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Original Article

Health promotion model in the utilization of health services for Indonesian social security agency for health participants

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Abstract

Health promotion models are essential for enhancing community health and facilitating access to quality health services. Understanding the effects of these models on the utilization of health services among participants of the Indonesian Social Security Agency for Health (*Badan Penyelenggara Jaminan Sosial Kesehatan*/BPJS) provides valuable insights for developing effective health promotion strategies. The aim of this study was to assess the impact of health promotion on the utilization of health services among BPJS health participants, focusing on the mediating roles of perception, self-efficacy, expected results, and social support, using structural equation modeling (SEM). A descriptive, quantitative research design was employed, involving 160 BPJS health participants at Prof. Dr. Margono Soekarjo Hospital, Purwokerto, Indonesia. Data was collected using structured questionnaires, with participants selected through purposive sampling. SEM analysis, performed using AMOS software, was utilized to examine the relationships among health promotion, perception, self-efficacy, social support, expected outcomes, and health service utilization behavior. The SEM analysis revealed that health promotion significantly influenced health service utilization behavior directly (critical ratio (CR)=2.741; p=0.011). Furthermore, health promotion had a significant effect on perception through self-efficacy (CR=2.500; p=0.012). Perception also significantly influenced behavior through self-efficacy (CR=3.789, p<0.001), while its indirect effect on behavior through outcome expectations was not significant (CR=0.908; p=0.958). Social support directly affected behavior (CR=2.267; p=0.023) and exerted both direct and indirect effects on behavior through self-efficacy (CR=3.789; p<0.001) and outcome expectations via self-efficacy (CR=6.267; p<0.001). However, self-efficacy did not significantly influence the behavior of utilizing BPJS health services through outcome expectations (CR=0.237; p=0.185). The findings indicate that health promotion significantly enhances the utilization of health services among BPJS health participants by improving perceptions and self-efficacy. Social support emerges as a critical factor in influencing health service utilization behavior and shaping outcome expectations through perception. In conclusion, future health promotion strategies should prioritize strengthening perceptions, enhancing self-efficacy, and leveraging social support to improve health service outcomes effectively.

Keywords: Health promotion, national health insurance, perception, self-efficacy, social support

Introduction

The World Health Organization (WHO) was established to ensure every individual achieves the highest possible level of health and well-being. Its responsibilities include protecting global

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health, advancing health initiatives, and supporting vulnerable populations, emphasizing universality, equity, and human rights [1]. These principles align with the United Nations' declaration on human rights, which asserts that every individual or citizen of a nation has the same right to an adequate standard of living for their health, including access to food, drink, clothing, housing, and health services [2].

The Indonesian government is committed to achieving universal health coverage (UHC) by providing comprehensive, high-quality health services to all residents, encompassing promotion, prevention, treatment, and rehabilitation [3].The primary goals of UHC are: (1) ensuring universal health coverage for two billion individuals; (2) safeguarding over two billion people from health emergencies, and (3) enhancing the well-being and health of two billion individuals [4]. Achieving these targets involves enhancing the availability of essential health services, decreasing financial difficulties from healthcare expenses, and enhancing access to necessary medications, vaccines, diagnostics, and healthcare devices[5].

In order to attain UHC, the Indonesian government launched the national health insurance (NHI) program, known as the Indonesian Social Security Agency for Health (*Badan Penyelenggara Jaminan Sosial Kesehatan*/BPJS) program, on January 1, 2014 [6,7]. This program aims to provide the public with access to health services and ensure financial protection. Administered by the Social Security Administration Agency for Health under Law No. 40 of 2004 on the National Social Security System [7], this program is in line with the Sustainable Development Goals (SDGs), which all individuals will experience the advantages of sustainable development by 2030 [8].

Despite a significant increase in public awareness about health issues, the quality of health services for BPJS participants has not seen corresponding improvements, leading to numerous complaints, such as long wait times, unavailability of prescribed free medications at pharmacies, and lack of inpatient rooms for BPJS patients [9]. This dissatisfaction affects engagement with the BPJS program, often leading participants to discontinue their membership by ceasing regular monthly payments. This issue may stem from the public's limited knowledge about the BPJS program, resulting in low utilization of health services [10].

Recent studies have highlighted various challenges in the utilization of health services by BPJS participants. For instance, research indicates that negative perceptions of healthcare providers and the BPJS program contribute to low utilization of health services [11]. Additionally, facility availability, as well as the knowledge, motivation, and attitude of healthcare workers significantly impact health service utilization [12,13]. To ensure the successful implementation of the Indonesian Social Security Agency for Health program and achieve UHC, the role of health promotion activities in enhancing public understanding and utilization of the BPJS program as part of the Indonesian Social Security Agency for Health system is essential. However, there has been no specific study that comprehensively explains the effectiveness of health promotion models in improving the utilization of health services among BPJS participants. This promotion model includes educational, informational, and promotional activities to enhance public knowledge, attitudes, and health behaviors. Within the BPJS as the national health insurance program, a health promotion model can help the public understand its benefits and improve their access to quality health services. The aim of this study was to identify and evaluate a health promotion model that effectively facilitates the use of health services by Indonesian Social Security Agency for Health (BPJS) participants.

Methods

Population and sample

The study population consisted of all Indonesian Social Security Agency for Health (BPJS) participants seeking treatment at Prof. Dr. Margono Soekarjo Hospital, Purwokerto, Indonesia. Purposive sampling was used to select respondents based on the following inclusion criteria, including currently undergoing treatment at the hospital during the study period, returning patients who have visited the hospital at least twice, aged 18 years or older, capable of reading and writing, able to communicate effectively, and willing to participate in the study. The sample size was calculated based on the guidelines by Hair *et al*. [14] which recommends 5 to 10 respondents per indicator. With 27 indicators in the study, a minimum sample size of 135 and a

maximum of 270 respondents were required. A total of 160 respondents were included, which is within the acceptable range for adequate statistical power.

