from the larger value of AVE square root presented 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
Perceived service quality (PSQ)	Gonçalves et al. (2020)	4	0.775	0.621 – 0.733	0.777	0.467
Satisfaction (S)	Gonçalves et al. (2020) and Dayan et al. (2022)	5	0.834	0.687 – 0.729	0.834	0.502
Word-of-mouth (WOM)	Cham et al. (2021)	5	0.850	0.653 – 0.797	0.851	0.534
Brand image (BI)	Cham et al. (2021) and Chahal and Bala (2012)	5	0.852	0.667 – 0.792	0.853	0.539
Brand loyalty (BL)	Chahal and Bala (2012)	4	0.767	0.567 – 0.762	0.775	0.466
Brand equity (BE)	Altaf et al. (2018)	4	0.813	0.649 – 0.795	0.815	0.526

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

Table 4: Discriminant Validity

Variable	Factor Correlations					
	PSQ	S	WOM	BI	BL	BE
PSQ	**0.684**					
S	0.544	**0.709**				
WOM	0.181	0.203	**0.731**			
BI	0.348	0.166	0.155	**0.734**		
BL	0.644	0.523	0.255	0.482	**0.682**	
BE	0.614	0.537	0.215	0.628	0.628	**0.725**

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

4.3 Structural Equation Model (SEM)

Structural equation model is an approach to evaluate the causal relationships among the variables based on path diagram and assess the fitness of structural model. The fitness of structural model was evaluated using goodness-of-fit indices and compare against the criterion. Structural model was then adjusted until statistical indices fall within the acceptable criterion to affirmed model fitness. Table 5 demonstrated the good-of-fit for structural model. The statistical values were CMIN/df = 1.728; GFI = 0.928; AGFI = 0.914; NFI = 0.902; CFI = 0.956; TLI = 0.951; RMSEA = 0.038.

Table 5: Goodness of Fit for Structural Model

Index	Criterion	Statistical Value after Model Adjustment
CMIN/DF	< 3.00 (Hair et al., 2006)	1.728
GFI	≥ 0.90 (Hair et al., 2006)	0.928
AGFI	≥ 0.90 (Hair et al., 2006)	0.914
NFI	≥ 0.90 (Arbuckle, 1995)	0.902
CFI	≥ 0.90 (Hair et al., 2006)	0.956
TLI	≥ 0.90 (Hair et al., 2006)	0.951
RMSEA	< 0.05 (Browne & Cudeck, 1993)	0.038

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 causal relationship between variables in the structural is measured from the regression weights and R^2 variances at p-value<0.05. Hypothesis results presented in table 6 and figure 2 showed that all hypotheses proposed were supported, except for H5. Brand equity was determined by brand loyalty, in which brand loyalty is constituted of satisfaction and brand image. In addition, the findings demonstrate an indirect effect of perceived service quality and word-of-mouth on brand loyalty, and brand equity.

Table 6: Hypothesis Testing Result

Hypothesis		Standardized path coefficients (β)	t-value	Test Result
H1	PSQ → S	0.584	9.418*	Supported
H2	S → BL	0.563	9.357*	Supported
H3	WOM → BI	0.172	3.287*	Supported
H4	BI → BL	0.414	7.791*	Supported
H5	BI → BE	0.030	0.565	Not Supported
H6	BL → BE	0.664	8.773*	Supported

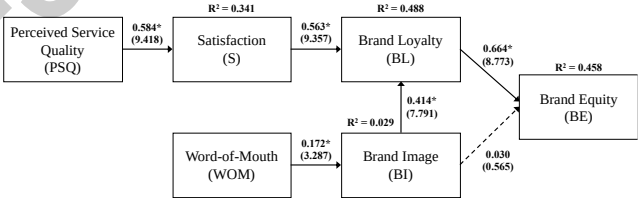

Figure 2: Revised Research Framework
Note: Solid line reported the Standardized Coefficient with *p<0.05, and t-value in Parentheses; Dash line (H5) reported not significant.

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

H1: Perceived service quality significantly impact satisfaction from standardized path coefficients at 0.584 and t-value at 9.418. This find agrees with Ampaw et al. (2020) and Fatima et al. (2018) that satisfaction of patients can be strongly predicted by perceived service quality such as interactions and technical competence in diagnosis and treatment.

H2: Satisfaction significantly impact brand loyalty from standardized path coefficients at 0.563 and t-value at 9.357. According to Dayan et al. (2022) and Gonçalves et al. (2020), satisfied experience perceived by patients would turns into loyalty overtime.

H3: Word of mouth significantly impact brand image from standardized path coefficients at 0.172 and t-value at 3.287. This implies that messages or recommendations of

patients significantly shaped the consumers' perception and awareness regarding the brand. Cham et al. (2016) and Cham et al. (2021) hence emphasized on the importance of word-of-mouth communication.

H4: Brand image significantly impact brand loyalty from standardized path coefficients at 0.414 and t-value at 7.791. Positive image of a brand perceived by patients would subsequently turns to loyalty as it could increases consumers' confidence in rendering the service. The finding is consistent with Chahal and Bala (2012) and Dayan et al. (2022).

