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## LEVEL OF KNOWLEDGE AND THE UTILIZATION OF PLANTS AS MEDICINE IN PRODUCTIVE AGE

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DOI: <https://doi.org/10.32553/ijmbs.v5i7.2004>

KEYWORDS: knowledge, age, education, economic status

PDF

**MAKE A SUBMISSION**

International Journal of Medical and Biomedical Studies



ISSN(Print): 2589-8698  
ISSN(Online): 2589-868X  
Volume 5 Issue 7

International Journal of Medical and Biomedical Studies



ISSN(online): 2589-8698  
ISSN(print): 2589-868X  
E-mail: [editor@ijmbs.info](mailto:editor@ijmbs.info)

4:15 PM 8/2/2021



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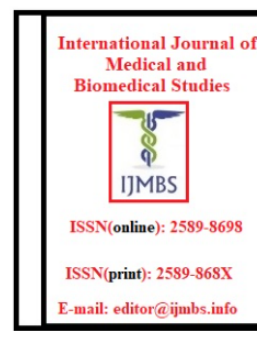
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**Article Info:** Received 08 June 2021; Accepted 22 July 2021

**DOI:** <https://doi.org/10.32553/ijmbs.v5i7.2004>

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**Conflict of interest:** No conflict of interest.

### Abstract

**Background:** Knowledge on the benefit of medicinal plants is commonly generated from experiences passed down generations. The objective of this research is to analyze the factors related with the utilization of plants as medicine.

**Method:** This research is an analytic observational research with a cross sectional design that involves 79 subjects. Furthermore, this study was conducted in October 2020 and data were collected through guided interviews and filling out questionnaires for socio-demographic data, level of knowledge and its utilization. Also, sampling was done by consecutive non-random sampling, and data analysis used SPSS V.25, Chi-square statistical tests with a significance level of 0.05.

**Results:** Out of 79 subjects we discover that the average age level of the subjects are  $40.02 \pm 10.12$  years old, dominated by females, housewives, Javanese, and with income level of below regional minimum wage. Research result shows that 72.1% of respondents possess decent level of knowledge and the level of medicinal plant utilization is at 67.1%. Based on Chi Square test, there is a significant relationship between level of knowledge and the utilization of plants as medicine ( $p=0.019$ ). Meanwhile sex, level of education, and economic level possess insignificant relationship with the utilization of plants as medicine.

**Conclusion:** The level of knowledge possesses significant relationship with the utilization of plants as medicine.

**Keywords :** knowledge, age, education, economic status

### Introduction

Traditional medicine is a blend of natural ingredients that consists of materials obtained from plants, animals, essence (gelanic) or mixtures of these materials used through generations as medicine, which can be adjusted with the requirements in the society.<sup>[1]</sup> Indonesia is a country rich with natural resources; the estimated number of plants in Indonesia is at least at 30,000 varieties and 7,000 of them can be used as medicinal materials for medications.<sup>[2]</sup>

According to a data released by basic health research in 2018, the prevalence of familial medicinal plants on the society of all levels in Jakarta is at 9.1%.<sup>[3]</sup> Herbal medicine is a potion that consists of various types of medicinal plants which are also known to possess efficacy and ability to cure a number of different diseases.<sup>[1]</sup> Herbal medicine known to have smaller side effects than chemical medicine so it is safe to be used to cure diseases without causing negative effects on healthy body parts. Herbal medicine relieves the pain, although it needs a relatively longer time. However, it is safe to be used on a longer period of time.<sup>[4,5]</sup>

The discovery and research of new drugs in the field of health and medicine continues to develop, so that more and more new types of drugs, both synthetic drugs and phyto-pharmacy, are derived from natural medicines that have been subjected to clinical trials, and have proven their

efficacy, benefits and safety. The discoveries of synthetic or chemical medicines have lowered the trust level in the society on the benefit of herbal medicine. There are several factors that cause the lowered trust level of medicinal plants namely the disconnection of knowledge on the benefits and contents of medicinal plants, owned by the ancestors of the Indonesian nation.<sup>[6]</sup>