Measures

Data collection was conducted using a structured questionnaire designed to evaluate various aspects of health promotions, self-perception, social support, self-efficacy, expected results, and behavior of BPJS participants, which were represented as latent variables. The questionnaire was adapted from validated instruments used in previous studies on healthcare perceptions [15-17]. The scales were adapted for cultural relevance to the Indonesian context. Minor language and content modifications were made to ensure clarity and appropriateness for Indonesian participants. These adaptations involved translation and back-translation to ensure linguistic accuracy [18,19], as well as consultations with two local experts from Universitas Sebelas Maret, Surakarta, Indonesia, and Universitas Muhammadiyah Purwokerto, Purwokerto, Indonesia, to ensure that the language and content were appropriate for the local context. These cultural adaptations were intended to preserve the validity of the scales without compromising their reliability [19,20].

The questionnaire was divided into six latent variables: (1) health promotions (22-item questionnaires), this latent variable consisted of four sub-scales, i.e., topic (capturing awareness and understanding of health-related topics), media (evaluating the influence of media on health perception), facilities (assessing the perceived adequacy of healthcare facilities), and healthcare workers (perceptions regarding the role and influence of healthcare providers). Each sub-scale was rated on a 5-point Likert scale (1=strongly disagree to 5=strongly agree), where higher scores reflected more positive perceptions. Cronbach's α for this variable was 0.87, which achieved an acceptable value of 0.7 [21]. (2) Perception (17-item questionnaires), this latent variable included sub-scales assessing participants' perception of health-related topics. The sub-scales under this construct were perceived barriers (evaluating obstacles to accessing health services), perceived benefits (identifying the advantages of using health services), perceived severity (understanding the seriousness of health issues), and perceived vulnerability (assessing the participants' sense of risk exposure). Each sub-scale was rated on a 5-point Likert scale (1=strongly disagree to 5=strongly agree), where higher scores reflected more positive perceptions. This scale provided nuanced feedback across dimensions such as accessibility, quality, and satisfaction with healthcare services. Cronbach's α for this scale was 0.84 and higher than the acceptable value of 0.7 [21], indicating good internal consistency. (3) Social support (22-item questionnaires), this latent variable included sub-scales through various sources of perceived support, which included family support (assistance and encouragement from family), friend support (support from friends), health worker support (guidance and help from medical professionals), and village official support (assistance from local community leaders). These sub-scales were scored on a 5-point Likert scale, with higher scores indicating stronger perceived social support. The scale's internal reliability was high, as shown by Cronbach's α of 0.92. (4) Self-efficacy (16-item questionnaires), this latent variable comprised sub-scales that reflected participants' confidence in managing their health. The variables included strength (participants' resilience in managing health issues), level (their perceived competence in undertaking health-related tasks), and generality (the extent to which self-efficacy beliefs were applied across various health-related situations). Responses for each sub-scale were also rated utilizing a 5-point Likert scale, where higher scores indicated greater self-efficacy. A high score suggested a strong belief in one's capability to engage in health-promoting actions and overcome health-related challenges. Cronbach's α for this scale was 0.75, which exceeds the acceptable threshold of 0.7 [21] and demonstrates high reliability. (5) Expected results (9-item questionnaires), this latent variable comprised sub-scales i.e., self-evaluation (participants' ability to assess their health behaviors) and social (how social settings influenced their self-efficacy). Cronbach's α for this scale was 0.90, which exceeds the acceptable threshold of 0.7 [21] and achieved reliability. (6) Behavior of BPJS participants (18-item questionnaires), This latent variable included sub-scales, i.e., cognitive (knowledge and understanding of health practices), attitudes (participants' mindset and beliefs toward health behaviors), actions (the practical engagement in health-promoting behaviors), and physical (engagement in physical health activities such as exercise). Higher scores reflected a

higher frequency and quality of positive health behavior. Responses of each sub-scale were rated on a 5-point Likert scale, where higher scores indicated more frequent engagement in positive health behaviors. These scores were considered to reflect real-world behaviors, with higher scores representing individuals who consistently practice proactive health measures. The scale's Cronbach's α was 0.90, more than the acceptable value of 0.7 [21], indicating strong reliability.

Each scale provided participants with the opportunity to give detailed feedback on distinct constructs. The interpretation of higher scores was as follows: a higher score for health promotions indicated a more positive perception of health-related initiatives and the influence of associated factors like media and healthcare workers; a higher perception score reflected a more favorable view of health topics, benefits, and vulnerability awareness; a higher social support score suggested a robust support system from various sources such as family, friends, healthcare providers, and community leaders; a higher self-efficacy score denoted greater confidence in one's capability to manage health-related tasks and challenges; higher scores for expected results implied better self-assessment and socially influenced self-efficacy outcomes; and a higher behavior score indicated more frequent engagement in positive health practices and behaviors, reflecting a proactive approach to maintaining physical and cognitive health.

Responses for each item were averaged to create composite scores for each variable (health promotions, self-perception, social support, self-efficacy, expected results, and behavior of BPJS participants). These composite scores were used in the subsequent analysis to understand their relationship to health service utilization behaviors among BPJS participants. Higher composite scores for each variable were directly associated with favorable health outcomes or attitudes, allowing us to map these scores onto real-world implications in the study context.

