

## GENDER ANALYSIS OF DEMAND FOR HEALTH SERVICES IN RURAL AREAS OF JAVA, INDONESIA

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### ABSTRACT

*There is a hypothesis that women in rural area have less access to health services than men because of social and cultural factors. This study aims to examine gender discrimination, which is measured using demand for health services. The results indicate that women and men are equal in terms of accessing health services when tested using a Chow-test. When demand is tested using a Hausman-test, there is an indication of different structural demand. Women tend to have more access to health services than men because of specific characteristics in terms of health problems. For these two villages, the hypothesis of which women have less access to health services than men is not the case. Policy implication is that the local government ought to pay more attention to other villages to imitate a condition at which the human-right of women and men are practically equal.*

### Introduction

Poverty is a major problem in the rural regions of Indonesia. Most poor people stay in rural areas (Djojohadikusumo, 1994), and around 82 per cent of workforce of rural poor households work in agricultural sector; and more than 65 per cent of them in rural areas (Soekartawi, 1996). Poverty always relates to agricultural and rural developments (Kasryno and Stepanek, 1985).

Based on the evidence, the target of rural economic development is undeniably needed to diminish rural poverty. At least there are two identified constraints of rural development, that is, productivity of rural people and gender inequality in rural areas. The productivity of human resource in agricultural sector is, to some extent, dependent on the health condition (Antle and Capalbo, 1994). The human resource will be more productive when the health condition is better. High productivity related to health has

been highlighted by Bloom et al. (2004) and Webber (2002) that health has positive impact on economic growth. Improvements in women's access to productive resources are able to increase agricultural productivity. This is supported by the fact that disparities in health and education in developing countries are higher than that in developed countries. In South-Asian countries, the educational level of women is only half of that of men. Furthermore, women-led households in rural areas hold small size of farm or even landless (Mutume, 2001).

The discriminating role of women and men in social life is because of gender issues, which exist because of social and cultural circumstance that posits the woman into an unfavourable position (Lilja et al., 1998). With the position, the productivity of women becomes lower than that of men; and consequently women in rural area become the second people in such social and cultural circumstances. For

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example, women have lower right of agricultural education and training than men (Mariyono, 1998; 2008). Lilja et al. (1998) argue that woman productivity in agricultural sector would not be different from man, if the social roles of women were excluded from their daily life.

### Problem Formulation and Goal

Rural and agricultural sectors are the 'backbone' of the national economy (Irz et al., 2001). The role of the sectors is somewhat subject to contributions of women workforce. Surveys conducted by Kingsley and Siwi (1997) and Kingsley (1998) show that more than 50 per cent of agricultural activities in the rural areas of Indonesia are carried out by women labour. Certainly, women contribution is more than enough. With a series of biological roles of a woman starting from being pregnant, giving birth, providing breast feeding, and taking care of children, it is not fair if a woman has more than 50 per cent of work.

Javanese culture still firmly holds a perspective of women as "*kanca wingking*" (Javanese jargon: a partner working at the kitchen). This implies that being a woman becomes the second person in the rural household. Since the local culture in rural area still posits women as the second group, it is likely that women are subordinated in the social and cultural activities; and therefore, there is a strong hypothesis that women have less priority of having sufficient health services than men.

Since rural development can be enhanced by improving health (Antle and Capalbo,

1994; Webber, 2002; Bloom et al., 2004) and reducing gender disparity (Mutume, 2001), information of gender disparity in health in rural areas is important. It has been pointed out that the quality of life and social happiness can be enhanced by reducing gender disparity (Mookerjee and Beron, 2005) and improving public health (Gerdtham and Johannesson, 2001). When the fact is that share of women is almost equal to that of man in agricultural production activities (Kingsley and Siwi, 1997), women need to have equal rights, including health services.

This study aims to examine the gender disparity in health services in rural areas. The difference in health services is estimated using demand function for health services, which is estimated using travel cost approach. The result of this study is expected to be useful for local government to create policies related to public health, particularly for women health. Naturally, the quality of the future generation is dependent on the health of children who are borne to healthy mothers.

### Research Methodology

**Fundamental Theory:** The underlying theories of this research are consumption theory and welfare economics explained by Pindyck and Rubinfeld (1998). A level of utility representing level of welfare can be reached by consuming a bundle of goods and services. In this case, the service is focused on health services. Diagrammatically, the welfare of individuals consuming goods and services is described in Figure 1.