A number of studies have concluded several factors that are connected with the utilization of plants as medicine. According to a study conducted by Oktarlina ZR<sup>[7]</sup> and Emilda<sup>[8]</sup> the knowledge and age level are unrelated with medicinal plants utilization. Similarly, another study concluded that educational, age, and economic status factors is related with the utilization of medicinal plants, meanwhile family size and religion factors are unrelated with the utilization of traditional medicine.<sup>[9,10]</sup> There are several factors that can drive a person to utilize traditional medicine, one of which is the level of knowledge on the traditional medicine itself. The level of knowledge of a person is affected by several factors namely age, sex, educational level, income level, information exposure, consultation with health workers, and socio-cultural factor.<sup>[11]</sup>

The data above shows that there are a number of factors related with the utilization of plants as medicine. On the

other hand, with the existence of pros and cons on the utilization of plants as medicine, we are interested to conduct a research to analyze the factors related with the utilization of plants as medicine.

## Method

### 2.1 Research Design

This research utilizes observational analytic method with a Cross-sectional research design, conducted in Cipinang Lontar sub-district in East Jakarta on October 2020.

### 2.2 Research Subject

79 subjects were involved in this research. Samples are taken with a consecutive non random sampling technique. The inclusion criteria in this research are male and female of 18-54 years old, able to communicate decently and willing to fill inform consent. The measurement of sample was conducted by using the following formula.

$$no = \frac{Z\alpha^2 \times p \times q}{d^2}$$

The prevalence of the utilization of herbal medicine on the society is at 95% with accuracy level of 0.05. That is why the required sample is 127 subjects. The number of citizen that fulfills inclusion criteria in RT 011 area of Cipinang Lontar sub-district is 150 people with drop-out level of 15%. Based on this, the number of sample needed in this research is 79 subjects.

### 2.3 Data Collection and data analysis

The required data were collected with interview and questionnaire to reveal the demographic characteristics (age, sex, education, occupation, race, and income levels) of the subjects. To measure knowledge level of medicinal plants, we posed 20 questions, and of every question we will categorize the level of knowledge into decent and less

decent levels with scores of  $\geq 80$  and  $< 80$ . The level of medicinal plants utilization was measured by 10 right or wrong questions, with a score of 5 for every correct answer and a score of 2 for every wrong answer. Medicinal plants utilization is categorized as high when the score is at  $\geq 40$  and low when the score is at  $< 40$ . Descriptively, the data is presented on percentages. Chi-Square test is utilized to analyze the relationship of the level of knowledge with medicinal plants utilization. Significance level used in this research is at 0.05. Statistical test was conducted on SPSS version 25. The research protocol has obtained ethics review from Ethical Committee of Faculty of Medicine with review No. 13/KER-FK/10/2020.

### Results

Based on the socio-demographic data, it shows that 60 out of 79 subjects have history of medicinal plants utilization, with a utilization prevalence level of 75.94 % with the average age level of  $40.02 \pm 10.12$  years old. From 79 subjects, 32 (40.5%) of them were included in the early elderly category. The occupation of subjects are dominated by housewives with 53 persons (67.1%), with 11 of the subjects being other occupation entrepreneurs (13.9%), 9 subjects being jobless (11.4%), and 6 of the subjects are employees (7.6%). Based on races data, 36 (45.6 %) Javenese, 25 (31.6%), Sundanese, 9 (11.4 %), Minang and 9 (11.4%) Betawi.

Based on their sex, 58 people (73.4%) of them are females. The research result viewed from educational level, most of the subjects (56 person or 70.9%) possesses high educational background, and the subjects are dominated by income level of 77.2% below regional minimum wage level. Based on their level of knowledge on medicinal plants, it was revealed that subjects with decent and less knowledge of medicinal plants are at 31.6%, and subjects with high medicinal plants level of knowledge is at 67.1 % (Table 1).

