The effect of consumers’ perception to the satisfaction of use of traditional medicines in Medan

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Abstract. Consumption of chemical medicines fluctuated in 2009-2014, whereas the consumption of solid traditional medicine increased in 2009-2014. The purpose of this study is to analyse the influence of consumers’s perception on the consumption of traditional medicinal plants. The data was analysed by using a binomial logit regression analysis. It is found that the consumers’s perceptions affect customer satisfaction simultaneously are the health benefits variable, quality of traditional medicine variable, price of traditional medicine and available product; the health benefits variable and quality of traditional medicine variable partially have significant effects to customers’s satisfaction simultaneously satisfaction partially; the health benefit variable and quality of traditional medicine is found to have a marginal effect of 7% and 4%, respectively.

1. Introduction
Indonesia has the fourth largest population in the world after the People's Republic of China, India and USA. The population of Indonesia according to BPS is 255,993,674 people. A large number of residents resulted in the need for medicines Indonesia continues to increase from year to year. 90% of Indonesian medicine needs is produced domestically, and 10% is obtained from imports. Knowledge and increasing income also leads to better public awareness of well-being. This causes increasing demands for medicines. Thus drug prices in Indonesia are still relatively expensive. Modern health services have grown in Indonesia, but the number of people using traditional medicine remains high.

The use of traditional medicines is also increasing because it has become a substitute for chemical drugs considering the side effects caused by chemical drugs. This increase in traditional medicine also follows the global trend of "back to nature". The tendency to return to nature shows rapid growth, including in Indonesia.

Traditional medicine has remained as the most affordable and easily accessible source of treatment in the primary health care system of resource poor communities. The local people have a long history of traditional plant usage for medicinal purposes. The medicinal use of plants is very old. The writings indicate that therapeutic use of plants is as old as 4000 - 5000 B.C. and Chinese used first the natural herbal preparations as medicines.[6]

Medicinal plants have played an essential role in the development of human culture. Medicinal plants are resources of traditional medicines and many of the modern medicines are produced indirectly from plants. It has been confirmed by WHO that herbal medicines serve the health needs of about 80 percent of the world’s population; especially for millions of people in the vast rural areas of developing countries. Meanwhile, consumers in developed countries are becoming disillusioned with modern health care and are seeking alternatives[7]

Modern health services have grown rapidly in Indonesia, but the number of people using traditional medicine remains high. According to Susenas (2001), 31.7% of Indonesians use traditional medicine and 9.8% seek treatment in a traditional way to overcome their health problems [8]
Indonesian have known about traditional medicinal plants for a long time; besides, they also have used the medicinal plants as one of the efforts in solving health problems. The use of medicinal plants is partly based on their experiences and skills which are forwarded from generation to generation[5].

The data of traditional medicine profile in Province of North Sumatra shows that there are 2629 traditional medicines using medicinal plants, derived from self-made medicinal plants and traditional Indonesian medicines. The data include the city of Medan which has 739 people of its population using traditional medicine [3] Based on the fact, a study to determine the cause of traditional medicine consumption in needed. The purpose of this study is to analyse the influence of consumers’s perception on the consumption of traditional medicinal plants

2. Methods

2.1 Method of Determining The Research Area
The location of the research is determined purposively in Medan. According to Minister of Health are the people of Medan mostly use traditional medicinal plants compared to 7 cities and 25 other districts in North Sumatera. This is very contradictory when it is viewed from the activities of the city community which is much busier than other cities and districts. How the perception of traditional medicinal plants consumers affects the use of this traditional medicines and what other factors affect consumers are the question that need to be investigated more deeply.

Purposive sampling was used in determining the sample in this research, which were the consumers of traditional medicine. Sample size is determined based on [1] formula:

\[
n = \frac{Z^2 \cdot \frac{a}{2}}{E^2}
\]

(1)

\[
n = \frac{1.96^2}{0.20^2}
\]

n = 96 respondents

The effect of consumers’s perception to the satisfaction of use of traditional medicines in Medan analyzed by logistic regression model specified as follow :

\[
\ln \left( \frac{p}{1-p} \right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5
\]

(2)

where :\(\ln \left( \frac{p}{1-p} \right)\) is odd ratio where (p) explain the predicted probability of consumers are satisfaction of consume traditional medicine which is coded with 1 (interest), (1-p) is the predicted probability of the consumers are not satisfaction of consume traditional medicine which is coded with 0 (not interest).

