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DEMAND AND WILLINGNESS-TO-PAY FOR HEALTH INSURANCE AND HEALTH COOPERATIVES IN NEPAL: A DISCRETE CHOICE EXPERIMENT

Msc. Thesis

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Second reader: Dr. Ir. M.M. van den Berg
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Abstract

In this research a demand study has been done for a health cooperative programme in rural Nepal including credit and saving facilities, health education, skills-based trainings and health insurance. 101 women in rural Nepal who are eligible for the programme have been interviewed in the period February to April 2013. For the health insurance aspect a Discrete Choice Experiment is used to determine the trade-off between its different attributes: the premium, a co-payment for pharmacy and the type of package (individual, core or extended family). For the other aspects of the cooperative a general questionnaire has been applied to study the respondents' former experience with former programmes and the demand for the health cooperative. Overall, most of the respondents are willing to join the health cooperative. Their actual willingness to join, however, will be dependent on specific design of the programme that still has to be made. Most of the respondent are also willing to join the health insurance scheme. The results of the Discrete Choice Experiment shows that a family package is clearly preferred over an individual package. This research could not prove a significant effect of a co-payment for pharmacy on the utility of the health insurance.

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I want to send a big '*dhanyabad*' to my data-assistants and dear friends Uma Shrestha and Prakriti Khanal for their help and companionship during the field work. They were the most dedicated data-assistants I could wish for. They even went to the field without me when I was ill and called me three times a day for check-ups and updates.

I enjoyed the conversations in the Nepali sun with my friend Chris Westrup during our coffee breaks at the hospital. I want to thank him for patiently listening to my academic considerations and for critically challenging my economic presumptions. Moreover, I would like to thank Griogorios Emvalomatis for taking the time to help me understand the econometric problems. Many thanks also to my friend and colleague Ilse van Winssen for honestly telling me my methodology was 'awfully boring'. Her critical remarks have helped me improve my report considerable.

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Selma van der Haar,

August, 2013

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List of abbreviations

BP	Bahunepati
DCE	Discrete Choice Experiment
DH	Dhulikhel Hospital
KD	Kattike Deurali
MRS	Marginal Rate of Substitution
MWTP	Marginal Willingness to pay
NPR	Nepalese Rupees
SBT	Skills-based trainings
WTP	Willingness to pay

1. Introduction

Micro insurance aims at protecting the poor from large income shocks. One such shock that can have a very large impact on income is health care expenditure. Most of health care expenditure globally is paid out-of-pocket. These costs can be a heavy burden on households. In a global study Ke et al. (2007) found that 150 million people every year suffer from large, catastrophic health care expenditure. Therefore, in many countries certain forms of micro health insurance have emerged to extend insurance services to low income population (Armendáriz & Murdoch, 2010). Micro health insurance schemes are '*risk management institutions for low-income households that cover the costs of certain predefined illness-related losses to a certain extent*' (Leppert, 2010). A regular premium is paid by the insured in return for reimbursement of (part of) the health care costs in case of illness. Escobar et al. (2010) show that micro health insurance has a positive impact on the access to and the use of medical care and that it can significantly reduce out-of-pocket payments and the incidence of high financial shocks due to illness.

Uptake of micro health insurances, however, have been much lower than expected (Leatherman et al., 2012; Matul et al. 2013). One reason for this is that often either the premium is considered to be too high or the benefits included in the insurance package are too low (Duflo & Banerjee, 2011). To reach the poorest households, premiums should be set very low. It would not be financially viable to offer a lot of health care services for such a low premium, because the costs of the health care would be much higher than the revenues from the premiums. One strategy that is often applied is to limit the services covered to only catastrophic events that don not occur frequently. This may lead to resistance from households that want their high frequency, low costs to be covered. However, including all these costs would drive up the premium considerably. Hence, it is very difficult to find a balance between the costs and the benefits (premium) of health insurance in such a way that the product is both financially viable and attractive for low-income households.

This is a challenge that Dhulikhel Hospital faces as well. This community-based hospital operates several health centres in rural Nepal and offers community programmes such as microfinance and health education to local low-income households. The hospital wants to initiate a micro health insurance scheme for these households to help them cover their medical expenses. A few years ago they have launched a pilot health insurance scheme to test the working of such a programme. The pilot scheme however is not financially viable at the moment. The costs of the health care can not be covered by the monthly premium that are paid. A large part of the costs arise from pharmacy expenditure. So one possibility to improve the sustainability would be to exclude pharmacy coverage from the insurance package. Yet, this could make the insurance programme unattractive for the local

households. The hospital wants to find a way to adjust the insurance programme to the needs of the local community, while at the same time making it financially sustainable.

According to Dror (2007) most Health Insurances that are offered do not meet the demands of the poor. He states that involving communities in the design of an insurance package will increase the acceptability and understandability of the product. A micro health insurance programme consists of several attributes, such as the premium, the services, the quality of the care, etcetera. To understand the demand for the health insurance, it is important to understand the demand for each individual attribute of the health insurance package and the trade-off between them.

One method that is used increasingly in health economics and other disciplines to determine this trade-off between the attributes of health care products or programmes is Discrete Choice Experiments (DCE). In DCE's the stated preference for a hypothetical product or programme is measured, so that the product can be adjusted to the local demand. Respondents are asked to make discrete choices between sets of alternatives with different attribute levels. They would for example have to compare a health insurance package with many services included, performed by a professional doctor for a high premium, with a package with little services included, performed by a nurse for a low premium. By letting respondents make several such choices their preferences can be indirectly measured and the relative importance of the different attributes can be analysed by determining the marginal willingness to pay for changes in attribute levels (Amaya-Amaya et al., 2008).

In this thesis a Discrete Choice Experiment will be applied to get insight in the trade-off between various attributes of the health insurance of Dhulikhel Hospital. Dhulikhel Hospital is planning to offer this micro health insurance as a part of a Health Cooperative Programme. In this programme health insurance is combined with other services: credit- and savings services, health education and skills-based trainings. The demand for these other aspects of the Health Cooperative Programme will be studied in this thesis as well, so the whole programme can be adjusted to the local demand.

Hence, the research questions are:

- What is the relative importance of and the trade-off between the attributes of the micro health insurance?
- What is the demand for the other three aspects of the health cooperative and the health cooperative as a whole?

These questions will be explored in two separate parts: one part about the health insurance (A) and another about the other aspects of the health cooperatives (B). First, the development of both programmes and their relation is explained in Chapter 2. Then, in part A the demand for health

insurance will be analysed by making use of a Discrete Choice Experiment. In chapter 3, the theory behind DCE's will be explained. In chapter 4, the application of the theory in the methodology of this thesis will be described. In chapter 5 and 6, the results of this DCE will be shown and discussed, respectively. In part B, the demand for the other aspects of the health cooperatives will be explored. In chapter 7 the methodology will be outlined and in chapter 8 and 9 the results will be shown and discussed. The thesis concludes with the main findings of the whole research (chapter 10) and the recommendations for Dhulikhel Hospital and for future research (chapter 11).

2. Dhulikhel Hospital Health Cooperative Programme

Dhulikhel Hospital (DH) is a non-governmental, not-for-profit, community based institution in the centre of Nepal. The hospital is related to Kathmandu University. It was founded in 1996 and is now one of the main hospitals in the area. The hospital operates 13 health centres in the rural area around Dhulikhel and is involved in cooperations with several other hospitals in Nepal. A map of DH and its health centres is shown in Figure 1. Besides medical services, DH provides social programmes to the community, such as women's health programmes, health education, microfinance and micro health insurance.

