

Investigating the Effect of Amanah Ikhtiar Malaysia's Microcredit Program on Their Clients Quality of Life in Rural Malaysia

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Received: July 8, 2011

Accepted: August 1, 2011

Published: January 1, 2012

doi:10.5539/ijef.v4n1p192

URL: <http://dx.doi.org/10.5539/ijef.v4n1p192>

This study was conducted under the project titled "Fighting Against Poverty" funded by The Centre for Social Entrepreneurship, Binary University College

Abstract

The objective of this study is to examine the impact of Amanah Ikhtiar Malaysia's (AIM) microcredit program on their poor client's quality of life in rural Malaysia. AIM provides small scale financial services and training to poor and hardcore poor households in order to improve their socio-economic condition. This study employed a cross-sectional design with stratified random sampling method to examine whether participation in AIM's microfinance programs improves poor rural households quality of life. A quality of life index using eleven selected indicators was developed. Findings of this study extend the literature by providing empirical evidence that access to microfinance improved quality of life of the poor rural households in Malaysia. The findings show that respondent's participation status is associated with the size and quality of their houses. AIM should therefore focus on increasing the outreach as well as review and re-organize their programs in order to offer a dynamic and well-diversified microfinance program to fulfill all financial needs of their poor clients in rural areas.

Keywords: Microfinance, Poverty, Quality of life, Welfare, Malaysia

1. Introduction

The poverty rate in Malaysia has declined dramatically after its independence. While 49.3% of Malaysian households lived below the poverty line in 1970, the poverty rate has reduced significantly to 16.5% in 1990, and further declined to 3.6% in 2007 (Midterm Review of 9th Malaysia Plan). The reduction in poverty rate can be attributed to the rapid economic growth in Malaysia which generated higher-paid employment opportunities and profitable micro and small-scale businesses opportunities in Malaysia (Economic Report, 2008/09). Moreover, the government of Malaysia implemented several strategies to increase productivity, diversify sources of income and improve the quality of life of the poor. These poverty reduction strategies were the integrated and integral part of Malaysia's core development plans. The government encourages and works together with private sectors and state based poverty eradication foundations. The leading organizations working toward socio-economic development of the poor and hardcore poor households in Malaysia includes (1) *Tabung Ekonomi Kumpulan Usahawan Nasional* (National Entrepreneurs Economic Group Fund - TEKUN), (2) *Agrobank*, (3) *Lembaga Kemajuan Ikan Malaysia* (Malaysia Fisheries Development Board - LKIM), (4) *Yayasan Basmis Kemiskinan* (Poverty Eradication Foundation -YBK) and (5) *Amanah Ikhtiar Malaysia*.

However, the client selection process as well as product and services offered by each program are not same. TEKUN was established in 1998 as a foundation under Ministry of Entrepreneur Development and Cooperatives, Malaysia, to provide loans only to Bumiputra's who own and are directly involved in any business not necessarily from the poor or hardcore poor group. Agrobank provides microcredit to all Malaysian micro-entrepreneurs, which they labeled as '*Entrepreneur Capital 1 Malaysia*', and this scheme is not primarily focusing on poor and hardcore poor households in Malaysia. LKIM was established to offer several small scale credit services to improve the socio-economic status of the fishing community only and the fishermen does not necessarily have to be poor or hardcore poor. YBK was launched by the State Government of Selangor and it provides financial services only to selected participants from the State. The objectives of YBK are to produce entrepreneur and small scale businessman and to improve the quality of life of hardcore poor households in Selangor, Malaysia.

AIM on the other hand was established in 1987, to provide small scale financial services and training to poor and hardcore poor only, in order to improve their socio-economic condition. AIM uses a group based Grameen Bank (a Bangladeshi microfinance organization) model, which has been replicated by many MFO's all over the world. AIM selects their clients based on clients' average monthly household income. Households with average monthly household income below the poverty line income (PLI has been calculated by the Malaysian government since 1976. It was estimated based on the necessity of food and other basic needs) would be considered as absolute poor, while households with average monthly household income below half of the PLI would be categorized as hardcore poor. AIM only selects those households, whose average monthly household income falls below the PLI, which includes both poor and hardcore poor households.