**Table 1: Characteristics of Research Subjects (n = 79)**

Characteristics	Total (n)	Percentage (%)
<b>Sex</b>		
Males	21	26,6
Females	58	73,4
<b>Education Level</b>		
Low	23	29,1
High	56	70,9
<b>Monthly Income</b>		
Over minimum wage	18	22,8
Below minimum wage	61	77,2
<b>Level of knowledge</b>		
Decent	68	86,1
Less decent	11	13,9
<b>Level utilization</b>		
Low	26	32,9
High	53	67,1

Based on Chi-Square test, it was revealed that there is a significant relationship between level of knowledge and medicinal plants utilization level with p value of 0.019. Chi-Square test shows that the relationship between sex, educational level, and economic level with medicinal plants utilization level is insignificant with respectively p values of 0.094, 0.764, and 0.539 (Table 2).

**Table 2: Relationship between Level of Knowledge, Utilization Level, Educational Level and Economic Level on Medicinal Plants Utilization**

Variables	Medicinal Plants Utilization Levels			P value
	High n (%)	Low n (%)	Total n (%)	
<b>Level of Knowledge</b>				
Decent	49 (72,1)	19 (27,9)	68(100)	0,019*
Less Decent	4 (36,4)	7 (63,6)	11(100)	
<b>Sex</b>				
Males	11 (52,3)	10 (47,7)	21(100)	0,094
Females	42 (72,4)	16 (27,6)	58(100)	
<b>Education Level</b>				
Low	16 (69,5)	7 (30,5)	23(100)	0,764
High	37 (66,1)	19 (33,9)	56(100)	
<b>Monthly Income</b>				
Over Minimum Wage	11 (61,1)	7 (38,9)	18(100)	0,539
Below Minimum Wage	42 (68,9)	19 (31,1)	61(100)	

\*p<0,05

## Discussion

The utilization of plants as medicine which is known as traditional medicine (TM) has been practiced since a long time ago by the society. The prevalence of TM utilization in this study is at 75.94%. This prevalence level is not that different with previous study that produced utilization prevalence of 70.9%.<sup>[10]</sup> However, this prevalence level is lower than another study conducted on Ethiopia which is at 80%<sup>[12]</sup> and Saudi Arabia which is at 93.7%.<sup>[13]</sup> The result is possibly influenced by cultural and behavior patterns of TM utilizations, also the different situations of these areas that possess different types of vegetation. The high level of prevalence is indicated because the benefit of TM is not only felt by the society, but also driven by the government that pushes the utilization of TM to maintain health levels, treatment for illness, and to reduce health complaints felt by the patients. Based on a data released by Indonesian Ministry of Commerce, there are 15 types of plants that are commonly used in the society namely galangal, turmeric, ginger, kencur, curcuma, lempuyang cardamom, the god's crown, noni, aloe vera, temuireng, temukunci, kejobeling, and sambiloto as TM.<sup>[14]</sup>

Based on the subjects' characteristics, the majority of the subjects are early elderly with decent level of knowledge and high TM utilization level. The consumption of TM by elders is relatively higher because TM are known to be used as alternative or complementary medications on therapies for a number of degenerative diseases experienced by elders<sup>[13]</sup>. Medicinal plants are commonly used on hypertension, diabetic, diarrhea, cough, constipation, and digestive disorders.<sup>[5,15,16]</sup> Based on occupational and racial categories, most of the respondents are housewives, Javanese, which possess decent knowledge and high utilization levels. This result is indicated because females

spend more times at home than males supported by their educational level which are mostly at high school level, it is easier for them to search and understand information about the utilization from various sources. Besides that, with the abundant amount of time, housewives are tend to socialize more in their neighborhood which makes it easier for them to obtain more information about medicinal plants. Indonesia possesses various customs and cultures. Different locations of society will leads to the utilization of different type of plants, plant cultivation status, used parts, and the way they utilize the plants. The situation is highly related with the availability of medicinal plants in the area and the knowledge possessed by the society.<sup>[17]</sup>