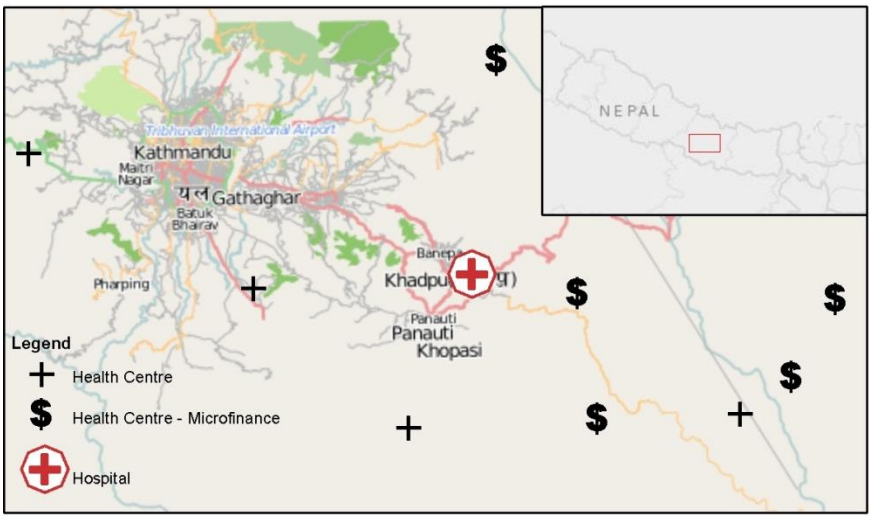


FIGURE 1: LOCATION OF DHULIKHEL HOSPITAL AND ITS HEALTH SERVICES

2.1. Microfinance programme

In 2008 the Department of Community Programmes of DH has launched a microfinance programme for women. The aim of the programme is to empower women in the community. Being able to take loans may increase their financial independence, increase their decision making power, and increase their self-dignity (Dhulikhel Hospital, 2012).

The credit programme is currently offered in five villages where DH operates a health centre: Baluwa, Bahunepati, Dapcha, Solombhu and Kattike Deurali. They are shown on the map in Figure 1. In these five health centres there are 31 microfinance groups, consisting of 7 to 13 women each.

In the microfinance programme women who complied with the selection criteria were visited and asked to join a credit group within their ward. Each village in Nepal is spatially divided in 9 wards, as is shown in figure 2.

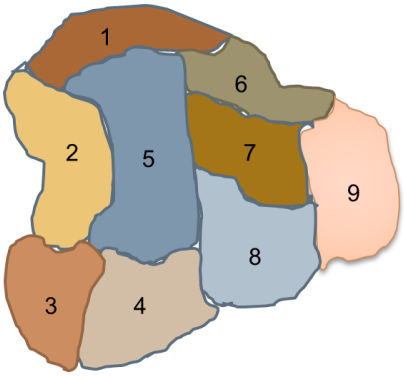


FIGURE 2: A VILLAGE IN NEPAL CONSISTS OF SEVERAL WARDS

The hospital offers loans of around 60.000-70.000 Nepalese Rupees (NPR)[1] to each group to divide over there members. So each woman receives around 6000 NPR[2]. The groups pay back the loans in monthly instalments over four years with an interest rate of 4 percent per year. The hospital has provided different kinds of skills based training to the group such as veterinary training, candle making, mushroom farming and tailoring (Dhulikhel Hospital, 2013b).

The microfinance groups also serve as a saving facility. The women save around 100 to 200 NPR per individual, per month. The amount of savings differs per microfinance group. The saving and the interest rate together form an increasing credit fund for the groups of women.

Moreover, DH makes use of the structure of the microfinance programme to provide health education sessions about prevention and health care. Topics covered are hygiene and sanitation, women's health and awareness trainings.

2.2. Health insurance programme

In 2010 the hospital has started a pilot insurance programme. Hospital staff noticed that many women in the microfinance programme had difficulty in paying for health care services and would often not be able to get the medical treatment they needed. To ensure the women could receive basic medical care, the hospital designed an insurance package for a relatively low premium. The hospital has piloted this health insurance programme for only 50 NPR per month. 10 women and one of their children are included in the pilot: 20 persons in total. Chronic illnesses are not covered. The programme includes the following services:

- Out-patient care;
- One day hospitalization;

[1] 60.000/70.000 NPR is about 610/720 $ and 460/540 € (exchange rate 03-08-2013)
[2] 6000 NPR is about 61 $ and 46 €

- Basic medicines;
- Every lab facility in the health centre;
- And the safe motherhood program (including antenatal care, delivery, postnatal care and child health) (De Jong, 2012)

The hospital itself offers the services through its local health centre. Hence, this is a provider-based health insurance model: the hospital acts both as insurer (collects the premiums) and as provider (provides the health care) as depicted in Figure 2 (Leppert, 2010).

To date, the pilot programme is still running but it is not financially sustainable. It costs the hospital around 1200 NPR. per month. An important finding of the pilot study is that medicine use went up considerably: average medicine use in the pilot group increased by 65 percent.

In 2012 a demand and feasibility study has been performed on the health insurance (De Jong, 2012). This study offers several options to make the insurance scheme financially viable. The hospital can decrease the amount of services offered in the package. It can increase the co-payment for medicines and it can increase the premium. Though, all these options may affect the demand for the insurance programme considerably. Therefore, it is important to get further insight into the demand for different aspects of the insurance programme, so the hospital can adjust the programme to the needs of the women.

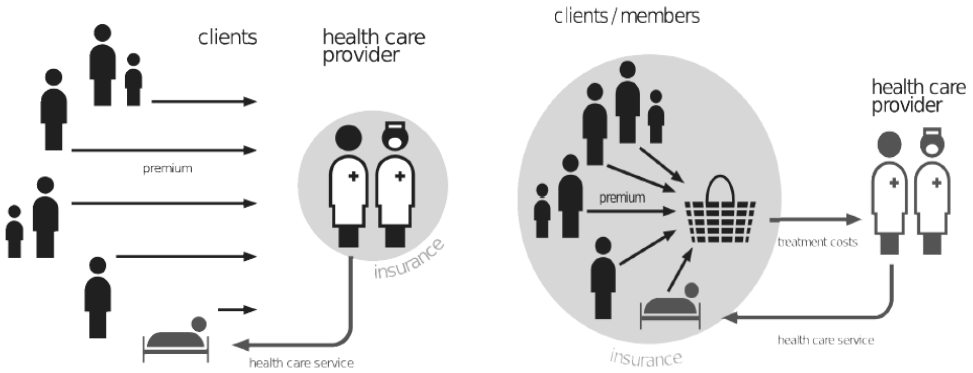


FIGURE 3: PROVIDER-BASED HEALTH INSURANCE AND COMMUNITY-BASED HEALTH INSURANCE (LEPPERT, 2010)

2.3. Health cooperative programme

Many women have successfully paid back their loans after the four year period. The hospital wants to maintain the close connection with the women and increase their financial independence in the long run. Therefore they want to unite them in health cooperatives.

Cooperatives are independent institutions. Membership is voluntary. The members democratically run the organization themselves, hence it is a community based organisation. Credit and savings are

managed within the cooperative. The women will receive the opportunity to take larger loans than in the microfinance programme. The idea behind that is that their financial position has already increased a bit after participating in the microfinance programme and that they can repay higher loans now, to do larger investments. Not only the loans will be higher, but also the interest rates that have to be paid over the loans. In the initial credit programme this was 4 percent. The guideline for interest rate for cooperatives set by the government is 12 percent, though the cooperatives are allowed to deviate from that. The rules for the credit will be uniform and administered in the cooperative constitution (Dhulikhel Hospital, 2013c).