Data Collection

Data collection was conducted over two months from December 2023 until January 2024. Questionnaires were distributed both in person and electronically via Google Form (Google LLC, Mountain View, USA) shared through WhatsApp (Meta Platforms Inc., Menlo Park, USA) to maximize accessibility. Participants were given up to two weeks to complete the questionnaire, and assistance was available by phone or in person to answer any questions, reducing the risk of bias from misinterpretation. This approach helped minimize potential response biases and provided flexibility for participants.

Data analysis

The research model was tested using quantitative analysis methods by performing structural equation modeling (SEM), due to the large number of measurement items and the presence of indirect relationships between variables. AMOS version 21 software (IBM, Armonk, USA) was utilized to evaluate the proposed reflective measurement model. Confirmatory factor analysis (CFA) was conducted to confirm the most dominant factors within each group of variables, ensuring the validity and reliability of the measurement model. The study included six core latent variables—health promotion, self-perception, social support, self-efficacy, result expectation, and BPJS members' behavior—which are essential for testing the overall model fit. SEM was employed to examine the magnitude of influence between variables and to test the overall model fit. Before conducting SEM, it was crucial to assess the normality of the data for both univariate and multivariate distributions by reporting the skewness and kurtosis values for a more extensive set of observed variables, which are specific items or components that form part of the latent constructs evaluated in CFA. These observed variables include detailed aspects such as attitudes, cognitive and physical dimensions, and various forms of social support (e.g., family, friends, and healthcare providers).

The steps used in SEM modeling, as suggested by Hair *et al.* [14], included: (a) developing the model based on theory by reviewing literature and scientific sources to support the research variables, ensuring a strong theoretical foundation; (b) developing a path diagram illustrating causal relationships, with straight arrows indicating direct causal relationships and curved lines indicating correlations, dividing constructs into exogenous (independent) and endogenous (dependent) variables; (c) converting the path diagram into equations; (d) selecting the input type and estimation method; (e) assessing model identification problems; and (f) evaluating goodness-of-fit criteria using indices such as the Chi-square/degrees of freedom: (χ^2/df), goodness-of-fit

index (GFI), comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) [22-26]. The hypothesis associated with the path was tested by calculating a confidence interval for each path coefficient. If the value 0 (zero) was not included in the interval, the alternative hypothesis was supported. Otherwise, the hypothesis was rejected. The potential benefits of using confidence intervals instead of *p*-values for hypothesis testing are debatable [27]. Recently, Kock provided a detailed comparison of the two approaches in the context of partial least squares structural equation modeling (PLS-SEM) that allows the estimation of complex cause-effect relationships in path models with latent variables and found comparable results in hypothesis testing [28]. Descriptive analyses, including means, standard deviations, skewness, and kurtosis, were performed to assess data normality [23,29]. Multicollinearity was examined using tolerance and variance inflation factor (VIF). The procedure of bootstrap bias correction was used to examine mediation effects, with standardized coefficients and 99% confidence intervals based on 5,000 bootstrap resamples. The significance level for statistical tests was set at $p<0.01$.

Results

Participant demography

Table 1 presents the demographic characteristics of the 160 study participants, with a majority of female participants (62.5%) and 37.5% male. Most participants were married (79.3%), and the largest proportion held a bachelor's degree (46.3%), followed by those with a master's degree (20.5%), high school education (21.3%), diploma (8.8%), and doctorates (3.1%). Occupation-wise, the formal sector employed the most participants (57.5%), followed by retirees (16.3%), homemakers (11.2%), and students (7.5%). The age distribution showed that 30% were aged 36–45 years, with other age groups being relatively evenly represented. Income-wise, most participants earned around the regional minimum wage (RMW), specifically between IDR 2,000,000 and 4,000,000 (35.0%), while 28.8% earned below the RMW (IDR <2,000,000), and 36.2% earned above the RMW (IDR >4,000,000). Regarding BPJS membership duration, 56.9% had been enrolled for 1–10 years, and the majority of participants (52.5%) visited healthcare facilities between 2 and 11 times, followed by those visiting more than 32 times (25.0%) and 12–21 times (20.0%).

Table 1. Participant demographics (n=160)

Category	Frequency	Percentage (%)
Sex		
Male	60	37.5
Female	100	62.5
Marital status		
Single	24	15.0
Widowed	3	1.9
Divorced	6	3.8
Married	127	79.3
Education level		
High school	34	21.3
Diploma	14	8.8
Bachelor	74	46.3
Master	33	20.5
Doctor	5	3.1
Occupation		
Formal workers	92	57.5
Informal workers	12	7.5
Student	12	7.5
Retired	26	16.3
Homemakers	18	11.2
Age group (year), (mean=35.8±12.1)		
18–25	19	11.9
26–35	22	13.8
36–45	48	30.0
46–55	26	16.3
56–65	18	11.3

Category	Frequency	Percentage (%)
>65	27	16.7
Income (mean=IDR 3,147,500±2,418,000)		
Below RMW (IDR <2,000,000)	46	28.8
Around RMW (IDR 2,000,000–4,000,000)	56	35.0
Above RMW (IDR >4,000,000)	58	36.2
BPJS membership duration (year), (mean=7.8±5.4)		
1–10	91	56.9
11–20	26	16.3
21–30	16	10.0
>31	27	16.8
Visit frequency (mean=8.3±6.4)		
2–11 visits	84	52.5
12–21 visits	32	20.0
22–31 visits	4	2.5
≥32 visits	40	25.0

IDR: Indonesian rupiah; RMW: regional minimum wage

Confirmatory factor analysis

Table 2 provides detailed variables used to evaluate the fit of a structural model for various variables, including health promotion, self-perception, social support, self-efficacy, result expectation, and national health insurance (BPJS) members' behavior.