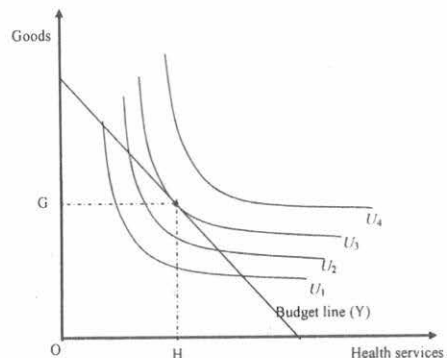


Figure 1 : Maximising utility subject to budget constraint

Let the curved lines  $U_i$  for  $i=1,2,3,4$  be indifferent curves representing combination of consumption of goods ( $G$ ) and health services ( $H$ ). The further away  $U$  from the origin represents better-off condition. To attain a certain level of utility needs a certain level of money income ( $Y$ ). For a given level of money income  $Y$ , the maximum attainable utility level is  $U_2$ . The level of  $U_3$  is the highest, but it is unattainable with such income. The feasible maximum utility can be reached when the indifferent curve makes a tangency point with budget line.

Following Silberberg and Suen (2000), a mathematical explanation of Figure 1 can be expressed as

$$\text{Max}U(G, H) \text{ subject to } Y = P \cdot G + C \cdot H \quad (1)$$

where  $U$  is a strictly convex and twice differentiable function,  $P$  is composite price of other goods, and  $C$  is cost of health services. Using Lagrange's procedure, the constrained maximisation problem can be formulated as

$$\text{Max}L = U(G, H) - \lambda(Y - P \cdot G - C \cdot H) \quad (2)$$

where  $\lambda$  Lagrange multiplier. Solving for  $H$  from the first order necessary conditions for the maximisation of equation (2) gives a demand function for health services, which is expressed as

$$H = f(C, P, Y) \quad (3)$$

Equation (3) shows that the demand for health services is affected by cost of health services, composite price of other goods, and money income level. By strict convexity of the indifferent curves, the impact of each variable on the demand for health services can be expressed as

$$\frac{\partial H}{\partial C} < 0, \frac{\partial H}{\partial P} > 0, \text{ and } \frac{\partial H}{\partial Y} > 0 \quad (4)$$

These mean that if the cost of health services rises, the demand for health services will fall; if the composite price of other goods increases, the demand for health services will increase; and when the money income level in-

creases, the demand for health services increases.

Social and cultural factors are likely to affect the demand for health. This is because social and cultural factors result in different perception on the importance of health services. Individuals with high level of education, for example, will posit health service more important than individuals with low level of education. Local culture also has discernible effect on demand for health services. Gender, for instance, will make man's demand function for health services different from woman's one. Based on the above explanation, the demand function for health services is going to be

$$H = f(C, P, Y, \theta) \quad (5)$$

where  $\theta$  is a representative of social and cultural factors.

**Study Site:** This study is based on a survey carried out during November 2004 to January 2005, in two villages of Central Java Province, Indonesia; namely, Desa Bojong and Desa Buniwah. The villages are located at around 250 km east of Jakarta, the capital city of Indonesia, and around 250 km west of Semarang, the capital city of Central Java Province. These villages are chosen because they have intensive agricultural based economies which involve women peasants. There is evidence that such intensive agriculture has resulted in serious health problems in rural areas of Indonesia (Kishi et al., 1993; Pawukir and Mariyono, 2002), and Africa (Nachi, 1999; Gerken et al., 2001).

**Subject, Sampling Method and Type of Study:**

This study uses farmer's household as the unit of research. This implies that farmers express the daily events related to socio-economic and cultural life. The researchers do not attempt to provide any treatment to the farmers, such that farmers are expected to be uninfluenced by the existence of the researchers.