The health cooperative will be independent. The hospital will only assist and provide trainings when needed. The close link with the hospital will make this cooperative a health cooperative. The hospital will provide health education to the women. Moreover, they will assist with organising skills-based trainings if necessary to assist the women with their investments. And finally, they will help with implementing a health insurance. The hospital is still considering if they should make health insurance a mandatory part of cooperative. First, a financially sustainable insurance scheme should be designed. More insight should be obtained on the demand of the women for health insurance and the trade-off they are willing to make between the different aspects. The health cooperatives will thus consist of four main pillars: microcredit and savings, skills-based training, health education and health insurance (Dhulikhel Hospital, 2013c).

In each village there will be one cooperative. The structure of the cooperative will be based on the microfinance programme. This structure is represented in figure 4. In each ward there are several microfinance groups. Each group has its own chairwoman, secretary and treasurer. The chairwomen of each microfinance group in the ward are united into ward committees that represent all the groups in the ward. Finally, the representatives of all the 9 wards are combined into a central cooperative committee that is the official management of the cooperative.

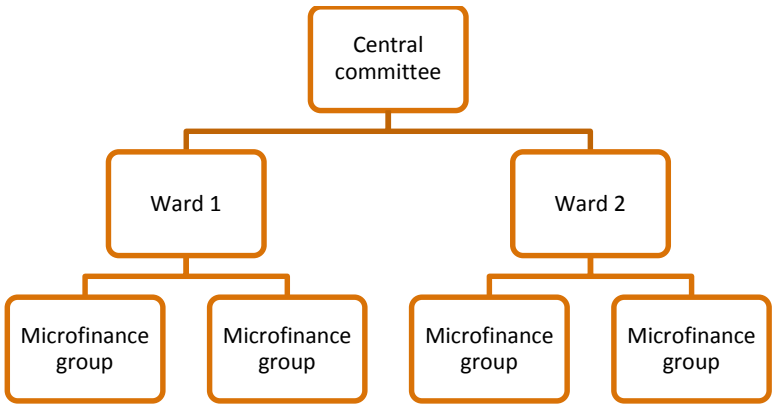


FIGURE 4: COOPERATIVE STRUCTURE

2.4. Research site and research population

The research was conducted in two of the villages where DH has introduced its microcredit programme: Kattike Deurali (KD) and Bahunepati (BP). The women in these villages that have successfully finished their microfinance programme and paid back their loans are eligible for the health cooperative programme. In KD 103 women have successfully finished their microfinance programme and in BP 30. These women are distributed over nine wards, or neighbourhoods, as shown in Figure 2.

Total population sampling was applied, to get a clear idea about the preferences of all the eligible women. In each ward all women who were around at the moment were approached to participate in the research. This resulted in a representative sample of 101 respondents: 76 percent of the research population. Out of the 103 eligible women in KD 77 were interviewed and out of the 30 women in BP 24 participated.

Part A: Health Insurance

3. Discrete Choice Experiments

Discrete Choice Experiments (DCE's) are a survey-based method that is used to measure preference for products or programmes that are not yet on the market, like the health insurance programme of DH. As there is no market for the good yet, revealed preferences can not be measured and stated preferences have to be used to measure demand (Lancsar & Louviere, 2008).

DCE's originated in psychological and economic modelling of choices. They are used intensively in marketing, transport and environmental economics. Last two decades they are used increasingly in health economics as well to evaluate demand for products and programmes such as: breast cancer screening programmes (Gerard et al., 2008); preventive asthma medication (Lancsar et al., 2007); long-term care services (Nieboer et al., 2010); and even whole health care systems (Franken & Koolman, 2008). DCE's are a form of cost-benefit analysis in which not only health outcomes are evaluated, but process factors such as waiting time, quality of care and costs are included as well. Therefore, with DCE's multiple policy options can be compared and evaluated at ones (Amaya-Amaya et al., 2008; Lancsar & Louviere, 2008).

In DCE's real world decisions are simulated for hypothetical products or programmes (Mangham et al., 2009). Respondents are asked to make a choice between two or more different alternatives. One set of alternatives is called a choice set (Kuhfeld, 2010). In Table 1 a choice set consisting of two alternatives is shown. Each alternative represents a hypothetical product or programme, such as DH's health insurance programme. This programme consists of several characteristics, called attributes (Amaya-Amaya et al., 2008; Lancsar & Louviere, 2008). Possible attributes of a health insurance are: the premium, the number of health services included and the quality of the care. The second and the third column of Table 1 both represent an alternative health insurance package. Both packages consist of the same three attributes, but in each alternative the attributes have a different level. The first alternative may, for example represent a health insurance package with a low premium (attribute 1 level a), a high number of services included (attribute 2 level c) and a medium quality of care (attribute 3 level b). The second alternative then represents a health insurance package with a high premium (attribute 1 level c), medium number of services included (attribute 2 level b) and low quality of care (attribute 3 level a). In a DCE respondents are asked to make a discrete choice (either one or the other) between the presented alternatives (Amaya-Amaya et al., 2008; Lancsar & Louviere, 2008).

TABLE 1: ONE CHOICE SET WITH TWO ALTERNATIVES

	Alternative 1	Alternative 2
Attribute 1	Attribute1 level a	Attribute1 level c
Attribute 2	Attribute2 level c	Attribute2 level b
Attribute 3	Attribute3 level b	Attribute3 level a

Hence, a choice set is a set of alternatives, combinations of attribute levels, which respondents will have to compare in the choice experiment (Johnson et al, 2013). Often respondents are presented with multiple choice sets. By choosing between the alternatives, respondents make a trade-off between the attribute levels and reveal their underlying preferences. As such, the relative (stated) preference for the individual attributes can be measured (Bekker-Grob et al, 2009; Johnson et al, 2013).

DCE's are rooted in the notion of rationality. People are thought to make rational choices between different alternatives. To do so they have to evaluate all the attributes of the alternatives. The assumptions of DCE's are as follow:

- People's choice represents a true reflection of their preferences;
- People have complete preferences over alternatives and their attributes;
- People's preferences are stable over time;
- People are willing to trade between attributes (Franken & Koolman, 2008);
- And people have unlimited information processing capacity in order to make the choice (Danthurebandara et al., 2011).

These assumptions are interrelated. Choice experiments are aimed at unravelling people's preferences for different programmes and their attributes. To do so, people first of all should have preferences for these programmes. These preferences have to be complete and stable. Having complete preferences means that people value all attributes of the programme (either positive or negative) and take all the levels of all the attributes into account when choosing their preferred alternative. Having stable preferences means that those preferences do not change over time. Moreover, respondents should be willing to trade between the attributes, because DCE's are aimed at finding the relative importance of different attributes (Franken & Koolman, 2008). To be able to assess difficult choice sets with many alternatives, attributes and attribute levels, respondents need unlimited information processing capacity (Danthurebandara et al., 2011).

The method draws upon two important theories on choice behaviour: Lancaster's Theory of Value and Random Utility Theory. Lancaster's Theory of Value states that the value that a certain product has to an individual is determined by the value that the underlying attributes of that product provide to that

person. People's preferences for those attributes are revealed by the choices they make (Amaya-Amaya et al., 2008; Louviere et al., 2000).

Random Utility Theory (RUT) states that people derive utility form certain choices. They are assumed to rationally choose the alternative that will provide them the most utility in order to maximize their total utility. Researchers can empirically measure some part of that utility and the factors that influence it by analysing peoples choices, but there will always be a random utility component that can not be explained. Hence, the utility U that individual n receives from alternative j can be written as:

$$U_{nj} = V_{nj} + \varepsilon_{nj} \tag{3.1}$$

It exists of a systematic, explainable component V_{nj} and a random component ε_{nj}. This random component represents the random variation in preferences that can not be measured (Amaya-Amaya et al., 2008; Lancsar & Louviere, 2008; Mangham et al., 2009).