\(\beta_0\) = Intercept
\(\beta_1\) = Coefficient of health benefits
\(\beta_2\) = Coefficient of quality
\(\beta_3\) = Coeffecient of price
\(\beta_4\) = Coeffecient of product availability
\(X_1\) = Health benefits
\(X_2\) = Quality
\(X_3\) = Price
\(X_4\) = Product availability

2.2 Parameter Testing

2.2.1 Concurrent Testing. It is performed to know the significance of \(\beta\) parameters as a whole or simultaneously. This recitation hypothesis is:

\[H_0: \beta_0 = \beta_1 = \cdots = \beta_p = 0\]. With rejection: reject \(H_0\) if value \(G > X^2_{(\alpha,1)}\) Where \(p\) is the number of statistical variables in the model or \(p\)- value < \(\alpha\).

a. Individual Test (Wald Test)
It is intended to examine the significance of individual \(\beta\) parameters. This recitation hypothesis is:

\[H_0: \beta_j = 0, \quad H_1: \beta_j \neq 0, \quad j = 1, 2, \ldots, p\]

With statistical tests:
W (Wald) = \frac{\beta_j}{S.E (\beta_j)}

Denial area : reject $H_0$ if $W^2_j > X^2_{a,1}$ atau p-value < $\alpha$

2.2.2 *Hosmer and Lemeshow Test*. This test aims to compare the distribution of observation with the distribution of theory (model test). Criteria Test:
If sign < 0.1 then accept $H_1$ reject $H_0$
If sign > then accept $H_0$ reject $H_1$ [2].

2.2.3 *Odd Ratio and calculation of marginal effect*. Odds ratio is the probability of results obtained by individuals with $x = 1$ defined $\pi (1)/[1 - \pi (1)]$. Similarly, the likelihood of results being present between individuals with $x = 0$ defined as $\pi (0)/[1 - \pi (0)]$. *Odds Ratio*Which is denoted by OR, Defined as the opportunity ratio for $x = 1$ And opportunities for $x = 0$. Which can be written in the following equation:

$$\frac{\pi (1)/[1 - \pi (1)]}{\pi (0)/[1 - \pi (0)]}$$

Marginal Effect can be calculated by using the equation below:

$$P_i = \frac{e^{\beta_i x_i}}{1 + e^{\beta_i x_i}} = (1 + e^{-c\beta_i X_i})^{-1}$$

$$dp_i = \frac{dx_i}{(1 + e^{-c\beta_i X_i})^{-1}} = -1(1 + e^{-c\beta_i X_i})^{-2}(1 + e^{-c\beta_i X_i})^{-1}$$

$$= \frac{1}{(1 + e^{-c\beta_i X_i})^2} (0 + e^{-c\beta_i X_i} \beta_i)$$

$$= \frac{1}{1 + e^{-c\beta_i X_i}} (1 - p_i)$$

$$= \beta_i \hat{p}_i (1 - \hat{p}_i)$$

3. Result and Discussion
The influence of perception factors on customer satisfaction can be seen in table 1.

**Table 1. Panel Regression Result**

| Variable          | B    | S.E. | Wald | Sig. | Exp(B) |
|-------------------|------|------|------|------|--------|
| Health Benefit    | 0.298| 0.143| 4.35 | 0.037| 1.348  |
| Quality           | 0.171| 0.076| 5.090| 0.024| 1.187  |
| Price             | 0.133| 0.160| 0.694| 0.405| 1.142  |
| Product availability | 0.026| 0.173| 0.023| 0.879| 1.027  |
| Constant          | 10.32| 2.28 | 20.42| 0.000| 0.000  |

The estimated model can be write is:

$$\ln \frac{\hat{p}}{1 - \hat{p}} = 0.00 + 1.348X_1 + 1.187X_2 + 1.142X_3 + 1.027X_4$$

Interpretation of result in logistic regression model

3.1 *Wald Test*
Table 1 show that health and quality benefits influence the satisfaction of consumers of traditional medicinal plants partially. Where this is explained by the significance of the results obtained in each variable health benefits 0.037 and quality 0.024 with $\alpha$ amount 0.05. Price factor and product availability do not influence the satisfaction of consumer of traditional medicinal plants partially,
where this is explained by the value of significance obtained are the price 0.405 and product availability 0.879 with \( \alpha \) amount 0.05.