Table 2. Confirmatory factor analysis of latent variables in the study (n=160)

Variable	Chi-square (χ^2)	*p*-value	CMIN/DF	Tucker-Lewis index (TLI)
Health promotions	15.21	0.06	1.63	0.91
Self-perception	14.73	0.07	1.83	0.89
Social support	16.24	0.08	1.59	0.74
Self-efficacy	16.63	0.07	1.84	0.98
Expected results	15.72	0.08	1.81	0.86
Behavior of BPJS participants	16.64	0.07	1.88	0.81

CMIN/DF: Chi-square minimum discrepancy divided by degrees of freedom

The confirmatory factor analysis results indicate a marginally acceptable fit for all variables. The variable of health promotion (χ^2=15.21; chi-square minimum discrepancy divided by degrees of freedom (CMIN/DF)=1.63; Tucker-Lewis index (TLI)=0.91), self-perception (χ^2=14.73; CMIN/DF=1.83; TLI=0.89), and expected results (χ^2=15.72; CMIN/DF=1.81; TLI=0.86) showed a good fit with CMIN/DF values below 2 and TLI values close to or above 0.9. Self-efficacy (χ^2=16.63; CMIN/DF=1.84; TLI=0.98) demonstrated the best fit with an excellent TLI. Social support (χ^2=16.24; CMIN/DF=1.59; TLI=0.74) and respondent's behavior (χ^2=16.64; CMIN/DF=1.88; TLI=0.81) showed a weaker fit with lower TLI values [22-26]. Overall, the model adequately represents the observed data, although improvement is needed for social support and respondents' behavior.

Assessment of normality

The assessment of normality aims to determine whether the data for each variable, both univariate and multivariate, are normally distributed. This is important because it is a prerequisite for conducting SEM analysis, where normally distributed data ensures unbiased results (**Table 3**).

The assessment of normality for the research variables is presented in **Table 2**. Results of the normality test of research variable data indicate that the data exhibits both skewness and kurtosis deviations. Most variables showed skewness critical ratios within acceptable limits, with values between -3.476 and 0.497, indicating slight deviations from normal distribution. Variables such as physical (-3.476), family support (-3.294), village official support (-3.346), perceived vulnerability (-2.096), and healthcare workers (-3.550) showed more significant skewness. Kurtosis values, however, presented larger critical ratios, especially for variables like the topic (-3.406), media (-3.354), facilities (-3.382), and healthcare workers (-3.550), suggesting more substantial departures from normality. The multivariate kurtosis critical ratio of 19.330 further confirms the presence of multivariate non-normality. To address these normality issues, extreme outliers were removed, data transformation techniques were applied as necessary, and the

bootstrap method with 5,000 resamples was employed to adjust for any residual non-normality. These corrective measures were implemented to ensure accurate and unbiased results in the SEM analysis.

Table 3. Results of normality test of research variable data (n=160)

Variable	Skewness	Critical ratio	Kurtosis	Critical ratio
Health promotions				
Topic	-0.177	-0.887	-1.362	-3.406
Media	-0.062	-0.308	-1.342	-3.354
Facilities	0.099	0.497	-1.353	-3.382
Healthcare workers	-0.013	-0.067	-1.420	-3.550
Perception				
Perceived barriers	-0.441	-2.204	-0.615	-1.538
Perceived benefits	-0.453	-2.263	-0.176	-.441
Perceived severity	-0.279	-1.395	-0.777	-1.941
Perceived vulnerability	-0.419	-2.096	-0.509	-1.272
Social support				
Family support	-0.659	-3.294	-0.252	-0.630
Friend support	-0.567	-2.837	-0.031	-0.078
Health worker support	-0.346	-1.728	-0.399	-0.998
Village officials support	-0.669	-3.346	0.013	0.032
Self-efficacy				
Level	-0.401	-2.007	-.240	-0.601
Strength	-0.340	-1.698	-0.405	-1.011
Generabilty	-0.404	-2.019	-0.284	-0.711
Expected results				
Physical	-0.695	-3.476	0.235	0.587
Social	-0.527	-2.635	-0.337	-0.842
Self-evaluation	-0.259	-1.297	-0.082	-0.205
Behavior of BPJS participants				
Actions	-0.521	-2.606	0.045	0.113
Attitudes	-0.257	-1.286	-0.497	-1.243
Cognitive	-0.516	-2.582	0.199	0.496
Multivariate			48.860	19.330

After removing the outliers, the normality of the data was re-tested, and the findings indicated that the distributions of several variables deviated from normality. Skewness measures the asymmetry of the data distribution. A positive skewness indicates a longer right tail, whereas a negative skewness suggests a longer left tail. **Table 4** presents the details of the result of the normality test after removing the outliers. Among the variables, "topic" exhibits a significant positive skewness (1.220), indicating a considerable asymmetry to the right. In contrast, "facilities" shows a notable negative skewness (-1.006), suggesting a pronounced asymmetry to the left. Most other variables exhibit skewness values closer to zero, indicating relatively symmetric distributions, with some slight negative or positive tendencies. For skewness, all variables have critical ratios of 0.192, which were well below the threshold, suggesting that their skewness values, despite being positive or negative, do not significantly deviate from normality (**Table 4**).

Kurtosis measures the tailedness of the data distribution. A high kurtosis value indicates a distribution with heavy tails and a sharp peak, whereas a low kurtosis value suggests lighter tails and a flatter peak. After the outlier's removal, "facilities" has an exceptionally high kurtosis (5.296), indicating a distribution with significant outliers. "Action" also shows a high kurtosis (3.122), albeit lower than "facilities," suggesting some degree of heavy-tailed distribution. Other variables, such as "topic" (1.049) and "generality" (2.552), exhibit moderate kurtosis, indicating some level of peakedness and potential outliers, but not as extreme. The critical ratios for skewness and kurtosis are used to assess the significance of these measures. The critical ratios for kurtosis were consistently 0.381 across all variables, indicating no significant deviation from a normal distribution (**Table 4**). The analysis of skewness and kurtosis provides insights into the underlying distribution of data for each variable. The notable skewness in "topic" and "facilities" suggested potential outliers or a non-normal distribution, which may require further corrective actions before applying parametric statistical tests. This study applied a log transformation to "facilities" to reduce high kurtosis and outlier influence, while outlier removal was conducted on

"topic" to correct skewness. These adjustments ensured the data met parametric analysis assumptions, leading to more accurate and reliable results.