In this study, we revealed that the level of knowledge to utilize herbal medicine is at decent level. The decent level of knowledge is reflected by the decent knowledge of type, benefit and the way to utilize the plants in relations with TM production. The utilization of TM is passed through generations by each family. These medicinal plants are commonly sourced from private plantation on their houses to make it easier for them to utilize it when needed. Knowledge level regarding physicality of these plants for example shapes, colors, and tastes or parts of plants that can be utilized as medicine affect the frequency of the utilization of the plants as TM. There are several types of plants that are commonly cultivated by the society because of its relatively easy and efficient cultivation and maintenance.<sup>[18, 19, 20]</sup>

High medicinal plants utilization level is evident in this research. This result is similar as the ones obtained by previous research.<sup>[21]</sup> Most of the respondents obtain their plants from private plantations around their houses which are built based on their knowledge on medicinal plants, parts that can be utilized as medicine such as stems, leaves,

seeds, flowers, saps, rhizome, roots, and the way to utilize these parts to produce medicine to maintain health and cure diseases. Different as a study conducted by Rosmanita<sup>[22]</sup>, which concluded that the society has lack knowledge of medicinal plants on health caused by less utilization frequency of medicinal plants to treat diseases.

The result of research data analysis shows that there is a significant relationship between knowledge level and utilization level of plants as medicine. Knowledge is shaped through trial and error that transforms into experience of the society which creates local wisdom and cultural richness of types of plants that can be utilized on medication activities.<sup>[19]</sup> A slightly similar result was also obtained from previous research, which concluded that there is a significant relationship between knowledge and the utilization of TM. Knowledge is one of the positive predisposition factors on medicinal plants such as less side effects, cheaper prices, safer, more practical, highly available around housings, and high benefits on health are driving people to utilize medicinal plants more.<sup>[7,8]</sup> Differently with the other research<sup>[20]</sup> which concluded that there is no significant relationship between knowledge level and medicinal plants utilization. This result was indicated because herbal medicine is not optimally utilized and minimum level of knowledge on medicinal plants that drive families to choose formal health facilities more. Besides knowledge on plants characteristics, parts of plants that can be used as medicine, and the processing knowledge such as dried, pounded, boiled, and other processing ways influence the utilization of medicinal plants as both internal or external cures.<sup>[15]</sup> Leaf is the most frequent part of medicinal plants utilized on medications than any other parts. Leaf, which is the main photosynthetic part of a plant, is considered to contain more active materials that can be utilized as medicine.<sup>[23]</sup>

Our research reveals that there is no significant relationship between sex and medicinal plants utilization. Females and males both have different medicinal experiences on their daily lives. Other factors that might influence TM utilization are races, experiences, family behaviors, and living locations/areas.<sup>[24]</sup> However, this result is different than the ones obtained by Kristina<sup>[25]</sup> which concluded that sex has a relationship with the utilization of TM. This result is indicated because females are more involved in traditional medication, both to cure their own self and to cure their relatives.

Educational level is not significantly related with the utilization of medicinal plants. This result is similar as the ones indicated in the previous study<sup>[9]</sup> which concluded that age and educational level is not related with the utilization of medicinal plants. This result is indicated because the higher the educational level, the less the driving factor to utilize medicinal plants. Educational level influence a person's ability to access and digest information related with health which forms their behavioral pattern on practicing necessary preventive or curative activities to

support their health.<sup>[26]</sup> The higher the level of education, the person tends to believe more in rational and objective thoughts in consuming modern medicines that have been clinically tested compared to the use of medicinal plants.<sup>[7,27]</sup> A person with high educational level will become more critical on information processing, meanwhile a person with lower educational level will tend to embrace information without confirming its validity. With higher educational level, it is expected for a person to obtain more accurate insights.<sup>[28]</sup>

Our research shows that economic level has no significant relationship with the utilization of medicinal plants. This is different with another study which reveals that economic level of a family will have significant effect on the utilization of medicinal plants. Different with previous study, they concluded that economic level of a family will influence its medicinal behavior. The higher the economic status of a person, the easier it is become for them to access and utilizes rational educational at a maximum level. Different with families with lower economic statuses which has limited funds to be allocated on their health and tend to choose TM as their primary medicinal decision based on its cheaper prices.<sup>[27, 29]</sup>

In this research, there are a number of important limitation factors such as socio-cultural, religion/beliefs, available health facilities and health workers, and reliable information regarding TM utilization that needs to be considered.