3.2 Omnibus and Hosmer–Lemeshow Test

**Table 2. Omnibus and Hosmer&Lemeshow Consumer Perception Variables**

| Test       | Omnibus | Hosmer & Lemeshow |
|------------|---------|-------------------|
| Chi Square | 46.548  | 8.505             |
| Sig        | 0.00    | 0.386             |

Table 2 gave the result which indicated whether the inclusion of variables contributed significantly to model fit. A p-value (sig) of less than 0.05. The null hypothesis was rejected. Therefore, the model is statistically significant.

The test results explain that there is no difference in the distribution of observation with the distribution of theory/model in accordance with the data held. Where this is explained by the value of significance obtained is equal to 0.386 with \( \alpha \) amount 0.05 which means that was not statistically significant and therefore the model was quite a good fit.

3.3 Interpretation of Category Variables Exp (B)

The \( \text{Exp (B)} \) in the Table 1 presented the extent to which raising the corresponding measure by one unit influences the odds ratio. To find the value of the odd ratio using the marginal formula can be write is:

\[
\text{Exp (B)} = e^{B_i x_i} \]

\[
P_i = \frac{e^{B_i x_i}}{1 + e^{B_i x_i}}
\]

\[
P_i = \frac{1.348}{9.652,348}
\]

\[
P_i = 0.057
\]

\[
C_i = \beta P_i (1 - P_i)
\]

\[
C_i = (0.298)(0.57)(1-0.57)
\]

\[
C_i = 0.07
\]

The odd ratio of health benefit has a value 0.07. The model predicts that the odds of perception to satisfaction consume traditional medicines are 7% it can be explained that the benefits obtained are not proportional to the time spent to cure or increase the metabolism of a user using traditional medicinal plants.

The odd ratio of quality has a value 0.04. The model predicts that the odds of perception to satisfaction consume traditional medicines are 4% Phenomenon that occur to the field are the taste, the smell, color and cleanliness get the lowest score from consumers. This can be explained because the smell, taste, color and hygiene of traditional medicinal plants are in homogeneous colors and can’t be brighter after processing from traditional medicinal plants, the sense that consumers are expected can not be fulfilled, because the majority of the flavor generated by traditional medicinal plants is not delicious or bitter, the resulted smell stimulates the sensory nerves to refuse to consume the processing of traditional medicinal plants because in general the consumers have sensitive to the stinging smell and cleanliness that lacks standards while consumer tastes are heterogeneous meaning this will reduce the chances of consumers to be satisfied.

The odd ratio of price has a value 0.03. The model predicts that the odds of perception to satisfaction consume traditional medicines are 3%. The phenomenon that occurs in the field is the price is not a major factor in determining the consumption of a health product so that the more variable price, the smaller of the influence on customer satisfaction opportunities.

The odd ratio of product availability has a value 0.006. The model predicts that the odds of perception to satisfaction consume traditional medicines are 0.6%. The phenomenon that occurs to
the field explains that the availability of traditional medicinal plants is sufficient, but there are several
types of herbs from traditional medicinal plants that should be combined as traditional medicine with
other traditional medicinal plants located in separate or different locations and have a long distance
and some locations are difficult to be taken so as the result, the efforts to obtain the entire medicinal
plant is low.

4. Conclusion and Recommendation
Based on the results of research conducted, it can be concluded that health benefits variable, quality,
price and product availability have significant influence simultaneously to satisfaction of consumer of
traditional medicine in Medan. Partially, health benefit and quality have significant effect on
satisfaction of consumer of traditional medicine. The health and quality variables have a marginal
effect of 7% and 4% on the satisfaction of consumers of traditional medicine.

Therefore, the researchers should increase investigation of variation of types of traditional
medicine which has a good taste, practical and has a high quality. Then, provide education to
consumers about the utility and how to use traditional medicine.

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