AIM provides three economic loans namely I-Mesra loan, I-Srikandi loan and I-Wibawa loan. AIM also provides I-Penyayang loan or recovery loan. In addition, AIM provides education loan (I-Bistari) and housing/multipurpose loan known as I-Sejahtera. No legal action would be taken if the borrowers fail to settle their payments. As at August 2010, AIM has extended their outreach to 87 branches in Malaysia. There are 60497 groups in 6646 centers, currently serving a total of 254,116 clients achieving a 99.42% repayment rate (AIM, 2010) from all the loans disbursed. AIM is the only microfinance organization operating at national level and reaching to more than 82% of the poor and hardcore poor households in Malaysia. In view of its wide coverage, this study therefore selected AIM in order to measure the impact of microcredit program on the quality of life of poor rural households in Malaysia.

2. Literature Review

Microcredit came into existence nearly two decades ago to fulfill the need for basic financial services of nearly half of the world's population (Abed, 2000). Microcredit is established to uplift poor people and bring them out of poverty by lending small amount of collateral free credit for small scale income generating activities (Rosenberg, 2010). The Asian Development Bank (2009) defines microcredit as the provision of a broad range of financial services such as loans, deposits, payment services, money transfer, and insurance to poor and hardcore poor households and their micro-enterprises. Consultative Group to Assist the Poor (CGAP, 2010) defined microcredit as "a credit methodology that employs effective collateral substitutes to deliver and recover short-term, working capital loans to micro entrepreneurs." The Microcredit Summit (2006) adopted the definition of microcredit as "programs to extend small loans to very poor people for self-employment projects that generate income, allowing them to care for themselves and their families." The objective of Microcredit Summit is to ensure that 175 million of the world's poorest families, especially the women in those families, receive credit for self-employment and other financial and business services before the end of 2015 (Microcredit Summit Campaign Report, 2009). As mentioned in Microcredit Summit Campaign Report (2009), "assuming five persons per family, reaching 175 million of the world's poorest families would affect 875 million family members. When 100 million families rise above the US\$1 a day threshold, half a billion people will have left extreme poverty".

Microcredit provides productive capital, which together with social capital and human capital enables the poor and hardcore poor households to move out of poverty (Otero, 1999; Abed, 2000). There is extensive literature on microcredit showing that it has a significant impact on poverty reduction around the world. Studies conducted by Hossain (1988), Mustafa et al. (1996), Khandker and Pitt (1998), Kamal (1999), Latifee (2003), Khandker (2003), Hussain and Nargis (2008), Hoque (2008), and Rahman, Rafiq and Momen (2009) on several microfinance organization's clients in Bangladesh noted that participation in microfinance programs improved poor households ability to generate income which leads to an improvement in household's income, net working capital, fixed assets, increase spending on food, medical facilities and children's schooling. A study conducted by Khandker and Pitt (1998) showed indirect improvement of household welfare by increasing market labor supply and children's schooling. Findings of Malhota, Schuler and Boender (2002) have shown that after participating in a group based microcredit program, women become more conscious about their family welfare, which ultimately leads to positive outcomes in child health and education as well as household wellbeing. Latifee (2003) in his study on Grameen

Bank's microcredit clients in Bangladesh mentioned that about 90% of the borrowers reported an improvement in standard of living. Studies conducted by Sutoro (1990) in Indonesia, Sebstad and Walsh (1991) in Nairobi, Mosley (1996) in Bolivia, Dunn (2005) in Bosnia and Herzegovina, Panda (2009) in India also noted similar positive impacts of microcredit.

The impact of AIM's microfinance schemes followed a similar pattern, as it does for others. Study conducted by Sukor and Gibbons (1990) discovered a significant 55% increase in client's monthly household income. The Second Internal Impact Study, (1990) conducted by Research and Development Unit, AIM, showed further overall improvement among participating households. Around 98% of them experienced an increase in household income compared to 70% from the first study. The per capita monthly income also increased from RM40 to RM73. The Third Internal Impact Study (1994) measured the impact on quality of life, by analyzing the ownership and quality of housing, type and quality of household assets, agricultural land and savings. Findings of this study also noted that increase in household income enables the participants to improve their housing conditions. Household savings increased from an average RM33.11 to RM211.25. The increase in household income also facilitated an increase in expenditure on food, nutrition, education and reinvestment.