### Conclusion

Based on this research, we can conclude that level of knowledge has a significant relationship with the utilization level of medicinal plants as cures.

### Acknowledgment

We would like to thank head of RT 11 in Cipinang Lontar area and every research subjects that have participated in this research.

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*by Meiyanti Meiyanti*

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**Submission date:** 01-Sep-2021 09:06AM (UTC+0700)

**Submission ID:** 1639200390

**File name:** 2004-Article\_Text-3251-1-10-20210802\_IJMBS\_Tiara\_Meiyanti\_1.pdf (633.27K)

**Word count:** 3864

**Character count:** 20809

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**Article Info:** Received 08 June 2021; Accepted 22 July 2021

**DOI:** <https://doi.org/10.32553/ijmbs.v5i7.2004>

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**Background:** Knowledge on the benefit of medicinal plants is commonly generated from experiences passed down generations. The objective of this research is to analyze the factors related with the utilization of plants as medicine.

**Method:** This research is an analytic observational research with a cross sectional design that involves 79 subjects. Furthermore, this study was conducted in October 2020 and data were collected through guided interviews and filling out questionnaires for socio-demographic data, level of knowledge and its utilization. Also, sampling was done by consecutive non-random sampling, and data analysis used SPSS V.25. Chi-square statistical tests with a significance level of 0.05.

**Results:** Out of 79 subjects we discover that the average age level of the subjects are  $40.02 \pm 10.12$  years old, dominated by females, housewives, Javanese, and with income level of below regional minimum wage. Research result shows that 72.1% of respondents possess decent level of knowledge and the level of medicinal plant utilization is at 67.1%. Based on Chi Square test, there is a significant relationship between level of knowledge and the utilization of plants as medicine ( $p=0.019$ ). Meanwhile sex, level of education, and economic level possess insignificant relationship with the utilization of plants as medicine.

**Conclusion:** The level of knowledge possesses significant relationship with the utilization of plants as medicine,

**Keywords:** knowledge, age, education, economic status

### Introduction

Traditional medicine is a blend of natural ingredients that consists of materials obtained from plants, animals, essence (gelanic) or mixtures of these materials used through generations as medicine, which can be adjusted with the requirements in the society.<sup>[1]</sup> Indonesia is a country rich with natural resources; the estimated number of plants in Indonesia is at least at 30,000 varieties and 7,000 of them can be used as medicinal materials & medications.<sup>[2]</sup> According to a data released by basic health research in 2018, the prevalence of familial medicinal plants on the society of all levels in Jakarta is at 9.1%.<sup>[3]</sup> Herbal medicine is a potion that consists of various types of medicinal plants which are also known to possess efficacy and ability to cure a number of different diseases.<sup>[1]</sup> Herbal medicine known to have smaller side effects than chemical medicine so it is safe to be used to cure diseases without causing negative effects on healthy body parts. Herbal medicine relieves the pain, although it needs a relatively longer time. However, it is safe to be used on a longer period of time.<sup>[4,5]</sup>

The discovery and research of new drugs in the field of health and medicine continues to develop, so that more and more new types of drugs, both synthetic drugs and phyto-pharmacy, are derived from natural medicines that have been subjected to clinical trials, and have proven their

efficacy, benefits and safety. The discoveries of synthetic or chemical medicines have lowered the trust level in the society on the benefit of herbal medicine.<sup>[5]</sup> There are several factors that cause the lowered trust level of medicinal plants namely the disconnection of knowledge on the benefits and contents of medicinal plants, owned by the ancestors of the Indonesian nation.<sup>[6]</sup>

A number of studies have concluded several factors that are connected with the utilization of plants as medicine. According to a study conducted by Oktarlina ZR<sup>[7]</sup> and Emilda<sup>[8]</sup> the knowledge and age level are unrelated with medicinal plants utilization. Similarly, another study concluded that educational, age, and economic status factors is related with the utilization of medicinal plants, meanwhile family size and religion factors are unrelated with the utilization of traditional medicine.<sup>[9,10]</sup> There are several factors that can drive a person to utilize traditional medicine, one of which is the level of knowledge on the traditional medicine itself. The level of knowledge of a person is affected by several factors namely age, sex, educational level, income level, information exposure, consultation with health workers, and socio-cultural factor.<sup>[11]</sup>

The data above shows that there are a number of factors related with the utilization of plants as medicine. On the

other hand, with the existence of pros and cons on the utilization of plants as medicine, we are interested to conduct a research to analyze the factors related with the utilization of plants as medicine.