This study uses a snow ball sampling method, with the first sample selected randomly, and the next sample determined by the first

sample, the third sample determined by the second sample, and so forth. The size of sample is 60 households. Statistically, the number of samples is expected to be sufficiently representative. According to Diekhoff (1992), a sample of more than 30 is considered to be able to provide sufficient statistical inferences. Data are directly collected from farmers through informal interviews, carried out by local enumerators. Information resulting from interviews is recorded in a book. Each sample is recorded in a separate book. Focus group discussions have been conducted to support the results of analysis. Additional qualitative observations are done in the places of health services providers. That is, Centre for Public Health (PUSKESMAS), general practitioner, paramedic, mid-wife practice and indigenous medical practitioner.

The type of this study is considered as explanatory research, that is, a research that highlights a relationship between variables and tests

$$\ln Kw = \delta_0 + \delta_1 \ln WT + \delta_2 \ln DT + \delta_3 \ln FM + \delta_4 \ln AG + \delta_5 \ln ED + \mathcal{E}w \quad (6)$$

Meanwhile, men's demand function for health services is expressed as:

$$\ln Km = \beta_0 + \beta_1 \ln WT + \beta_2 \ln DT + \beta_3 \ln FM + \beta_4 \ln AG + \beta_5 \ln ED + \mathcal{E}m \quad (7)$$

where

*Kw* and *Km*: fraction of income spent for health services of women and men, respectively

*WT*: level of wealth

*DT*: distance from home to health service provider

*FM*: number of family members

*AG*: age

*ED*: level of education

$\ln$ : logarithmic operation

$\delta_i$  and  $\beta_i$  for  $i=0, 1, 2, \dots, 5$ : coefficients to be estimated

$\mathcal{E}$ : error terms.

The distance between home and health services provider is used as a proxy of health cost. This proxy is used because the official cost

a hypothesis that has been previously formulated. The main content of this research is descriptive relation that focus on the variables analysed (Singarimbun, 1983). Explanatory research is easily conducted because the information and knowledge related to the problem formulation are available. Therefore, the explanatory research will determine the characteristic and relationship between one or more dependent variable(s) and one or more independent variable(s) (Tan, 1994).

**Model of Analysis:** Following Gujarati (2003) and Wooldridge (2000), data analysis is done by using an econometric approach. A demand function for health services is estimated using a multiple regression method to examine the relationship between dependent and independent variables. The demand function for health services is modeled as constant-elasticity functional forms. Technically, women's demand function for health services is expressed as:

of health in rural areas is relatively similar for all rural people. Thus, the different distances represent different health costs. This method is called a travel cost approach (Grafton, 2004). The composite price of other goods is not included in this analysis because all rural people face the same price at the same time.

The demand function for health services is estimated using two set of separated data on women and men. Any differences in demand elasticity and structural demand function represent the influence of gender on the consumption of health services in rural areas. Testing for the different elasticities of demand is carried out using a Chow-test, whereas testing for different structural demands is carried out using a Hausman-test (Greene, 2003).

**Definition and Measurement of Variables:**

There are two main variables in this study: dependent variable and independent variables. The dependent variable is the access to health services, measured by a fraction of income spent for health services of the head of household and his wife. The centre of public health (PUSKESMAS), midwives, general practitioners, nurses, and traditional medical practitioners are considered providers of health services.

Independent variables consist of level of wealth measured by the amount of cultivated land and owned land; distance between home and the health services providers measured by meters; number of family members; age of the head of household and his wife; and average educational level of head of household and his wife.

**Testable Hypothesis:** There are two hypotheses of different sexes in terms of demand for health services. The first hypothesis is no difference in elasticities of demand for health services with respect to cost of health and other socio-economic factors. This hypothesis is formally formulated as:

$$H_0: \delta_i = \beta_i \text{ for } i = 0, 1, 2, \dots, 5$$

$$H_1: \text{at least one not equal}$$

$H_0$  will be rejected if  $F_{Chow}$  is greater than  $F_{2(N-k)}^k$  at, at least, 10 per cent significance level.  $F_{Chow}$  is calculated using a formula (Greene, 2003; Wooldridge, 2000) as:

$$F_{Chow} = \frac{(SSE_{mw} - (SSE_m + SSE_w)) / k}{(SSE_m + SSE_w) / 2(N - k)} \tag{8}$$

where  $SSE_{mw}$  is sum squared error of man's and woman's demand estimation,  $SSE_m$  is sum squared error of man's demand estimation,  $SSE_w$  is sum squared error of woman's demand estimation,  $k$  is number of variables, and  $N$  is number of observations.