Earlier researches used a wide range of indicators to measure the quality of life of the households' of microfinance organizations clients. Snodgrass and Sebstad (2002) conducted an impact study in three MFO's; SEWA Bank in India; Mibanco in Peru and Zambuko Trust in Zimbabwe. The indicators they used to measure households quality of life in India include materials used in the Walls, Floor and Roof, number of rooms, number of floors, separate room for a kitchen, separate household plot, separate house/ room/ building, have electricity, sources of water, light and cooking fuel. Uotila (2005), in his impact assessment in Rwanda, measured the quality of life of microfinance clients households based on their sources of drinking water, cooking fuel, toilet facilities and children in school. The Third Internal Impact Study (1994) measured their client's household's quality of life by using the following indicators, owner occupied house, use of electric household products, ownership of agricultural land, perception of nutritional quality and voluntary savings. After reviewing the earlier studies, this study selected the following variables to measure the impact of AIM's microfinance schemes on poor rural household's quality of life - size of the house, number of storey, number of rooms, structural condition, materials used in walls, roof and floor; sources of drinking water, cooking fuel, toilet facilities and sources of light

3. Research Methodology

3.1 Conceptual Model and Hypothesis

As mentioned by Hulme (1997), "behind all microfinance programs is the assumption that intervention will change human behaviors and practices in ways that lead to the achievement (or raise the probability of achievement) of desired outcomes." The conceptual model of impact chain presents a complex set of links as each 'effect' becomes a 'cause' in its own right generating further effects. One of the most complex conceptual models for impact assessment was presented by Chen and Dunn (1996), called the household economic portfolio model (HHEP), where researchers explained the effect of credit on household resources and household activities only. This study however only measures one of the implications of Household Economic Portfolio Model; which is hypothesized as (H_1) 'participation in microcredit program lead to an improvement in households' quality of life in Rural Malaysia'.

3.2 Research Design

As mentioned by Montgomery and Weiss (2011), impact assessment methodology addressed how participation in microcredit program affects selected variables with how those same selected variables would have performed in the absence of microcredit program. The most appropriate method to address the question should be by employing an experimental design. Since it is just not possible to control all the factors while measuring the impact of microcredit (Hulme, 2000), therefore, full experimental approach is not feasible to assess the impact of microcredit programs (see also Khandker and Pitt, 1998; Swain and Varghese, 2009; Montgomery and Weiss, 2011), this study therefore used a quasi-experimental approach to measure the impact of microcredit. In quasi-experimental approach control and treatment groups are used to measure the impact of AIM's microcredit programs. Moreover, in Malaysia, AIM provides financial services to more than 82 percent of the poor households. The rest of the poor and hardcore poor households are more likely to receive financial aid from other government and non-government development agencies or projects. It is also highly likely that these poor households live in remote locations therefore are unable to form a five member group and participate in weekly center meetings and/or they just do not want to participate in AIM's microcredit program. To minimize the difference between the control and the treatment group (participating more than 12 months), this study therefore selects the control group (participating less than or equal to 12 months) from AIM's client base. This study also used before and after method to measure the impact of microcredit on poor rural household's quality of life.

This research employed a cross-sectional design to measure the impact of AIM's microcredit schemes in Peninsular Malaysia. This study adopted the group statistics that has been most often used known as 'average effect of treatment of treated', which measures the impact on the outcome of one group compared to others. The average program impact is estimated by comparing the average outcome of the members of treatment group (old respondents) with the same average outcome of the members of the control group (new respondents).

3.3 Sample Selection and Data Collection

This research employed a stratified random sampling method and collected data through face-to-face structured interviews. AIM's microcredit program currently offers financial services through 87 branches in Malaysia. Among the 87 branches, 7 branches were randomly selected from five states, where poverty rate is relatively higher compared to other states. Out of seven branches, two were from Kedah (Cawangan Baling and Cawangan Pendang), two were from Kelantan (Cawangan Machang and Cawangan Tumpat) and one branch each from Perlis (Cawangan Perlis), Perak (Cawangan Batang Padang) and Terengganu (Cawangan Besut). A team of nine Research Assistants together with the Project Manager then visited each of the branches from 18th April, 2011 to 9th May, 2011. Respondents were randomly selected during the centre meetings. After the data collection team had explained the purpose of the study a total of 286 respondents agreed to be interviewed and complete data were collected from a total of 281 poor rural clients, of whom 34 were new clients and 247 were old clients

4. Summary of Findings

4.1 Housing Conditions

Respondents housing conditions were assessed based on the size of the house, number of storey of the house, number of rooms in the house and structural conditions of the house. The percentage distribution of size of home for new and old respondents is presented in Table 1. The p -value for Pearson's Chi-Square tests indicates an association between respondents participation status with the size of the house they living in (p -value = 0.000 < 0.05). Moreover, a relatively higher percentage of new respondents reported that they are living in smaller houses compared to the old respondents. The p -value for Pearson's Chi-Square tests indicates an association between respondents membership status (new and old) with the size of the house they live in (p -value = 0.000 < 0.05).