## Method

### 2.1 Research Design

This research utilizes observational analytic method with a Cross-sectional research design, conducted in Cipinang Lontar sub-district in East Jakarta on October 2020.

### 2.2 Research Subject

79 subjects were involved in this research. Samples are taken with a consecutive non random sampling technique. The inclusion criteria in this research are male and female of 18-54 years old, able to communicate decently and willing to fill inform consent. The measurement of sample was conducted by using the following formula.

$$no = \frac{Z\alpha^2 \times p \times q}{d^2}$$

The prevalence of the utilization of herbal medicine on the society is at 95% with accuracy level of 0.05. That is why the required sample is 127 subjects. The number of citizen that fulfills inclusion criteria in RT 011 area of Cipinang Lontar sub-district is 150 people with drop-out level of 15%. Based on this, the number of sample needed in this research is 79 subjects.

### 2.3 Data Collection and data analysis

The required data were collected with interview and questionnaire to reveal the demographic characteristics (age, sex, education, occupation, race, and income levels) of the subjects. To measure knowledge level of medicinal plants, we posed 20 questions, and of every question we will categorize the level of knowledge into decent and less

decent levels with scores of  $\geq 80$  and  $< 80$ . The level of medicinal plants utilization was measured by 10 right or wrong questions, with a score of 5 for every correct answer and a score of 2 for every wrong answer. Medicinal plants utilization is categorized as high when the score is at  $\geq 40$  and low when the score is at  $< 40$ . Descriptively, the data is presented on percentages. Chi-Square test is utilized to analyze the relationship of the level of knowledge with medicinal plants utilization. Significance level used in this research is at 0.05. Statistical test was conducted on SPSS version 25. The research protocol has obtained ethics review from Ethical Committee of Faculty of Medicine with review No. 13/KER-FK/10/2020.

## Results

Based on the socio-demographic data, it shows that 60 out of 79 subjects have history of medicinal plants utilization, with a utilization prevalence level of 75.94 % with the average age level of  $40.02 \pm 10.12$  years old. From 79 subjects, 32 (40.5%) of them were included in the early elderly category. The occupation of subjects are dominated by housewives with 53 persons (67.1%), with 11 of the subjects being other occupation entrepreneurs (13.9%), 9 subjects being jobless (11.4%), and 6 of the subjects are employees (7.6%). Based on races data, 36 (45.6 %) Javeneese, 25 (31.6%), Sundanese, 9 (11.4 %) , Minang and 9 (11.4%) Betawi.

Based on their sex, 58 people (73.4%) of them are females. The research result viewed from educational level, most of the subjects (56 person or 70.9%) possesses high educational background, and the subjects are dominated by income level of 77.2% below regional minimum wage level. Based on their level of knowledge on medicinal plants, it was revealed that subjects with decent and less knowledge of medicinal plants are at 31.6%, and subjects with high medicinal plants level of knowledge is at 67.1 % (Table 1).

Table 1: Characteristics of Research Subjects (n = 79)

Characteristics	Total (n)	Percentage (%)
<b>Sex</b>		
Males	21	26,6
Females	58	73,4
<b>Education Level</b>		
Low	23	29,1
High	56	70,9
<b>Monthly Income</b>		
Over minimum wage	18	22,8
Below minimum wage	61	77,2
<b>Level of knowledge</b>		
Decent	68	86,1
Less decent	11	13,9
<b>Level utilization</b>		
Low	26	32,9
High	53	67,1

Based on Chi-Square test, it was revealed that there is a significant relationship between level of knowledge and medicinal plants utilization level with p value of 0.019. Chi-Square test shows that the relationship between sex, educational level, and economic level with medicinal plants utilization level is insignificant with respectively p values of 0.094, 0.764, and 0.539 (Table 2).