Following Lancaster's Theory of Value the systematic component $V(x_{nj}, \beta)$ is a function of the vector of the attribute levels x_{nj} that respondent n faces in alternative j and the estimate of their relative contribution to total utility, β.

$$U_{nj} = V\big(X_{nj}, \beta\big) + \varepsilon_{nj} \tag{3.2}$$

Most often it can be assumed that U_{nj} is linear in the unknown parameters (McFadden, 1973). In that case the formula will look like:

$$U_{nj} = x_{1j}\beta_{1nj} + x_{2j}\beta_{2nj} + \ldots + x_{pj}\beta_{pnj} + \varepsilon_{nj} \tag{3.3}$$

p represents the total number of attributes of which alternative j consists. And $(x_{1j}, x_{2j}, \ldots, x_{pj})$ represent the attribute levels included in the alternative. In table 1 the attribute levels of alternative 1 are given vertically in the second column. As there are three attributes in that example p would be 3: x_{1j} would represent the lowest premium level, x_{2j} the highest number of services included in the package and x_{3j} the medium quality of care. $(\beta_{1nj}, \beta_{2nj}, \ldots, \beta_{pnj})$ represent the relative contribution of the attribute levels $(x_{1j}, x_{2j}, \ldots, x_{pj})$ to the utility that individual n receives from alternative j. Besides the observable effect of the attributes on the utility obtained, there is also an unobservable effect, which is captured in (ε_{nj}). Hence, the total utility that individual n receives from alternative j is the sum of the attribute levels $(x_{1j}, x_{2j}, \ldots, x_{pj})$ times their corresponding estimates $(\beta_{1nj}, \beta_{2nj}, \ldots, \beta_{pnj})$, plus the unobserved random component (ε_{nj}).

The dependent variable Utility, U_{nj}, is a latent variable, it can not be measured directly. It is indirectly revealed through the choice an individual makes (Lancsar & Louviere, 2008). This choice is represented by the binary variable y_{nj} that receives the value 1 if alternative j is chosen by individual n and 0 if any other alternative is chosen.

$$y_{nj} = \begin{cases} 1, if\ alternative\ j\ is\ chosen \\ 0, otherwise \end{cases} \quad (3.4)$$

So, the probability that individual n (that is randomly drawn from the sample) chooses alternative j is the estimated probability that y_{nj} is 1, given the attribute levels x_j of the alternative and their corresponding coefficient β_{nj}:

$$P_n(j) = \Pr(y_{nj} = 1 | x_j, \beta_{nj}) \quad (3.5)$$

Suppose there are two alternatives in the choice set: alternative j and alternative k. Individual n will choose alternative j over k if the utility he receives from alternative j is higher than the utility he receives from alternative k:

$$\begin{aligned} P_n(j) &= \Pr\left(U_{nj} \geq U_{nk}\right) \\ &= \Pr\left(\left(V_{nj} + \varepsilon_{nj}\right) \geq \left(V_{nk} + \varepsilon_{nk}\right)\right) \\ &= \Pr\left(\left(V_{nj} - V_{nk}\right) \geq \left(\varepsilon_{nk} - \varepsilon_{nj}\right)\right) \end{aligned} \quad (3.6)$$

It is possible to include more alternatives in the choice sets, in that case the probability of choosing alternative j would have to be larger than the probability of choosing any other alternative of all alternatives J. In this research only two alternatives will be included in the choice sets, therefore from now on a choice set will mean a set of two alternatives. These individual choices can be aggregated over all individuals N in all choice sets T. As such, the relative importance of the attributes for the whole population can be determined.

Measures of the relative importance of the attributes are called welfare measures. These can be used to determine the trade-off between the attributes of a future programme, such as the DH Health Insurance Programme. With this knowledge the programme can be design according to the needs of the people. One example of a welfare measure is the Marginal willingness to pay (MWTP). The MWTP shows how much people are willing to pay for an improvement in another attribute, for example, an increase in the quality of the health care. If a cost measure (such as the premium) is included as attribute, the Marginal Willingness-to-pay (MWTP) can be indirectly obtained. (Drummond et al, 2005; Kjaer, 2005; Lancsar & Louviere, 2008; Mangham et al., 2009; Ratcliffe, 2000).

The design of a DCE starts with the selection of relevant attributes and attribute levels. Both attributes with positive utility (such as health outcomes) as with negative utility (such as costs) should be included (Kjaer, 2005). Attribute levels can be cardinal (costs), ordinal (low, average, high) or categorical (doctor or nurse) (Franken & Koolman, 2008).

It is important that suitable attributes and attribute levels are chosen, because the DCE should reflect real life choices as much as possible, to reveal respondents true preferences (Ryan & Wordsworth, 2000; Viney et al., 2005). The attributes should be selected based on both population and policy concerns (Mangham et al., 2009). They should be comprehensive, realistic and meaningful to respondents (Mangham et al., 2009). This means that they should be adjusted to local circumstances. According to Wittington (2002) the quality of the data can be seriously affected if the research design and research execution are not adjusted to local circumstances. Hence, the validity of the research is dependent on how well the attributes and the attribute levels are specified (Mangham et al., 2009). For a researcher conducting a DCE in a foreign country this is specifically important. In order to define suitable attributes one should understand the decision problem in detail. The researcher needs to know the specifics about the product or programme under evaluation and needs to understand the perspective of the target population (Amaya-Amaya et al., 2008).

After the attributes and attribute levels are selected the experimental design should be created. This means combining different alternatives into choice sets and selecting a sample of all the possible choice sets for the experiment in such a way that all the parameters of interest can be estimated (Viney et al., 2005). The methodology applied for the selection of the attributes and the design of the attributes will be explained in the next chapter as well as the collection of the DCE-data and the method for analysing this data.

4. Methodology

The major goal of this research is to gain insight in the trade-off between various health insurance attributes. By identifying these trade-offs the Health Insurance Programme within the Health Cooperative Programme of DH can be adjusted to the demand of the local women.

In this section I will clarify how the research has been conducted. First, I will explain how I have chosen the attributes and attribute levels. Then I will show how these are combined into the experimental design consisting of nine choice sets. Subsequently, I will explain the data collection process and finally, the data analysis.

4.1. Attributes and attribute levels

In the literature several health insurance attributes are mentioned in studies in developing countries: monthly premium; health care services in the package; quality of the health care; co-payment for prescriptions; choice for hospital or physician; hospital waiting time; deductibles[3]; no-claim discount[4]; and additional services (Gates et al., 2000; Kerssens & Groenewegen, 2005; Vroomen & Zweifel, 2011). Some of these attributes are general characteristics of health insurances (such as premium and package) and others reflect country- or company specific choices (such as deductables and no-claim discounts). So they may not all be relevant in a low-income country, such as Nepal. According to Mangham (2009) it is advisable for foreign researchers with little knowledge about the local culture to collect primary qualitative data on the importance of certain attributes. The attributes should be selected both on population as well as policy concerns (Mangham, 2009). Kjaer (2005) suggests to first hold focus group discussions with policy makers and other experts in the field. Moreover, several authors advice pilot testing in order to test if the attributes and attribute levels are meaningful, realistic and comprehensive for local respondents (Glenk & Weber, unknown; Kjaer, 2005; Lancsar & Louviere, 2008; Mangham et al., 2009).

Based on these recommendations I started the research with a focus group discussion with the staff of the Department of Community Programmes that is responsible for the social projects of DH and the implementation of the Health Insurance and Health Cooperative Programme. They shared their personal experiences and the results of a feasibility study that was conducted for DH in 2012 (De Jong, 2012).