Table 4. Results of the normality test for the variables after outlier removal (n=160)

Variable	Skewness	Critical ratio	Kurtosis	Critical ratio
Health promotions				
Topic	1.220	0.192	1.049	0.381
Media	0.783	0.192	0.394	0.381
Facilities	-1.006	0.192	5.296	0.381
Healthcare workers	0.335	0.192	-0.870	0.381
Perception				
Perceived barriers	-0.699	0.192	1.507	0.381
Perceived benefits	-0.208	0.192	1.083	0.381
Perceived severity	-0.590	0.192	1.365	0.381
Perceived vulnerability	-0.663	0.192	0.752	0.381
Social support				
Family support	-0.517	0.192	-0.021	0.381
Friend support	-0.501	0.192	0.762	0.381
Healthcare workers support	0.054	0.192	1.535	0.381
Village official support	-0.269	0.192	0.018	0.381
Self-efficacy				
Level	-0.358	0.192	0.787	0.381
Strength	-0.312	0.192	1.292	0.381
Generality	-0.544	0.192	2.552	0.381
Expected results				
Physical	-0.864	0.192	1.947	0.381
Social	-0.213	0.192	0.320	0.381
Self-evaluation	-0.215	0.192	1.564	0.381
Behavior of BPJS participants				
Action	-0.591	0.192	3.122	0.381
Attitude	0.040	0.192	0.840	0.381
Cognitive	0.180	0.192	1.041	0.381
Multivariate			36.652	17.436

Assessment of multicollinearity

The purpose of multicollinearity testing is to determine whether a variable has a high level of correlation with other variables. A good model should not exhibit multicollinearity to ensure unbiased estimation. One method to test for multicollinearity is by examining the variance inflation factor (VIF) values and the tolerance values of the estimates. The results show that all tolerance values are greater than 0.3 and the VIF values are greater than 1.00. Therefore, no multicollinearity is found among the variables in this study. A variable is considered to have multicollinearity if its tolerance value is less than 0.10 and its VIF value is greater than 10 [30]. However, in this study, a more conservative threshold of 0.3 for tolerance values was used. This threshold is commonly used to indicate moderate multicollinearity and provides a balance between sensitivity to multicollinearity and avoiding the exclusion of valuable variables with lower correlations, as presented in similar research settings [30]. The results of the multicollinearity test are presented in **Table 5**.

Table 5. Assessment of multicollinearity analysis

Variable	Collinearity statistics	
	Tolerance	Variance inflation factor (VIF)
Health promotions		
Topic	0.666	1.501
Media	0.641	1.559
Facilities	0.789	1.267
Healthcare workers	0.506	1.975
Perception		
Perceived barriers	0.326	3.068
Perceived benefits	0.298	3.358
Perceived severity	0.139	7.195
Perceived vulnerability	0.163	6.124
Social Support		
Family support	0.648	1.544
Friend support	0.523	1.912

Variable	Collinearity statistics	
	Tolerance	Variance inflation factor (VIF)
Healthcare workers support	0.574	1.741
Village official support	0.666	1.502
Self-Efficacy		
Level	0.640	1.562
Strength	0.686	1.458
Generality	0.519	1.928
Expected Results		
Physical	0.372	2.689
Social	0.317	3.153
Self-evaluation	0.223	4.477
Behavior of BPJS participants		
Action	0.379	2.640
Attitude	0.507	1.973
Cognitive	0.547	1.827

The VIF and tolerance values were key indicators used in this test. A tolerance value greater than 0.1 and a VIF value less than 10 generally indicate that multicollinearity is not a concern. The results of this analysis show that most variables exhibit tolerance values greater than 0.3 and VIF values less than 3, suggesting low multicollinearity. For instance, variables such as "topic" and "media" have moderate tolerance values of 0.666 and 0.641, and VIF values of 1.501 and 1.559, respectively, indicating a low level of multicollinearity (**Table 5**). Similarly, "facilities" shows a high tolerance value of 0.789 and a low VIF value of 1.267, indicating very low multicollinearity. The variables "healthcare workers," "support from family," "support from friends," and "support from healthcare workers" all demonstrate good tolerance and VIF values, indicating low multicollinearity and suggesting that they are well-suited for inclusion in the regression model without significant risk of bias due to multicollinearity. However, some variables exhibit signs of moderate multicollinearity. "Perceived vulnerability" and "perceived severity" have the lowest tolerance values, 0.163 and 0.139, and the highest VIF values, 6.124 and 7.195, respectively. These values suggest a higher degree of multicollinearity, which could potentially impact the stability and interpretability of the regression coefficients. Similarly, "self-evaluation" also shows a lower tolerance value of 0.223 and a higher VIF value of 4.477, indicating moderate multicollinearity. Other variables such as "perceived benefits" and "perceived barriers" show moderate tolerance values of 0.298 and 0.326, and VIF values of 3.358 and 3.068, suggesting some level of multicollinearity but still within acceptable ranges. "Physical" and "social" variables exhibit tolerance values of 0.372 and 0.317, and VIF values of 2.689 and 3.153, respectively, indicating some multicollinearity but not to an extent that would critically affect the regression analysis.