**Table 2: Relationship between Level of Knowledge, Utilization Level, Educational Level and Economic Level on Medicinal Plants Utilization**

Variables	Medicinal Plants Utilization Levels			P value
	High n (%)	Low n (%)	Total n (%)	
<b>Level of Knowledge</b>				
Decent	49 (72,1)	19 (27,9)	68(100)	0,019*
Less Decent	4 (36,4)	7 (63,6)	11(100)	
<b>Sex</b>				
Males	11 (52,3)	10 (47,7)	21(100)	0,094
Females	42 (72,4)	16 (27,6)	58(100)	
<b>Education Level</b>				
Low	16 (69,5)	7 (30,5)	23(100)	0,764
High	37 (66,1)	19 (33,9)	56(100)	
<b>Monthly Income</b>				
Over Minimum Wage	11 (61,1)	7 (38,9)	18(100)	0,539
Below Minimum Wage	42 (68,9)	19 (31,1)	61(100)	

\*p<0,05

## Discussion

The utilization of plants as medicine which is known as traditional medicine (TM) has been practiced since a long time ago by the society. The prevalence of TM utilization in this study is at 75.94%. This prevalence level is not that different with previous study that produced utilization prevalence of 70.9%.<sup>[10]</sup> However, this prevalence level is lower than another study conducted on Ethiopia which is at 80%<sup>[12]</sup> and Saudi Arabia which is at 93.7%.<sup>[13]</sup> The result is possibly influenced by cultural and behavior patterns of TM utilizations, also the different situations of these areas that possess different types of vegetation. The high level of prevalence is indicated because the benefit of TM is not only felt by the society, but also driven by the government that pushes the utilization of TM to maintain health levels, treatment for illness, and to reduce health complaints felt by the patients. Based on a data released by Indonesian Ministry of Commerce, there are 15 types of plants that are commonly used in the society namely galangal, turmeric, ginger, kencur, curcuma, lempuyang cardamom, the god's crown, noni, aloe vera, temuireng, temukunci, keijibeling, and sambiloto as TM.<sup>[14]</sup>

Based on the subjects' characteristics, the majority of the subjects are early elderly with decent level of knowledge and high TM utilization level. The consumption of TM by elders is relatively higher because TM are known to be used as alternative or complementary medications on therapies for a number of degenerative diseases experienced by elders<sup>[13]</sup>. Medicinal plants are commonly used on hypertension, diabetic, diarrhea, cough, constipation, and digestive disorders.<sup>[5,15,16]</sup> Based on occupational and racial categories, most of the respondents are housewives, Javanese, which possess decent knowledge and high utilization levels. This result is indicated because females

spend more times at home than males supported by their educational level which are mostly at high school level, it is easier for them to search and understand information about the utilization from various sources. Besides that, with the abundant amount of time, housewives are tend to socialize more in their neighborhood which makes it easier for them to obtain more information about medicinal plants. Indonesia possesses various customs and cultures. Different locations of society will leads to the utilization of different type of plants, plant cultivation status, used parts, and the way they utilize the plants. The situation is highly related with the availability of medicinal plants in the area and the knowledge possessed by the society.<sup>[17]</sup>

In this study, we revealed that the level of knowledge to utilize herbal medicine is at decent level. The decent level of knowledge is reflected by the decent knowledge of type, benefit and the way to utilize the plants in relations with TM production. The utilization of TM is passed through generations by each family. These medicinal plants are commonly sourced from private plantation on their houses to make it easier for them to utilize it when needed. Knowledge level regarding physicality of these plants for example shapes, colors, and tastes or parts of plants that can be utilized as medicine affect the frequency of the utilization of the plants as TM. There are several types of plants that are commonly cultivated by the society because of its relatively easy and efficient cultivation and maintenance.<sup>[18, 19, 20]</sup>

High medicinal plants utilization level is evident in this research. This result is similar as the ones obtained by previous research.<sup>[21]</sup> Most of the respondents obtain their plants from private plantations around their houses which are built based on their knowledge on medicinal plants, parts that can be utilized as medicine such as stems, leaves,

seeds, flowers, saps, rhizome, roots, and the way to utilize these parts to produce medicine to maintain health and cure diseases. Different as a study conducted by Rosmanita<sup>[22]</sup>, which concluded that the society has lack knowledge of medicinal plants on health caused by less utilization frequency of medicinal plants to treat diseases.