[3] A deductible is the part of the health care costs that the insured have to pay out-of-pocket before the health insurance sets in. It is often a fixed amount per year.
[4] A discount on the premium or a bonus insured receive when they consume very little health care in a certain year.

The feasibility study showed that it is very difficult to find a sustainable balance between the monthly premium paid and the expected health care costs of the population. Most of the costs can be attributed to medicine use. In the health insurance pilot of DH this uptake increased by 65 percent after enrolment. De Jong recommends excluding pharmacy costs from the health insurance package to keep premiums low. However, the hospital staff thinks that the women will not be interested in the health insurance programme if pharmacy is excluded. Another option is to introduce a co-payment for pharmacy. A co-payment is a suitable instrument to reduce the moral hazard of overuse of facilities (Armendáriz & Murdoch, 2010). So, a co-payment on pharmacy may reduce the incentive to consume more medicines than necessary. The hospital staff considers including a co-payment more acceptable than excluding pharmacy costs all together. Both the co-payment, the premium and the balance between them may influence the demand for health insurance and, hence, are important attributes to include in the DCE.

Another important factor that affects the height of the premium to be charged is the number of people who are included in the health insurance. If more people are involved in the scheme, the risk of getting ill is spread over a larger pool of people. The chance that only high risk individuals will be included will decrease and the sustainable premium per person that has to be charged may become smaller as well. This is called 'the law of numbers' (Leppert, 2010).

So, there is an important trade of between the premium per month (in Nrs per person), the co-payment for pharmacy (in %) and the type of health care package, individual or family. Other health insurance attributes that are mentioned in the literature are the number of services included in the package, the quality of the health care and freedom to choose an institution or physician (Gates et al., 2000; Kerssens & Groenewegen, 2005; Vroomen & Zweifel, 2011). However, these attributes are already set in the programme DH wants to offer. It will be a provider-based health insurance (§ 2.2) so it only covers the health care provided by the local DH health centre. The quality of the care just reflects the care that is provided in the health centre. The services included in the package are the same as in the pilot programme (§ 2.2). As all these attributes are fixed they can not be included in the DCE[5].

Hence there are three attributes left to be included in the DCE: the premium (in NPR. per person per month) a co-payment for pharmacy (in percentage) and the type of package (in family type). Table 2 (below) shows these three attributes together with their corresponding attribute levels.

[5] They will be discussed in Chapter 6, though.

TABLE 2: ATTRIBUTES AND ATTRIBUTE LEVELS OF THE DHULIKHEL HOSPITAL HEALTH INSURANCE PROGRAMME

Attribute	Level
Premium (in NPR. per person per month)	100 – 120 – 140
Co-payment for pharmacy (in percentage)	10 – 20 – 30
Type of package	Individual - core family - extended family

The attribute levels were chosen in accordance with the staff of DH and by using the premium calculation model from the feasibility study (De Jong, 2012). According to the feasibility study an individual package without a co-payment would lead to a premium of 214 NPR.[6]. This exceeds, by far, the stated willingness to pay of 70 NPR., which was found in the same study. Because of the small range of the cost values used in that study, the actual willingness to pay may be somewhat higher than the stated 70 NPR., but it will not be as high as 214 NPR.. If the insurance is family-based and a co-payment for pharmacy of 30 percent is introduced, the minimal sustainable premium would become around 107 NPR. per family member per month.[7] A family package with a co-payment of 20 percent would require a premium of 122 NPR. and a co-payment of 30 percent a premium of 137 NPR.. So the minimum sustainable premium for health insurance with a co-payment would be between the range of 107-137 NPR. To assure enough difference between the levels of the premium, the levels 100, 120 and 140 were chosen for the DCE in accordance with the staff of DH. Moreover, co-payment levels of 10, 20 and 30 percent were chosen. In the feasibility study a family package was based on the average number of family members in the study. Some women live with their core family (husband and children) and some with their extended family (several generations in one household[8]). Therefore, in this research I make a distinction between the core family and the extended family. This provides us with three levels for the type of package: individual, core family and extended family. The attributes and attribute levels were tested and discussed during a pilot session in Bahunepati. This is described in § 4.3.1.

The levels of the attributes in each alternative j correspond to the x-values in equation 3.3 (x_{1j}, x_{2j}, x_{3j}). Their relative contribution to the utility of the health insurance package for individual n can be obtained by estimating the corresponding estimates $(\beta_{1nj}, \beta_{2nj}, \beta_{3nj})$. The attribute 'type of

[6] Based on a security charge of 15% to account for the small number insured when only the individual women are included.
[7] Based on a security charge of 5 % and a lower medicine use, because of the reduction of over-use due to moral hazard.
[8] Sometimes several families or parts of families live in one building, which can make the notion of households confusing. Therefore, a household is defined in Nepal as the people sharing one kitchen.

package' is included as dummy variable, because it is categorical. The levels 'core' and 'extended' are included in the utility function and 'individual' serves as the reference level.

Assuming the utility function is linear in the attributes (McFadden, 1973) the utility that individual n receives of alternative j is given by:

$$U_{nj} = \beta_{1nj} premium_j + \beta_{2nj} copayment_j + \beta_{3nj} core_j + \beta_{4nj} extended_j \qquad (4.1)$$

$premium_j$ corresponds to the premium level in alternative j and β_{1nj} to its contribution to the total utility individual n receives from alternative j. The same counts for $copayment_j$: it represents the co-payment level in alternative j and β_{2nj} represents its contribution to the total utility individual n receives from alternative j. The variable type of package is a dummy variable, therefore, its interpretation is a little different. Only one of its three levels can be included in alternative j. If j includes core family, than $core_j$ becomes 1 and $extended_j$ becomes 0 and if j includes extended family it is the other way around. If j is an individual package than both $core_j$ and $extended_j$ become 0. So β_{3nj} measures the difference in utility between individual and core family and β_{4nj} measures the difference in utility between individual and extended family.

If all discrete choices of all individuals N and all choice sets T are aggregated the equation becomes:

$$U = \beta_1 premium + \beta_2 copayment + \beta_3 core + \beta_4 extended \qquad (4.2)$$

4.2. Experimental design

Making an experimental design means combining different alternatives into choice sets and selecting a sample of all the possible choice sets for the experiment in such a way that all the parameters of interest can be estimated (Viney et al., 2005). One option would be to make a full factorial design. With such a design all main effects of the attributes on utility and all interaction effects between the attributes can be calculated. To do so all possible choice sets should be included in the design (Amaya-Amaya et al., 2008). From the three three-level attributes in the DCE 27 different alternatives could be generated, that subsequently could be combined into 351 binary choice sets[9]. Using all these 351 choice sets would give a very long survey and an extremely large cognitive burden for respondents. Therefore, I decided to use a fractional factorial design in which a sample of all 351 possible choice sets was generated in such a way that at least the main effects could be calculated. To do so I made use of the optimal design method of Street et al. (2008). They found that the number of choice sets to

[9] The total number of different alternatives that can be obtained by a certain design is given by the product of all attribute levels. The design with 3 levels for each attribute gives 3*3*3 = 27 different alternatives. Combining these into binary choice sets gives (27*26)/2 = 351 different possibilities (Amaya-Amaya et al., 2008)

be used can be reduced by using so called orthogonal arrays. Orthogonal arrays are codes that represent the attribute levels and that are both level balanced and orthogonal. Level balance means that all attribute levels appear an equal numbers of times (Johnson et al., 2013). Orthogonality means that each attribute level should appear in the choice sets with each level of each other attribute with equal frequency (Lancsar & Louviere, 2008). So, level balance minimizes the variance of the parameter estimates (Mangham et al., 2009) and orthogonality makes sure that the variations of the attributes are uncorrelated with each other (Lattin et al., 2003) and the estimates of the attributes are independent from each other (Street et al., 2008).