The p -value for the Wilcoxon Signed Ranks test is 0.034, which is less than the preferred 5% level of significance, indicating a significant difference in the mean size of the house; the mean size of the houses of respondents after participation is significantly bigger than the size of the house before the participation. Moreover, the p -value for the Mann-Whitney test is 0.010, which is less than the chosen 5% level of significance, indicating a significant difference in the mean size of the house; the mean size of the houses of old respondents is significantly bigger than the mean size of houses of new respondents.

On the number of storeys of the houses, only 11 out of 281 respondent, reported that they are currently living in houses with more than two storeys, which is higher than that recorded before participation. The p -value for Pearson's Chi-Square tests indicates an association between respondents participation status – before and after, with the number of storeys of the house they live in (p -value = 0.000 < 0.05). The p -value for the Wilcoxon Signed Ranks is 0.020, which is less than the chosen 5% level of significance and this indicates that more respondents are staying generally in multi-storey houses after participating AIM's microcredit program.

Table 2 presents the details about the number of rooms and structural condition of the houses of new and old respondent's as well as the changes after participation. The p -value for Pearson's Chi-Square tests indicates that respondent's participation status (before and after) is associated with the number of rooms in the house they are living in. Only 7 out of 281 respondents reported that the number of rooms in their houses increased after participation. The p -value for the Wilcoxon Signed Ranks is 0.000, which is less than the chosen 5% level of significance, indicating a significant difference in the mean number of rooms per house respondents are living in before and after participation.

With regard to the structural condition of the house respondents are living in, only 11 out of 281 respondents reported that the structural condition of their house is better than before participation. The p -value for Pearson's Chi-Square tests indicates that respondent's participation status (before and after) is associated with the structural condition of the house they are living in. The p -value for the Wilcoxon Signed Ranks is 0.000, which is less than the chosen 5% level of significance. On the whole the structural conditions of the house after participation is significantly better than before participation.

4.2 Housing Materials

To grade the materials used for the walls, floor and roofs of the houses, respondents were asked to answer from eight options which include the most common housing materials, such as cement/stone, wooden boards, plastics or

cardboard, zinc/tin, bamboo and others. Materials used were then divided into two groups, namely permanent materials and temporary materials. The types of housing materials used to construct walls, floor and roofs of the houses, new and old respondents are currently living in as well as before and after participating in AIM's microcredit program are presented in Table 3.

More than 80% of the total rural respondents reported that they used temporary material for the walls of their house. 84.3% respondents reported that they used temporary housing materials for the floor of the house and 98.9% respondents reported that they used temporary housing materials in the roofs of their houses. Out of 281 respondents, 14 households changed housing materials from temporary to permanent for walls of their houses. The p -value for Pearson's Chi-Square tests indicates that respondent's participation status (before and after) is associated with the materials used to construct walls of their houses. It is noted that the p -value for the Wilcoxon Signed Ranks is less than the chosen 5% level of significance indicating that the mean value for materials used for walls before and after participation in AIM's microcredit program is significantly different

4.3 Other Welfare Indicators

Other household welfare variables include household's toilet facilities, cooking fuel, sources of light and sources of drinking water. Findings from this study indicate that in rural Peninsular Malaysia, only 8 out of 281 respondents are reported to have no access to environmentally safe toilet facilities (Flash / Cement Toilet) and 8 out of 281 respondents reported that they use environmentally more destructive cooking fuel. On sources of drinking water, total 19 out of 281 rural respondents reported not having access to tap water. The number and percentage of new and old respondents having access to safe sources of drinking water, cooking fuel and toilet facilities are presented in Table 4.