The result of research data analysis shows that there is a significant relationship between knowledge level and utilization level of plants as medicine. Knowledge is shaped through trial and error that transforms into experience of the society which creates local wisdom and cultural richness of types of plants that can be utilized on medication activities.<sup>[19]</sup> A slightly similar result was also obtained from previous research, which concluded that there is a significant relationship between knowledge and the utilization of TM. Knowledge is one of the positive predisposition factors on medicinal plants such as less side effects, cheaper prices, safer, more practical, highly available around housings, and high benefits on health are driving people to utilize medicinal plants more.<sup>[18]</sup> Differently with the other research<sup>[20]</sup> which concluded that there is no significant relationship between knowledge level and medicinal plants utilization. This result was indicated because herbal medicine is not optimally utilized and minimum level of knowledge on medicinal plants that drive families to choose formal health facilities more. Besides knowledge on plants characteristics, parts of plants that can be used as medicine, and the processing knowledge such as dried, pounded, boiled, and other processing ways influence the utilization of medicinal plants as both internal or external cures.<sup>[15]</sup> Leaf is the most frequent part of medicinal plants utilized on medications than any other parts. Leaf, which is the main photosynthetic part of a plant, is considered to contain more active materials that can be utilized as medicine.<sup>[23]</sup>

Our research reveals that there is no significant relationship between sex and medicinal plants utilization. Females and males both have different medicinal experiences on their daily lives. Other factors that might influence TM utilization are races, experiences, family behaviors, and living locations/areas.<sup>[24]</sup> However, this result is different than the ones obtained by Kristina<sup>[25]</sup> which concluded that sex has a relationship with the utilization of TM. This result is indicated because females are more involved in traditional medication, both to cure their own self and to cure their relatives.

Educational level is not significantly related with the utilization of medicinal plants. This result is similar as the ones indicated in the previous study<sup>[9]</sup> which concluded that age and educational level is not related with the utilization of medicinal plants. This result is indicated because the higher the educational level, the less the driving factor to utilize medicinal plants. Educational level influence a person's ability to access and digest information related with health which forms their behavioral pattern on practicing necessary preventive or curative activities to

support their health.<sup>[26]</sup> The higher the level of education, the person tends to believe more in rational and objective thoughts in consuming modern medicines that have been clinically tested compared to the use of medicinal plants.<sup>[7,27]</sup> A person with high educational level will become more critical on information processing, meanwhile a person with lower educational level will tend to embrace information without confirming its validity. With higher educational level, it is expected for a person to obtain more accurate insights.<sup>[28]</sup>

Our research shows that economic level has no significant relationship with the utilization of medicinal plants. This is different with another study which reveals that economic level of a family will have significant effect on the utilization of medicinal plants. Different with previous study, they concluded that economic level of a family will influence its medicinal behavior. The higher the economic status of a person, the easier it is become for them to access and utilizes rational educational at a maximum level. Different with families with lower economic statuses which has limited funds to be allocated on their health and tend to choose TM as their primary medicinal decision based on its cheaper prices.<sup>[27,29]</sup>

In this research, there are a number of important limitation factors such as socio-cultural, religion/beliefs, available health facilities and health workers, and reliable information regarding TM utilization that needs to be considered.

## Conclusion

Based on this research, we can conclude that level of knowledge has a significant relationship with the utilization level of medicinal plants as cures.

## Acknowledgment

We would like to thank head of RT 11 in Cipinang Lontar area and every research subjects that have participated in this research.

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