Model fit analysis

The theoretical model testing was conducted using SEM. The theoretical model developed in this study examined the influence of health promotion, individual perception, social support, self-efficacy, and outcome expectations on the behavior of BPJS health participants in utilizing BPJS health services. The results from the measurement model analysis in this study indicate that all latent variables are a good fit, allowing the analysis to proceed to structural model testing. The results of the structural model analysis are presented in **Table 6**.

Table 6 demonstrates the results of the structural model analysis, indicating that the theoretical model developed in this study is a good fit based on several key indicators. The GFI is 0.957, which is well above the cut-off value of 0.900. This suggests that the model is a good fit for the observed data, capturing a significant portion of the variance and covariance within the data set [23]. Similarly, the normed fit index (NFI) is 0.908, surpassing the threshold of 0.900. The NFI assesses the model by comparing the fit of the hypothesized model to a null model, where all variables are assumed to be uncorrelated. A value above 0.900 indicates that the hypothesized model significantly improves the fit compared to the null model, thus supporting the model's validity [23,31]. The relative fit index (RFI), which is 0.978, also exceeds the 0.900 cut-off [32]. The RFI, similar to the NFI, accounts for model complexity by comparing the fit of the hypothesized model to the null model, adjusting for the degrees of freedom. A high RFI value indicates a well-fitting model that is not overly complex [23,31,32]. The incremental fit index (IFI)

and the CFI both yield values of 0.985 and 0.974, respectively [33]. These indices measure the relative improvement in the fit of the hypothesized model compared to a baseline model. Values close to 1 indicate an excellent fit, suggesting the hypothesized model has a significant incremental fit over a simpler model. The RMSEA was 0.076, which is below the threshold of 0.080 [22,23]. The RMSEA measures the discrepancy between the hypothesized model and the population covariance matrix, per degree of freedom [22,23]. An RMSEA value below 0.080 indicates a reasonable error of approximation, implying that the model fits the population data well.

Table 6. Fit model of structural equation modeling (SEM) examining health promotion, individual perception, social support, self-efficacy, and behavior of BPJS participants

Indicator	Count	Cut-off	Conclusion
Goodness-of-fit index (GFI)	0.957	>0.900	Fit
Normed fit index (NFI)	0.908	>0.900	Fit
Relative fit index (RFI)	0.978	>0.900	Fit
Incremental fit index (IFI)	0.985	>0.900	Fit
Comparative fit index (CFI)	0.974	>0.900	Fit
Root mean square error of approximation (RMSEA)	0.076	<0.080	Fit

Hypothesis testing

Hypothesis testing using multiple linear regression analysis revealed significant findings for several hypotheses. A summary of the linear regression results is presented in **Table 7**. Hypothesis 1 (H1) posited that health promotion positively influences the behavior of BPJS health participants in utilizing health services, which was supported (Critical ratio (CR)=2.741; p=0.011). Additionally, health promotion had a significant direct and indirect effect on self-efficacy through perception (H3: CR=2.500; p=0.012). Social support significantly impacted the behavior of BPJS health participants directly (H7: CR=2.267; p=0.023) and indirectly through outcome expectations (H10: CR=6.267; p<0.001) and self-efficacy (H12: CR=3.789; p<0.001). Perception had a significant effect on behavior through self-efficacy (H4: CR=3.789; p<0.001). However, hypotheses related to the indirect effects of perception on behavior through outcome expectations (H5: CR=0.908; p=0.958) and self-efficacy on behavior through outcome expectations (H13: p=0.185) were not supported. Hypotheses H2, H6, H8, H9, and H11 were tested, but they either showed non-significant results or did not demonstrate sufficient evidence of a meaningful relationship to be included in the final regression analysis. As a result, they were excluded from the table. A list of hypotheses can be found in **Appendix 1**.

Table 7. Summary of linear regression results for hypothesis testing of the latent variables

Hypothesis	Variable	Critical ratio (CR)	p-value
H1	Health promotion → Behavior	2.741	0.011
H3	Health promotion → Self-efficacy → Perception	2.500	0.012
H7	Social support → Behavior	2.267	0.023
H10	Social support → Outcome expectations → Behavior	6.267	<0.001
H12	Social support → Self-efficacy → Behavior	3.789	<0.001
H4	Perception → Self-efficacy → Behavior	3.789	<0.001
H5	Perception → Outcome expectations → Behavior	0.908	0.958
H13	Self-efficacy → Outcome expectations → Behavior	0.237	0.185

Figure 1 illustrates the hypothesized relationships among the variables in the study based on the SEM analysis. It depicts the interconnections between health promotion, perception, self-efficacy, social support, and behavior. The arrows indicate the proposed pathways of influence, reflecting the theoretical framework of the research. The numbers along the arrows (e.g., 0.35, 0.91, 0.72) represent standardized path coefficients, which indicate the strength and direction of the relationships between the variables. For example, a path coefficient of 0.35 means that the variable at the start of the arrow has a moderate influence on the variable at the end of the arrow. Higher values, such as 0.91, indicate a stronger influence between the two variables. The numbers next to the variable names (e.g., 0.99 for health promotion, 0.25 for perception, and 0.81 for family support) represent factor loadings. These values show how well each observed variable

(such as "topic," "perception benefit," or "family support") corresponds to its respective latent construct (e.g., "health promotion," "perception," or "social support"). For instance, a factor loading of 0.99 indicates a very strong relationship between the observed variable and its latent construct, while a value of 0.25 suggests a weaker relationship. This comprehensive depiction helps clarify the theoretical framework and relationships studied. For instance, health promotion is hypothesized to directly impact both behavior and self-efficacy, while self-efficacy and perception are suggested to mediate the relationship between social support and behavior. The results of the SEM analysis indicate that the indirect relationship between social support and behavior, mediated by self-efficacy and perception, is significant. The SEM results confirm several of these hypothesized relationships, as evidenced by the supported hypotheses outlined in **Table 6**, where significant critical ratios and *p*-values indicate strong empirical support for the proposed connections.