An orthogonal array is 100 percent efficient: it is both orthogonal and balanced. Efficiency measures how much information can be obtained from the design. It captures all deviations from orthogonality, balance and minimum standard errors in one number. If a design is a 100 percent efficient all main effects and all possible interactions can be measured. If a design is not 100 percent efficient the parameter estimates may be correlated and it may become difficult to estimate the effect of each individual attribute (Kuhfeld, 2010).

An orthogonal array is a matrix: a code that represents an experimental design. The columns represent the attribute levels in the DCE and the rows represent the number of choice sets. Orthogonal arrays can be obtained from design catalogues (Mangham et al., 2009). Street et al. (2008) make use of an online catalogue provided by Sloan (2005). The designs are coded as oa.N.k.s.t., indicating an orthogonal array (oa.) with N number of alternatives, k number of attributes, s number of levels and strength t. The strength indicates which effects can be calculated with the design: only main effects (strength 2) or main effects plus two-factor interactions (strength 4). The more interaction effects are included in the design, the more efficient it is and the more precise the parameter estimates will be (Sloan, 2005). Orthogonal arrays are only available for a specific number of choice sets, for a specific number of attributes and a specific number of attribute levels. They do not exist for all possible combinations. It is however possible to adjust an existing orthogonal array to obtain a D-efficient design. (Kuhfeld, 2010; Street et al., 2008). The efficiency of such an adjusted design can be calculated with the variance-covariance matrix (see Annex 1) (Street et al., 2008).

For my fractional factorial design with 3 attributes with 3 attribute levels each no orthogonal array exists, so a D-efficient design was obtained from an existing orthogonal array with similar properties. The smallest design in the catalogue (Sloan, 2005) for my DCE with 3 attributes and 3 levels with strength 4 (main effects + two factor interactions) would have over 100 alternatives. The smallest design with strength 2 (only main effects) would have 9 alternatives. So the difference is significant. According to Ryan and Wordsworth (2000), over 80 percent of the preference structure can be

explained by the main effects. Moreover, while choosing a design with more choice sets might improve the statistical efficiency of the design, it might decrease the respondents' efficiency of the design. The larger the burden that is placed on respondents, the larger the chance that their answers become biased. Therefore, I decided to use the design with strength 2 and 9 alternatives (oa.9.4.3.2). This design contains 4 attributes instead of 3, so I deleted 1 attribute from the design so each alternative had a three-digit code. This design code represents the first alternative of the choice set, as shown in the left column of Table 3. To receive the second alternative a generator (111) was added. The generator changes each attribute in the first alternative with 1 level to obtain the second alternative in Table 3. This way, for example, alternative 1 in choice set 8 (210) becomes (021) in the second alternative.

TABLE 3: CODE OF A DESIGN WITH 3 ALTERNATIVES WITH 3 LEVELS EACH

Alternative 1	Alternative 2
000	111
011	122
022	100
101	212
112	220
120	201
202	010
210	021
221	002

In Table 4 the translation of these codes into the actual choice sets is shown. As we can see each attribute level is presented an equal number of times, so the design is level balanced. However, each attribute level does not appears with each level of each other attribute equally frequent. For example, a premium of 100 appears with a co-payment of 10 and an individual package and with a co-payment of 10 and an extended family package, but it does not appear in the design with a co-payment of 10 and a core family package. The design is D-efficient: it is balanced, but not fully orthogonal. The efficiency of the design is 83.3 percent[10].

[10] For calculations see Annex 1.

TABLE 4: EXPERIMENTAL DESIGN DISCRETE CHOICE EXPERIMENT

Alternative 1			Alternative 2		
premium	co-payment	package	premium	co-payment	package
100	10	Individual	120	20	Core
100	20	Core	120	30	Extended
100	30	Extended	120	10	Individual
120	10	Core	140	20	Extended
120	20	Extended	140	30	Individual
120	30	Individual	140	10	Core
140	10	Extended	100	20	Individual
140	20	Individual	100	30	Core
140	30	Core	100	10	Extended

During the interviews each respondent was asked to choose between the two alternatives in Table 4. Would they prefer a premium of 100 Nrs. with a co-payment of 10 percent on an individual basis? Or would they prefer a somewhat higher premium of 120 Nrs. with a co-payment of 20 percent if all members of the core family are included in the package? So, each choice set the respondents is 'forced' to make a choice between the two hypothetical health insurance packages. Some scholars recommend including a so-called opt-out alternative in the choice set. This gives the respondents the opportunity to choose neither of the alternatives. In that case the respondents could choose either alternative 1, alternative 2 or neither of the two. If an opt-out alternative is left out the estimated participation rate may be overestimated, because in real life people also have the opportunity to choose not to participate in a certain programme. However, including an opt-out may also reduce the amount of information that is obtained on the preferences of the respondents (Amaya-Amaya et al., 2008; Ratcliffe, 2000). Therefore, I chose not to include an opt-out alternative, but to add an extra question after the choice experiment to ask if the respondents actually want to participate (see § 4.3.4).

4.3. Data collection

For the validity of the data it is very important that the DCE is comprehensive, realistic and understandable (Mangham, 2009). Both the research design and the research execution should be adjusted to local circumstances (Wittington, 2002). To improve the research design to local circumstances a pilot testing was conducted. In the research execution the understanding of the respondents, the local women, was considered. As most of the women are illiterate and a health insurance programme is a quite abstract concept, much effort was put into explaining the choice task in an understandable way. First, the data assistants who translated the questionnaire were trained to explain the choice tasks well. Second, introductory meetings were held to explain the aim of the research and the concepts of health insurance and health cooperatives. After that, the DCE was

conducted in individual face-to-face interviews. Moreover, in depth interviews were done to help understand the local context of the DCE-outcomes. All these phases will be explained here subsequently.

4.3.1. Pilot testing

Many authors state that it is important to pilot the survey to test respondents' understanding of the context of the choice and the complexity and length of the task (Glenk & Weber, unknown; Kjaer, 2005; Lancsar & Louviere, 2008; Mangham et al., 2009). Therefore, a pilot session was held in one of the research site, the village Bahunepati. Eight women were present at the pilot. First, two women were interviewed, while the others were present. Then, a focus group discussion was held about the length and difficulty of the questionnaire and the relevance and understandability of the questions. The DCE is part of a larger questionnaire that also addresses the other aspects of the health cooperative programme (see section B). But, while all parts of the questionnaire were discussed, most attention was given to the DCE, because of the relative difficulty of the task. Respondents were asked if the choice task was clear; if it was difficult to make a choice; and if the attribute levels and the used words were realistic.

In advance the women stated that they were already familiar with the concept of health insurance, but during the interviews the notion did not seem fully understood. Moreover, the women found it difficult to keep the overview of all the possible alternatives. The levels of the alternatives were found suitable, though, and the choice task was not considered to be too difficult.

4.3.2. Training of data assistants

The pilot testing session also provided a moment for the data assistants to practice the face-to-face interviews and the introduction. Two data assistants were selected by the hospital to perform the interviews in Nepali. Both women were students in the final year of their Bachelors Public Health. As such, they already had extensive knowledge of the health care system in Nepal and experience with field work. The data assistants had three main tasks: to help with arranging the logistics of the research[11]; to translate the instructions in the introductory meetings and the conversation in the in-depth interviews; and to individually perform the face-to-face interviews.