H5: Brand image does not have significant impact on brand equity from standardized path coefficients at 0.030 and t-value at 0.565. This finding contradicted with the study by Erden et al. (1999) that brand image would contribute directly on brand equity through its recognition and reputation.

H6: Brand loyalty significantly impact brand equity from standardized path coefficients at 0.664 and t-value at 8.773. This has proven the study of Chahal and Bala (2012) and Shekhar Kumar et al. (2013) that highlighted brand loyalty as the core dimension of brand equity. Consumers with repetitive purchase or preference in the brand would values the brand and willing to recommend the brand to other consumers.

5. Conclusions

5.1 Conclusions

The objective of this study is to investigate the determinants of brand equity in personal health assistant services for patients with hypertension. To achieve the objective, data was primarily collected from patients who have hypertension in the private hospital of Thailand using five variables of perceived service quality, satisfaction, word-of-mouth, brand image, and brand loyalty. The questionnaire developed for data collection was tested with IOC and pilot to verify the reliability of variables measurement items prior to distribution to the respondents. 500 valid data sets were collected for analysis with confirmatory factor analysis and structural equation model to test the validity and casual relationship between variables in the conceptual framework. The analysis has showed that from six hypotheses proposed, all hypotheses were supported except for one. Perceived service quality significantly impact satisfaction, which leads to preferences and continual behavior on brand loyalty. Brand loyalty also positively impacted brand image that formulated from word-of-mouth from other consumers. Although brand image has no direct relationship with brand equity, brand image indirectly built brand equity through the mediation from brand loyalty. Brand loyalty is the strongest indicator of brand equity.

The analysis results have explained the determinants of brand equity in personal health assistant services for patients with hypertension. Values of the brand or brand equity is directly impacted from brand loyalty or the long-term commitment and preferences that patients have over the brand. This proven the theory of (Aaker, 1991) where consumers' cognitive aspect and brand assets significantly effect branding in health care. Also, this has supported the study of Atilgan et al. (2005) and Shekhar Kumar et al. (2013) that posited brand loyalty as the strongest predictor towards brand equity. The commitment and preferences are the patient's positive feeling and opinion towards the brand, in which they are contributed from continual satisfaction and favorable image of the brand. Satisfaction in this study can be enhanced from the level of service quality perceived by patients such as the performance of service, technical competence on diagnosis and treatment, and effectiveness of health assistance services (Gonçalves et al., 2020). Whereas brand image or consumer's perception toward the brand are built from feedback or recommendations from other consumers. According to Riezebos (2003), social and marketing aspects are essential in building brand's credibility and positioning. Service organizations, especially in healthcare are highly dependable on spreading of positive feedback and recommendations due to the characteristic of service that its technical expertise is difficult for consumer to evaluate (Datta et al., 2005). Hence, patients experience on the personal health assistance services are highly crucial to form satisfaction, positive feedback, commitment, and ultimately brand equity that would help attain and attract patients in using services.

5.2 Recommendation

Determinants studied in this research has played critical role in driving brand equity over personal health assistant service in hypertension patients, which are perceived service quality, satisfaction, word-of-mouth, brand image, and brand loyalty. The innermost antecedents of brand equity are perceived service quality and word-of-mouth. Positive perceived service quality leads to satisfaction, and word-of-mouth creates brand image, in which both satisfaction and brand image impacts brand loyalty and ultimately brand equity. Therefore, the fundamental goal that marketers and brand managers should achieve are how to deliver quality services and favorable experience to consumers.

Although there are diverse dimensions of service quality, the vital quality for healthcare services would be on the effectiveness and efficiency of health diagnosis and treatment. Therefore, the personal health assistance services should be easy to use, simple and precise for patients to operate and well track on their wellness. The higher level of

service quality perceived by patients, the higher satisfaction toward the service. Also, the positive post-experience from using the service can then create positive feedback and recommendations to other consumers in their social circles.

In addition, the benefits and responsiveness of services should be promoted to raise awareness and social influence on the usage. The services can be promoted through the websites and communication materials in hypertension clinic, medicine department, or outpatient department of the hospitals to raise understanding on the severity of hypertension, importance of symptoms monitoring and benefits of personal health assistance services. These can help enhance word-of-mouth and demonstrate the positioning of the service brand.

5.3 Limitation and Further Study

The research can be further extended as this study has defined a definite scope of study and conceptual framework studied. Firstly, this study conducted the research with quantitative method. Qualitative method can also be used to gather insights from patients or their caregiver to better explain the determinants of brand equity. Also, five variables were studied as determinants of brand equity, therefore other research theories and theoretical framework can be used to extend variables in the conceptual framework such as dimensions of perceived service quality under SERVQUAL, or control variables such as age and gender. Lastly, the scope of respondents can be expended to other private and public hospitals in Thailand or in other geographical regions for representations of findings through the eye of patients with hypertension.

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