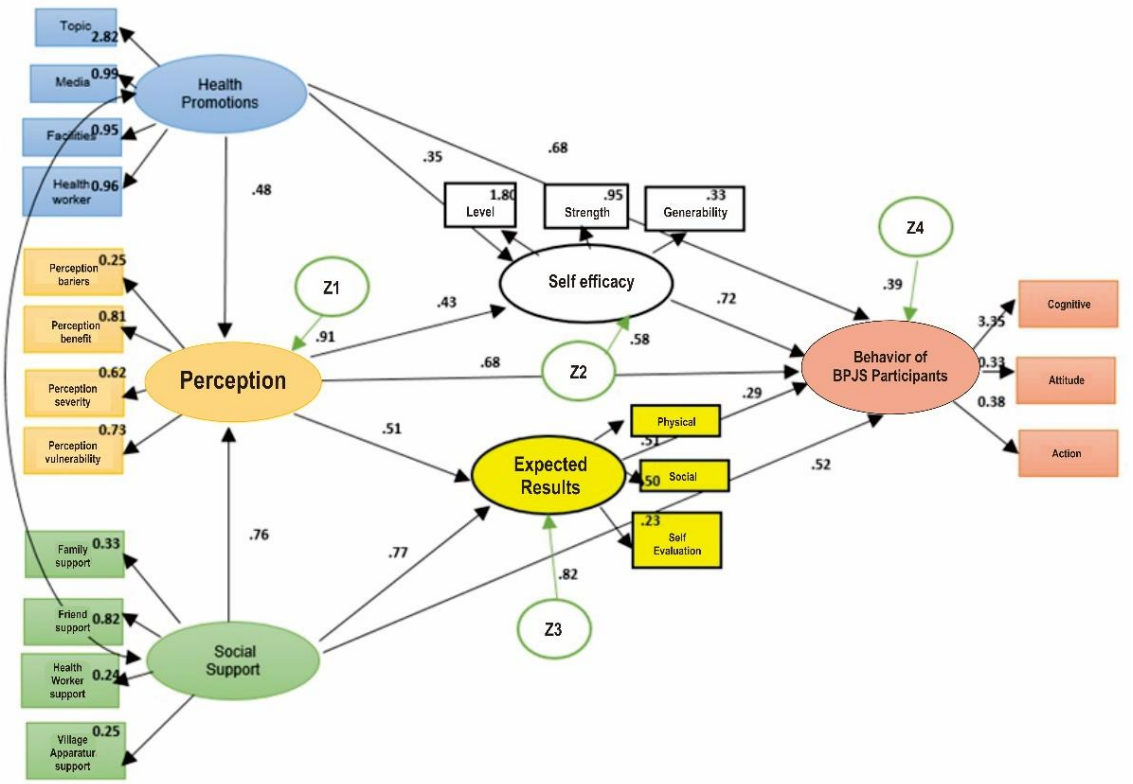

Figure 1. Structural model of hypothesized relationships among health promotion, social support, perception, self-efficacy, and behavior of BPJS participants. Z value represents the error value.

Discussion

Our findings reveal that health promotion significantly influences the behavior of BPJS health participants, highlighting the importance of effective health communication strategies. Policymakers and healthcare providers should prioritize creating personalized health promotion messages that resonate with cultural values and individual needs, utilizing multiple channels of communication to reach diverse populations effectively. This supports existing literature emphasizing the role of health promotion in improving healthcare utilization [34,35]. The analysis showed that health promotion significantly impacts the behavior of BPJS health participants in utilizing health services. This finding aligns with previous research from the USA, suggesting that effective health promotion can directly encourage individuals to engage more actively with health services, thereby improving their health outcomes [36]. Health promotion programs reduce the risk of various health issues by encouraging proactive health behaviors, increasing awareness and knowledge about health services, and fostering a supportive environment that motivates individuals to utilize available healthcare resources effectively [36,37].

Health promotion also exhibited both direct and indirect effects on behavior through perception, indicating that perception acts as a mediating factor, enhancing the impact of health promotion on health service utilization. This underscores the importance of addressing perceptions in health promotion strategies to maximize their effectiveness [38]. Healthcare providers can implement programs that address misconceptions and increase awareness about the value of healthcare services, thereby improving health service utilization. For example, healthcare providers can organize community workshops to educate individuals about preventive care and the importance of routine check-ups, addressing misconceptions directly. They could also deploy mobile health clinics to underserved areas, offering free screenings and consultations while providing information on available services. Additionally, targeted social media campaigns can debunk common myths about treatments or procedures, making healthcare more approachable and trustworthy for the public.

The study also found that improving perceptions through health promotion can significantly boost self-efficacy, which in turn leads to better health behaviors among BPJS health participants. To enhance this effect, healthcare providers should design interventions that explicitly target and build self-efficacy through skill-building workshops, peer mentoring, and motivational interviewing, ensuring that individuals feel confident in their ability to manage their health. This aligns with previous research that highlights the critical role of perception in enhancing individuals' confidence in managing their health [39,40]. The significant influence of perception on behavior via self-efficacy underscores the importance of interventions that target both perception and self-efficacy to effectively promote health service utilization [41,42]. The results indicated that perception did not influence behavior through outcome expectations. This finding may be attributed to the nature of BPJS participants' reliance on self-efficacy—confidence in their ability to take action—over the perceived benefits or consequences (outcome expectations). According to Bandura's social cognitive theory [39,43], self-efficacy often plays a more pivotal role in shaping health behavior than outcome expectations, especially when individuals face uncertainties or limited resources. The Indonesian cultural emphasis on personal resilience and the unique socio-economic context of BPJS health participants could also explain why self-efficacy emerged as a significant mediator while outcome expectations did not [7,44]. This suggests that in this population, self-efficacy may be more influential in driving behavior, whereas outcome expectations might require further contextual or motivational factors to have an impact [45]. Additionally, the hypothesis that perception affects outcome expectations through self-efficacy was also not supported, highlighting the complexity of these relationships and suggesting that self-efficacy does not significantly mediate the relationship between perception and outcome expectations [46].