The second hypothesis is that there is no difference in structural demand for health ser-

vices between women and men. Formally, the hypothesis can be formulated as:

$$H_0: \delta_i - \beta_i = 0 \text{ for } i=1, 2, \dots, 5$$

$$H_1: \delta_i - \beta_i \neq 0$$

$H_0$  will be rejected if the value of  $\chi^2_{Hausman}$  is greater than  $\chi^2(k)$  at, at least, 10 per cent significance level. In a matrix form, the value of  $\chi^2_{Hausman}$  is calculated using a formula:

$$\chi^2_{Hausman} = (\hat{\delta} - \hat{\beta}) \frac{1}{Var(\hat{\delta}) - Var(\hat{\beta})} (\hat{\delta} - \hat{\beta}) \tag{9}$$

where  $\hat{\delta}_i$  and  $\hat{\beta}_i$  are coefficients of sample,  $Var(\hat{\delta})$  and  $Var(\hat{\beta})$  are variance of and respectively. Estimation of demand function for health services using ordinary least square, Breusch-Pagan-test for heteroskedasticity, Chow-test for no different elasticity and Hausman-test for no structural difference in demand for health services are carried out using an econometric computer programme.

**Results and Discussion**

Table 1 shows the estimated demand functions for health services with data of all samples.  $F$ -test shows that the demand function for health services is significantly estimated. Coefficient determination is around 0.40 indicating that 40 per cent of total variations in consumption of health services are explainable with all variables included in the model of demand. The Breusch-Pagan (B-P) test for heteroskedasticity shows that heteroskedasticity problem is absent. This means that standard error of each coefficient is correctly estimated; implying that significance of each independent variable is not misleading (Greene, 2003).

The coefficient of distance is negative and significant. This is in line with a demand theory, that is, demand will fall as the price of goods and services increases (Nicholson, 2003). When the distance increases by 1 per cent, the

consumption of health services falls by 0.08 per cent. This indicates that demand for health services is inelastic, meaning that health services are important goods. The level of wealth significantly affects consumption of health services. An increase in wealth by 1 per cent leads to an increase in consumption of health services by 0.3 per cent. This indicates that health services are normal goods, that is, the consumption of

health services increases as income or wealth increases (Nicholson, 2003). The other factors do not significantly affect consumption of health. This is because the variations of such variables are small. This is a common phenomenon that family size and education in rural areas do not vary much. Ages of the head of household and his wife accidentally sampled also do not vary much.

**Table 1: Demand function for health services**

Independent variable	Coefficient	s.e.	t-test	P>t
Constant	2.9201	0.5206	5.61	0.0000
Distance	-0.0750	0.0298	-2.52	0.0130
Wealth	0.3642	0.0454	8.03	0.0000
Family size	-0.0164	0.0866	-0.19	0.8500
Education	-0.0737	0.0489	-1.51	0.1340
Age	0.1139	0.1168	0.98	0.3310
R <sup>2</sup>	0.40			
F-test	15.46***			
B-P test	0.85 <sup>ns</sup>			
SSE <sub>mw</sub>	7.15			
Number of samples	120			

Note: Dependent variable: fraction of income spent for health services.

Source: authors' estimation.

The focus of interest of this study is to differentiate the demand function for health services between women and men. Since women and men are biologically, socially and culturally different, it is most likely the case that the demand elasticity and structural demand for health services are different.

Table 2 shows the estimated demand functions for health services with separate data of women and men. The Chow-test shows that there is no difference in elasticity of demand with respect to all factors. In other words, women have the same right of health services as men. However, there is a tendency that the elasticities are different. Descriptively, the constant of demand for women's health is greater than that of demand for men's health. This is a biological representation of which women need greater demand for health services than men. This result is supported by another work of Mariyono and

Kuntariningsih (2007) using simpler analysis. Farmers' inequality of health service shows that females have slightly greater access to health services than males.