Findings of this study indicate that 93.2% households currently have access to safe drinking water, 97.2% households use environmentally less distractive cooking fuel and 97.2% of respondents used environmentally safe toilet facilities in rural Peninsular Malaysia. The p -value for Pearson's Chi-Square tests indicates that respondent's participation status (before and after) is associated with the sources of drinking water and sources of cooking fuel. The p -value for the Wilcoxon Signed Ranks is less than the chosen 5% level of significance indicating that the sources of drinking water and sources of cooking fuel used by the respondent's households are significantly better than before participation

4.4 Testing Research Hypothesis 1

The mean quality of life index score for 281 rural clients before and after participation in AIM's microcredit program are presented in Table 5. The mean quality of life score after participation is relatively higher than that before participation. The standard deviation of quality of life score also decreased after participation. The p -value for Wilcoxon Signed Ranks test is 0.000, which is less than chosen 5% level of significance, which indicates that the mean difference in quality of life index score is statistically significant. It is therefore concluded that participation in AIM's microcredit program does lead to an improvement in client's quality of life in rural Peninsular Malaysia.

5. Conclusion and Recommendation

This study assessed the impact of AIM's microcredit program on the quality of life of poor clients households in rural Peninsular Malaysia. Since the objective of AIM's microcredit program is to improve socio-economic condition of poor households in Malaysia, findings of this study therefore improve AIM's knowledge and understanding about the effectiveness of current microcredit program on household's quality of life.

As per the findings presented above, this study concludes that participation in AIM's microcredit program leads to an improvement in poor rural household's quality of life in Peninsular Malaysia. These findings are consistent with earlier research findings conducted to measure the impact of AIMs microfinance schemes on their client's quality of life as well as studies conducted around the world. These studies include SERU (1990) impact study; the Third Internal Impact Study (1994); Snodgrass and Sebstad (2002) in India, Peru and Zimbabwe; Uotila (2005) in Rwanda; and Latifee (2003) in Bangladesh.

The findings of this study have vital implications for academics, AIM, poor rural households, as well as the development economists and policy makers. For academicians, findings of this study indicate the importance of measuring impact of microcredit program on quality of life too instead of focusing only on income and asset. For AIM policy makers, these findings indicate the effectiveness of the program they practised since 1987. For rural poor households and for the economists and development policy makers, these findings indicate that participation in AIM's microcredit program can be a useful mechanism to improve the quality of life of rural poor households in Peninsular Malaysia.

AIM therefore has to intensify its efforts in order to increase the number of poor as well as less poor or low income group by offering them with a well-diversified products and services. It is therefore proposed that AIM should review current microfinance products and methodology and organize them in a way which can benefit their clients most.

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Table 1. Size of the House and Number of Storey

<i>Size of the House</i>		Membership Status		Participation Status	
		New	Old	Before	After
Small	N	11	19	33	30
	%	32.4%	7.7%	11.7%	10.7%
Medium	N	18	193	211	211
	%	52.9%	78.1%	75.1%	75.1%
Big	N	5	35	37	40
	%	14.7%	14.2%	13.2%	14.2%
Total	N	34	247	281	281
	%	100%	100%	100%	100%
Pearson Chi-Square Test	Value	19.5568		510.5852	
	<i>p</i> -value	0.000 < 0.05		0.000 < 0.05	
Descriptive Analysis	Mean	0.7059	0.7662	0.7536	0.7589
	SD	0.1682	0.1160	0.1249	0.1246
Shapiro-Wilk test of Normality	<i>p</i> -value	0.000	0.000	0.000	0.000
Testing Mean Difference		Mann-Whitney Test		Wilcoxon Signed Ranks	
	M.Rank	115.47	144.51	Positive Rank: 3	
	Z	-2.582		-2.1213	
	<i>p</i> -value	0.010 < 0.05		0.034 < 0.05	
<i>Number of Storey</i>					
One	N	28	213	251	241
	%	82.4%	86.2%	89.3%	85.8%
Two	N	5	33	27	38
	%	14.7%	13.4%	9.6%	13.5%
More than Two	N	1	1	3	2
	%	2.9%	0.4%	1.1%	0.7%
Total	N	34	247	281	281
	%	100%	100%	100%	100%
Pearson Chi-Square Test	Value	2.7937		349.7331	
	<i>p</i> -value	0.247 > 0.05		0.000 < 0.05	
Descriptive Analysis	Mean	0.7059	0.7662	0.7536	0.7589
	SD	0.1682	0.1160	0.1249	0.1246
Shapiro-Wilk test of Normality	<i>p</i> -value	0.000	0.000	0.000	0.000
Testing Mean Difference		Mann-Whitney Test		Wilcoxon Signed Ranks	
	M.Rank	146.21	140.28	Positive Rank: 10	
	Z	-0.6580		-2.3237	
	<i>p</i> -value	0.511 > 0.05		0.020 < 0.05	