The study also demonstrated that social support has a significant direct effect on the behavior of BPJS health participants. To maximize this influence, policymakers should create initiatives that strengthen community-based support networks, such as peer-led support groups or family involvement in health promotion programs, encouraging individuals to utilize health services with the backing of their social circles. This supports existing literature emphasizing the importance of social support in encouraging individuals to utilize health services and the value of fostering strong support networks [47,48]. On the other hand, the hypothesis that social support affects behavior through perception was not supported, indicating that while social support is crucial, its influence on health behavior may not be significantly mediated by perception alone [49]. Additionally, social support was found to significantly influence outcome expectations through perception. This finding suggests that improving perception can enhance the impact of social support on health-related outcomes [50]. The study further highlighted the importance of self-efficacy in mediating the relationship between social support and health behavior, suggesting that interventions should aim to bolster self-efficacy to maximize the benefits of social support. Conversely, the hypothesis that social support affects behavior through outcome expectations was not supported. This finding indicates that outcome expectations did not significantly mediate the relationship between social support and health behavior, highlighting the need to explore other potential mediators [51]. However, social support was found to significantly influence outcome expectations through self-efficacy, reinforcing the role of self-efficacy as a mediator and

suggesting that enhancing self-efficacy can amplify the effects of social support on outcome expectations [52].

These findings have practical implications for policymakers and healthcare providers. Effective health promotion campaigns should focus on building self-efficacy and addressing perception barriers, while also strengthening social support networks by involving families, communities, and peer groups. Healthcare providers can also focus on developing health literacy programs that empower individuals to make informed health decisions. Tailoring interventions to boost self-efficacy could be particularly beneficial, as self-efficacy emerged as a crucial mediator in our study.

Despite the valuable insights provided by this study, several limitations must be acknowledged. The cross-sectional design limits our ability to infer causal relationships, and the reliance on self-reported data introduces potential recall and social desirability biases. Additionally, the context of BPJS health participants in Indonesia may limit the generalizability of the findings to other populations or healthcare systems. Indonesia's national health insurance system differs from private or mixed healthcare models found in other countries, as it is a mandatory, single-payer public system focused on universal coverage and mutual cooperation. This contrasts with private insurance models that rely on individual premiums and risk assessments, often leading to financial barriers and access disparities for lower-income populations [53-56], while BPJS simplified administration reduces costs and healthcare inequities compared to private models with more complex billing systems [57,58]. Additionally, the cultural emphasis on community support in Indonesia may not translate similarly to more individualistic societies. Socioeconomic factors, such as differences in healthcare access and economic disparities, could further affect the applicability of the findings. Therefore, caution is advised when applying these results to populations with different healthcare systems, cultures, or socioeconomic conditions. Other potential influences on health behavior, such as healthcare accessibility and individual health status, were not examined. Furthermore, the mediation analysis only explored direct and indirect relationships, leaving out other possible mediating or moderating variables. Addressing these limitations in future research would enhance the robustness and applicability of the findings. Future research should explore more diverse populations and healthcare settings to further refine health promotion strategies. Additionally, further studies could examine the impact of specific self-efficacy interventions and evaluate their long-term effects on health behavior.

Conclusion

This study highlights the critical role of health promotion in enhancing service utilization among BPJS health participants, with both direct and indirect impacts through perception. Effective health promotion strategies that enhance self-efficacy can lead to improved health behaviors, demonstrating the need for tailored interventions that address specific population needs. Perception influences service utilization both directly and through self-efficacy but does not mediate the relationship between outcome expectations and service utilization. Social support significantly affects service utilization directly and also shapes outcome expectations both directly and through perception. While self-efficacy does not mediate the relationship between outcome expectations and service utilization, it remains a critical factor in health behaviors. Future research should focus on how health promotion strategies can be tailored to specific groups or regions to account for cultural, socioeconomic, and demographic factors that may influence their effectiveness. Additionally, further exploration of the role of social support in healthcare settings, particularly how it interacts with other psychosocial factors like self-efficacy and perception, is needed to improve intervention design. For policymakers and healthcare providers, it is essential to apply these findings in practice by developing targeted health promotion campaigns that enhance self-efficacy and leverage social support networks. Interventions should be culturally sensitive and tailored to meet the unique needs of different population groups, with a focus on improving health behaviors and service utilization. By prioritizing these strategies, stakeholders can contribute to better health outcomes and more efficient healthcare delivery.

Ethics approval

The ethical approval was granted by the Health Research Ethics Committee of the Prof. Dr. Margono Soekarjo Hospital Number (Approval #420/22605). The respondents provided written informed consent for participation in the survey. This research was conducted ethically in accordance with the World Medical Association Declaration of Helsinki.

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Competing interests

The authors declare no conflicts of interest.

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Underlying data

Data generated or analyzed during this study are in the appendix file, which has been uploaded to Figshare. You can access it using the following link: https://doi.org/10.6084/m9.figshare.27898578.v2. Please contact the corresponding author if you require further details or additional information.

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