Table 3 shows Hausman a test for difference in structural demand function. Overall, the test indicates that the structural demand for women's health is significantly different from that for men. In general, demand elasticity with respect to each variable for women is greater than for men, except for age. With respect to the distance representing health costs, family size and education, women have more inelastic demand for health services, meaning that women's health is more important than men's health. With respect to wealth, women have more elastic demand for health services, implying that health services for women are more normal than for men. When goods are considered as normal goods, it indicates that goods are important for

**Table 2: Demand function for women and men health services**

Independent variable	Women		Men	
	Coefficient	t-test	Coefficient	t-test
Constant	3.2176	4.09	2.4905	3.51
Distance	-0.0588	-1.25	-0.0943	-2.44
Wealth	0.3821	5.89	0.3218	4.82
Family size	-0.0015	-0.01	-0.0248	-0.22
Education	-0.0010	-0.01	-0.1413	-2.20
Age	0.0285	0.16	0.2244	1.44
R <sup>2</sup>	0.40		0.46	
F-test	7.18***		9.25***	
B-P test	0.51 <sup>ns</sup>		1.21 <sup>ns</sup>	
SSE	4.01		2.87	
F <sub>Chow</sub>	0.722 <sup>ns</sup>			
Number of samples	60		60	

Note: Dependent variable: fraction of income spent for health services.

Source: authors' estimation.

life. With regard to age, men have more elastic demand for health services. This is an indication that older men need more health services than

older women. In rural areas of Java, it is a common fact that a man is slightly older than his wife. Thus, man's demand elasticity with respect to age is greater than woman's.

**Table 3 : Hausman-test for difference in structural demand function**

Independent variable	Coefficient		Gap	
	Women	Men	$\delta_i - \beta_i$	s.e.
Distance	-0.0588	-0.0943	0.0354	0.0267
Wealth	0.3821	0.3218	0.0603	0.0000
Family size	-0.0015	-0.0248	0.0233	0.0683
Education	-0.0010	-0.1413	0.1404	0.0387
Age	0.0285	0.2244	-0.1959	0.0883
$\chi^2(5)$	13.63			
$P > \chi^2$	0.0182			

Source: authors' estimation.

The important finding of this study is that women tend to have greater chance in accessing health services than men. Field observations indicate that there are more women in the health service providers. There are two reasons of why women visit health service providers. First, women have more complicated illness than men, particularly related to biological women problems. Second, women usually visit the health service providers for accompanying their children, and at the same time they get health ser-

vices. By using a concentration curve, another similar study in different hamlets within the villages shows that there is no significant difference between male and female members of farmer's household, in terms of equality in access to health services. Even, households with more number of children show greater access to health services. This leads to female members of household to have greater access to health services than males (Mariyono et al., 2008).

The condition that women's access is greater than men to health services is remarkable because there is strong hypothesis that women in rural areas are posited in a second place due mostly to social and cultural factors. However, this hypothesis does not hold well in the case of these two villages. It is fair that mothers in rural areas have the same right of having health services as fathers. The future of the State of Indonesia is strongly dependent on the next generations, and the quality of next generations will be determined by the health condition of their mothers. The healthy mothers will result in healthy children.

Recently, there is a lot of support for women's roles in development. This is because it has been well recognised that women's roles are significantly important. There is a big chance for women to be leaders. Now, several districts in Java are being led by women; even, Indonesia has been led by a woman president. There is also a big chance for women to be involved in house of representatives, since recent regulation on electoral process forces political parties to provide a minimum fraction of 30 per cent for women participation in the people representative of political parties (Prihatmoko, 2009).

**Limitation :** This study is based on the sample study collected from two villages. The results consequently are only representative for the villages, and not representative for sub-district or higher level.

## Conclusion and Policy Implication

The role of women in rural development is important since more than 50 per cent of rural work is carried out by women labourers. It is fair to say that women get the same right as men, including health services. In rural areas where social and cultural factors posit women as a second people, it is likely that women will have less priority in accessing health services. This study, however, shows that in rural areas women are not different from men in terms of accessing in health services; even they tend to have greater chance in accessing health services. Rural women visit health service providers more than men since they have biologically specific health problems, and they get health services when accompanying their children. The overall results of this study conclude that women's health is posited at higher priority than men's health.

The main suggestion that can be provided from this study is to keep the social and cultural circumstances for which women have the same position as men, particularly in relation of having health services. For other villages where agriculture is operated intensively, it recommended for those to emulate the culture of two villages studied here. Since the scale of this study is relatively small in terms of sample size and site coverage, it will be much worthwhile if similar studies are conducted in larger scales.

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