Table 2. Number of Rooms and Structural Condition of the House

<i>Number of Rooms</i>		Membership Status		Participation Status	
		New	Old	Before	After
One	N	4	8	19	12
	%	11.8%	3.2%	6.8%	4.3%
Two	N	12	75	86	87
	%	35.3%	30.4%	30.6%	31.0%
Three	N	12	104	110	116
	%	35.3%	42.1%	39.1%	41.3%
More than Three	N	6	60	66	66
	%	17.6%	24.3%	23.5%	23.5%
Total	N	34	247	281	281
	%	100%	100%	100%	100%
Pearson Chi-Square Test	Value	6.2192		697.3008	
	<i>p</i> -value	0.101 > 0.05		0.000 < 0.05	
Descriptive Analysis	Mean	0.6471	0.7186	0.6984	0.7100
	SD	0.2312	0.6931	0.02195	0.2079
Shapiro-Wilk test of Normality	<i>p</i> -value	0.002	0.000	0.000	0.000
Testing Mean Difference		Mann-Whitney Test		Wilcoxon Signed Ranks	
	M.Rank	119.97	143.89	Positive Rank: 7	
	Z	-1.709		-3.3565	
	<i>p</i> -value	0.087 > 0.05		0.001 < 0.05	
<i>Structural Condition of the House</i>					
Poor	N	1	10	17	11
	%	2.9%	4.0%	6.0%	3.9%
Moderate	N	27	171	203	198
	%	79.4%	9.2%	72.2%	70.5%
Good	N	6	66	61	72
	%	17.6%	26.7%	21.7%	25.6%
Total	N	34	247	281	281
	%	100%	100%	100%	100%
Pearson Chi-Square Test	Value	1.4935		401.9442	
	<i>p</i> -value	0.474 > 0.05		0.000 < 0.05	
Descriptive Analysis	Mean	0.7868	0.8067	0.7891	0.8043
	SD	0.1089	0.1268	0.1259	0.1247
Shapiro-Wilk test of Normality	<i>p</i> -value	0.000	0.000	0.000	0.000
Testing Mean Difference		Mann-Whitney Test		Wilcoxon Signed Ranks	
	M.Rank	131.25	142.34	Positive Rank: 11	
	Z	-0.9376		-4.1231	
	<i>p</i> -value	0.348 > 0.05		0.000 < 0.05	

Table 3. Materials Used in the Walls, Floor and Roof

<i>Materials used in Walls of the House</i>		Membership Status		Participation Status	
		New	Old	Before	After
Temporary Materials (0) (Wood/Plastic/Zinc/Bamboo)	N	25	201	240	226
	%	73.5%	81.4%	85.4%	80.4%
Permanent Materials (1) (Cement/Stone)	N	9	46	41	55
	%	2.5%	18.6%	14.6%	19.6%
Pearson Chi-Square Test	Value	1.1690		197.2534	
	<i>p</i> -value	0.279 > 0.05		0.000 < 0.05	
Descriptive Analysis	Mean	0.2647	0.1862	0.1459	0.1957
	SD	0.4478	0.3900	0.3536	0.3974
Shapiro-Wilk test of Normality	<i>p</i> -value	0.000	0.000	0.000	0.000
Testing Mean Difference		Mann-Whitney Test		Wilcoxon Signed Ranks	
	M.Rank	150.69	139.67	Positive Rank: 14	
	Z	-1.0792		-3.7416	
	<i>p</i> -value	0.280 > 0.05		0.000 < 0.05	
<i>Materials used in the floor of the House</i>					
Temporary Materials (0) (Wood/Plastic/Zinc/Bamboo)	N	26	211	237	237
	%	76.9%	85.4%	84.3%	84.3%
Permanent Materials (1) (Cement/Stone)	N	8	36	44	44
	%	23.5%	14.6%	15.7%	15.7%
Pearson Chi-Square Test	Value	1.8145			
	<i>p</i> -value	0.178 > 0.05			
Descriptive Analysis	Mean	0.2353	0.1457		
	SD	0.4305	0.3535		
Shapiro-Wilk test of Normality		0.000	0.000		
Testing Mean Difference		Mann-Whitney Test			
	M.Rank	152.06	139.48		
	Z	-1.345			
	<i>p</i> -value	0.179 > 0.05			
<i>Materials used in the Roof of the House</i>					
Temporary Materials (0) (Wood/Plastic/Zinc/Bamboo)	N	33	245	278	278
	%	97.1%	99.2	98.9%	98.9%
Permanent Materials (1) (Cement/Stone)	N	1	2	3	3
	%	2.9%	0.8%	1.1%	1.1%
Total	N	34	247	281	281
	%	100%	100%	100%	100%
Pearson Chi-Square Test	Value	1.2854			
	<i>p</i> -value	0.257 > 0.05			
Descriptive Analysis	Mean	0.0294	0.0081		
	SD	0.1715	0.0898		
Shapiro-Wilk test of Normality	<i>p</i> -value	0.000	0.000		
Testing Mean Difference		Mann-Whitney Test			
	M.Rank	143.63	140.64		
	Z	-1.1317			
	<i>p</i> -value	0.258 > 0.05			