The data assistants played a key role in making the DCE understandable for respondents (Amaya-Amaya et al., 2008). Therefore, they were trained to use clear and simple wording and make the respondents feel at ease to reduce the cognitive burden of the choice task. Moreover, as there were two data assistants employed, there is a chance of interviewer bias: the interviewer might influence

[11] Reaching the research sites, finding all respondents, etc.

the answers respondents give (Glenk & Weber, unknown). In order to decrease interviewer bias, the women were trained to understand and explain the questions in the same way. Because of financial and time constraints, the questionnaire was not translated to Nepali at forehand. The data assistants had to translate them on the spot. In such a case, it is even more important to train data assistants well so the same explanation and words are used for all respondents (ibid.). Therefore, some important words were discussed, so both would use the same wording. These words are cooperative, insurance, premium, co-payment and income.

4.3.3. Introductory meetings

Before the individual interviews, introductory meeting were held to explain the women about the aim of the research, the plans of the hospital and the concepts of health cooperative and health insurance. The introductory meetings were held in groups of 6-12 women, mostly from the same ward and microfinance group. Most often, we asked the villagers to collect all the women from the ward who were in town and who were willing to participate in the research. At first we told them we were sent by DH to gain their trust, but during the introductory meeting we made sure they knew that we didn't work directly for the hospital to maintain our independence. Furthermore, we told them that all the answers would be considered confidential and that no information could be hold against them.

During the pilot it became clear that most women did not fully understand the concept of health insurance. Therefore, a health insurance game was introduced in which the difference between a situation with and without health insurance was visualized. This game is explained in Annex 2. The game also served as a light warming-up for the whole group and a way to gain trust for the face-to-face interviews.

Glenk and Weber (unknown) experienced that respondents often feel like they are not smart enough to participate in research or like they have to pass an exam. Therefore, we used simple language to make the respondent feel at ease. Moreover, we made clear that the interviews were not a test and that there was no right or wrong answer, but that we just wanted to know their opinion. This way we tried to reduce the courtesy/hospitality bias: that respondents may bias their answers to what they expect the interviewer wishes to hear. Glenk and Weber (ibid.) state that this bias can be especially large in Asian countries, because politeness is often stated very high in these cultures.

4.3.4. Face-to-face interviews

After the introductory meetings the individual face-to-face interviews were done. The DCE was included into a comprehensive questionnaire about all aspects of the health cooperative programme: microfinance; health education; skills-based trainings; and health insurance. This questionnaire can be found in Annex 3. Part D shows all the choice sets presented to the respondents.

Extra effort was made to reduce the cognitive complexity of the choice task. According to Mangham (2009) this can be done by reducing the number of choice sets, by reducing the number of attributes per choice or by adding pictures or verbal descriptions to the survey (Mangham, 2009). The experimental design was chosen in such a way that only nine choice sets with three attributes were left. Moreover, extensive information was provided during the group sessions. The knowledge obtained by this introduction was tested in part C. Question C3 and C4 addressed the concept of health insurance. In C3 it was checked if the women remembered the most important features of a health insurance (pay a monthly premium; receive basic health care in case of illness; receive nothing in case of no illness). In C4 the last aspect of question C3 was stressed again: 'What happens if you do not get ill in a month?'. This was to make sure that the women understood that they do not get their premium back. Dror (2011) found that over 50 percent of his respondents in India and Nepal thought that they would get their premium back if they do not fall ill.

Extra information was added to the questionnaire in the introduction to the DCE (see Annex 3, part D). In this introduction the respondents were explained how to make a choice between the two alternatives and they were asked to consider all alternatives in their decision. An example choice between two telephones is provided, which serves as a warming up for the actual exercise (question D1).

Subsequently, the attribute levels of the actual choice task, the health insurance were explained. In the pilot session it proved to be difficult for the respondents to keep an overview of all the attribute levels. Therefore, a show card with all attribute levels depicted in icons was used to visualize the choice task (Annex 4). This show card was used for every choice set.

Questions D3-D11 show the 9 choice sets that were obtained by the experimental design (Table 4). Two extra questions were added to test the rationality of the responses. Question D2 shows a dominant alternative (Kjaer, 2005). Both alternatives have the same levels for 2 attributes, but for the third attribute alternative 1 is clearly dominant over alternative 2. The rational choice would be to choose this dominant alternative. D12 shows a transitivity test (Kjaer, 2005). It is an expansion of question D6: a third alternative is added. Here it is checked if both choices are consistent with each other. If in D6 the first alternative is preferred over the second, than this should still be the case in D12.

If the respondent choses the second alternative in D12 her preferences are inconsistent. In line with Gyrd-Hansen & Skjoldborg ideas (2008) a probing questions was added to get more insight into where inconsistencies are based upon.

A consistency test for the whole experiment is provided by question D15. Here, the respondents are asked to rank the three attributes in order of importance. The outcome of these direct stated preferences will be compared to the indirect stated preferences of the DCE. Finally, D16 presents the substitute for the opt-out alternative (see 4.2) and asks the women if they are willing to join the cooperative if the insurance is mandatory.

4.3.5. In depth interviews

During the data collection process some extra information was received in informal conversations with different parties. Based on this information open questions were made for semi structured in-depth interviews with staff of the health centres, group leaders and other women who are eligible for the health insurance programme. These in-depth interviews addressed the experiences with the former Microfinance programme and thoughts and ideas about the new Health Cooperative programme. Some questions about the health insurance aspect of the Health Cooperative programme were added to provide a social context for the results of the DCE. The outcomes will be used in the discussion of the results (Chapter 6).

In Kattike Deurali 4 in-depth interviews were conducted of which two with staff of the health centre, one with a group leader and one with a group member. In Bahunepati also 4 in-depth interviews were held of which two with staff of the health centre, one with an individual group member and one group interview with three group members and a group leader. Because all the interviews were in Nepali they could not be recorded literally. They were translated and written down on the spot and later checked by the data assistants. The interviews can be found in Annex 5.

4.4. Data analysis

The aim of the research is to determine the relative importance of the individual attributes on total utility obtained by the health insurance. As explained in § 4.1 and equation 4.2:

$$U = \beta_1 premium + \beta_2 copayment + \beta_3 core + \beta_4 extended$$

This utility is a latent variable that is indirectly revealed trough the choices the respondents made in the choice experiment.

Each respondent was asked to make nine discrete choices between two alternative choice sets with different attribute levels. So the data shows a panel structure: there are several observations per individual. However, instead of measuring one choice at different moments in time for each individual, nine different choice sets t are presented at once to each individual. And each of these nine choice sets consists of two different alternatives with different attribute levels. The data are so-called alternative-specific. A model in which this alternative-specific panel structure is combined with binary data is called the conditional logit (Chamberlain, 1980; McFadden, 1973). The conditional logit model calculates the logistic (binary) regression model conditional on the alternative specific parameters x_{jt} and adds a fixed effect parameter α_{nt} for each choice set t for each individual n:

$$y_{njt}{}^{*} = x_{jt}\beta'_{jt} + \alpha_{nt} + \varepsilon_{njt} \qquad (4.3)$$

The individual specific parameter α_{nt} accounts for the panel structure of the data. As nine choice sets are made by each individual there is a correlation between these nine observations. α_{nt} captures random taste variation and other individual specific omitted variables. So each observation $y_{njt}{}^{*}$ that alternative j in choice set t made by individual n is chosen or not ($y_{njt}{}^{*} = 1/0$) is determined by the attribute levels in that alternative x_{jt} times the estimates of the effects of these attribute levels on total utility β'_{jt} , plus the individual specific parameter α_{nt} and the random variation ε_{njt}. Note that β'_{jt} is not individual specific. It shows the average effect (over all N) of the attribute levels on the total utility of alternative j in choice set t.