Table 4. Sources of Drinking Water, Cooking Fuel and Toilet Facilities

<i>Sources of Drinking Water</i>		Membership Status		Participation Status	
		New	Old	Before	After
Unsafe (0) (River/rain/pond water)	N	2	17	28	28
	%	5.9%	6.9%	9.96%	9.96%
Safe Sources (1) (Tap/Bottled Water)	N	32	230	253	253
	%	94.1%	93.1%	90.04%	90.04%
Total	N	34	247	281	281
	%	100%	100%	100%	100%
Pearson Chi-Square Test	Value	0.0474		184.1285	
	<i>p</i> -value	0.827 > 0.05		0.000 < 0.05	
Descriptive Analysis	Mean	0.9412	0.9312	0.9004	0.9324
	SD	0.2388	0.2536	0.3000	0.2515
Shapiro-Wilk test of Normality	<i>p</i> -value	0.000	0.000	0.000	0.000
Testing Mean Difference		Mann-Whitney Test		Wilcoxon Signed Ranks	
	M.Rank	142.24	140.83	Positive Rank: 9	
	Z	-0.2173		-3.000	
	<i>p</i> -value	0.828 > 0.05		0.003 < 0.05	
<i>Sources of Cooking Fuel</i>					
Environmentally More Distractive Sources (0) (Wood/Coal/Dung)	N	2	6	14	8
	%	5.9%	2.4%	5.0%	2.8%
Environmentally Less Distractive Sources (1) (Gas/Electricity)	N	32	241	267	273
	%	94.1%	97.6%	95.0%	97.2%
Total	N	34	247	281	281
	%	100%	100%	100%	100%
Pearson Chi-Square Test	Value	1.288		157.0423	
	<i>p</i> -value	0.256 > 0.05		0.000 < 0.05	
Descriptive Analysis	Mean	0.9412	0.9757	0.9502	0.9715
	SD	0.2388	0.1542	0.2179	0.1666
Shapiro-Wilk test of Normality	<i>p</i> -value	0.000	0.000	0.000	0.000
Testing Mean Difference		Mann-Whitney Test		Wilcoxon Signed Ranks	
	M.Rank	136.74	141.59	Positive Rank: 6	
	Z	-1.133		-2.4494	
	<i>p</i> -value	0.257 > 0.05		0.014 < 0.05	
<i>Sources of Toilet Facilities</i>					
Environmentally Unsafe (0) (Tradition Open Toilet)	N	2	6	8	8
	%	5.9	2.4	2.8	2.8
Environmentally Safe (1) (Flash / Cement Toilet)	N	32	241	273	273
	%	94.1	97.6	97.2	97.2
Total	N	34	247	281	281
	%	100%	100%	100%	100%
Pearson Chi-Square Test	Value	1.4181		N/A	
	<i>p</i> -value	0.492 > 0.05			
Descriptive Analysis	Mean	0.9411	0.9797		
	SD	0.2388	0.1674		
Shapiro-Wilk test of Normality	<i>p</i> -value	0.000	0.000		
Testing Mean Difference		Mann-Whitney Test			
	M.Rank	136.26	141.65		
	Z	-1.1882			
	<i>p</i> -value	0.235 > 0.05			

Table 5. Impact on Quality of Life

		Before	After
Mean		6.8950	7.0525
Standard Deviation		0.7688	0.7197
Shapiro-Wilk test of Normality	<i>p</i> -value	0.000	0.000
Wilcoxon Signed Ranks Test		Positive Rank: 65	
	Z	-7.0941	
	<i>p</i> -value	0.000 < 0.05	