Applying the conditional logit model to the DCE in this research would give the following Utility function for each alternative j for in each choice set t made by each individual n:

$$U_{njt} = \alpha_{nt} + \beta_{1t} premium_{njt} + \beta_{2t} copayment_{njt} + \beta_{3t} core_{njt} + \beta_{4t} extended_{njt} + \varepsilon_{njt} \qquad (4.4)$$

The individual specific parameter α_{nt} is the same for both alternatives in the choice set. It captures all variables that do not vary over the alternatives. Therefore, there is also no constant included in the equation. Hence, in the aggregate conditional logit utility function of the health insurance programme

both the individual specific parameter α_{nt} and the constant are excluded. Which gives the utility function of equation 4.2:

$$U = \beta_1 premium + \beta_2 copayment + \beta_3 core + \beta_4 extended \quad (4.5)$$

This equation can be solved by Maximum Likelihood (Chamberlain, 1980). In this research STATA 12.0 is used to do this calculation. The results are shown in Chapter 5.

5. Results

In this the results of the DCE are presented to answer the research question: *'What is the relative importance of and the trade-off between the attributes of the micro health insurance?'*.

5.1. Population

Table 5 gives an overview of the number of respondents that fully or partially finished the DCE and the number of choice sets and observations per research area. Of the total research population of 133 women, 101 participated in the research: 77 in Kattike Deurali (KD) and 24 in Bahunepati (BP). Out of the 77 respondents in KD 56 completed the full DCE, 4 completed part of it and 16 answered 'I do not know', this provided us with 522 choice sets and 1044[12] individual observations. In BP 18 out of the 24 respondents fully completed the DCE and 6 answered 'I do not know', corresponding to 162 choice sets and 324 observations. So the total number of individual observations included in the model is 1368.

TABLE 5: NUMBER OF RESPONDENTS IN THE DCE, THE NUMBER OF CHOICE SETS AND OBSERVATIONS

	Population	Respondents	Fully compl.	Part. compl.	Choice sets	Observations
KD	103	77	56	4	522	1044
BP	30	24	18	0	162	324
Total	133	101	74	4	684	1368

There were two rationality tests included in the questionnaire: the dominance test (D2) and the transitivity test (D12). In the dominance test only one respondent failed to choose the dominant alternative, 76 respondents passed the test[13]. In the transitivity test 5 respondents made a choice that was not consistent with the choice in question D6. When they were subsequently asked on which consideration they based their choice, 4 out of the 5 respondents answered I do not know and 1 told us it was based on the number of family members. So, unfortunately adding this extra question did not provide any extra information about the rationality behind the choice.

There is a lot of debate in the literature on whether irrational responses should be deleted from the design or not. Lancsar and Louviere (2008) argue that by deleting these irrational responses also valid

[12] Each observation represents 1 alternative that is either chosen or not, so in total there are 56 individuals x 9 choice sets x 2 alternatives = 1008 observations from the fully completed DCE's and 36 observations from the partially completed DCE's

[13] Note that this number is higher than the 74 respondents who fully completed the task, because there were also 4 respondents that partially completed the DCE.

answers may be deleted and insight into the preferences of the research population may be decreased. Therefore, I chose to include the irrational responses in the data, while keeping in mind that according to these tests not all respondents comply with the rational choice criteria of DCE's.

5.2. Demand and Willingness-to-pay for Health Insurance

The Discrete Choice Experiment is used to measure the relative importance of the attributes premium, co-payment and type of package (individual, core or extended family) on the utility obtained from the health insurance, as shown by the equation (4.5):

$$U = \beta_1 premium + \beta_2 copayment + \beta_3 core + \beta_4 extended$$

The results of this model for KD, BP and the whole population together are shown in Table 6. In the first four rows the parameter estimates of the attributes are listed $(\beta_1 - \beta_4)$. β_1 represents the change in utility of an increase of 1 NPR in premium paid per person per month. β_2 represents the change in utility of a 1 percent increase in co-payment for pharmacy. β_3 and β_4 represent the change in utility of a change in type of package from individual to core or extended family, respectively. In a logistic model the size of the parameter estimates can not be interpreted directly, but their sign does give an indication if the attributes have a positive or negative effect on total utility (Dougherty, 2011; Verbeek, 2012). The signs of most of the estimates reflect our prior expectations. The estimates for premium and co-payment both show a negative sign. This means that an increase in the level of premium or co-payment has a negative effect on utility. The estimates for core and extended package are positive: respondents prefer a package for both core and extended family over a package for only the individual woman. The estimate of core family is slightly higher than the estimate for extended family, indicating that people prefer a package for the core family over a package for the extended family.

TABLE 6: OUTPUT CONDITIONAL LOGIT MODEL

	Total		Kattike Deurali		Bahunepati	
Statistic	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
Premium (β_1)	-0.01778	0	-0.0160	0.001	-0.2527	0.013
Co-payment (β_2)	-0.0077	0.378	-0.0122	0.211	0.0100	0.618
Core family (β_3)	2.5195	0	2.4406	0	2.8822	0
Extended family (β4)	2.5102	0	2.4892	0	2.6878	0
WTP co-payment	-0.43		-0.76		0.39	
WTP core family	141.74		152.65		114.07	
WTP extended family	141.21		155.69		106.38	
WTP extended-core	-0.53		3.04		-7.70	
LL-Full model	-273.2031		-210.6647		-61.5548	
LL-Constant	-474.1127		-361.8228		-112.2898	
X^2-statistic (4 df)	401.82	0	302.32	0	101.47	0
McFadden's R^2	0.4238		0.4178		0.4518	
# Individuals	74		56		18	
# Observations	1368		1044		324	

Two out of the three attribute estimates are significant: the premium and the type of package. The estimate of the co-payment has a very low t-statistic and a p-value which is much higher than $\alpha(= 0.05)$, hence not significant. Below we will delete this attribute from the model and compare the results, but first we will discuss the results of this model further.

As stated before, the parameter estimates can not be interpreted directly, but the marginal effects of the estimates can (Dougherty, 2011; Verbeek, 2012). In the second four rows of the results in Table 6 the willingness to pay (WTP) estimates are given. The willingness to pay estimates are calculated by taking the negative of the attribute over the cost attribute: $-(\frac{\beta}{\beta_{cost}})$. In this research cost attribute is the premium in NPR. per month. The first WTP-measure represents how many NPR. premium respondents are willing to pay more for a 1 percent increase in the co-payment. This value is negative, reflecting the negative relationship between the co-payment and premium. The value varies between -0.76 for KD, 0.39 for BP and -0.43 for both villages together. Nevertheless, as the parameter estimate of co-payment is not significant this marginal WTP measure is not valid.

The second estimate shows that people on average are willing to pay 141 NPR. more to receive a package for the core family instead of an individual package[14]. For KD this is 153 and for BP 114 NPR. The WTP for a package for the extended family instead of an individual package is similar: overall the respondents are willing to pay 141 NPR per month more, this is 155 in KD and 106 in BP. Both measures are given compared to the reference level: individual. The levels can also be compared to each other. Dividing the difference between the two level ($\beta_4 - \beta_3$) by the premium estimate gives marginal willingness to pay for being to include the whole extended family rather than just the core family. This measure is positive in KD and negative in BP. This means that in KD the respondents are willing to pay more for extended family, but in BP they do not. In BP overall a package for core family is preferred over a package for the extended family. This becomes understandable when we examine the family structure of the women in both villages. In KD the majority of women lives with their extended family while the majority of the women in BP live with their core family.

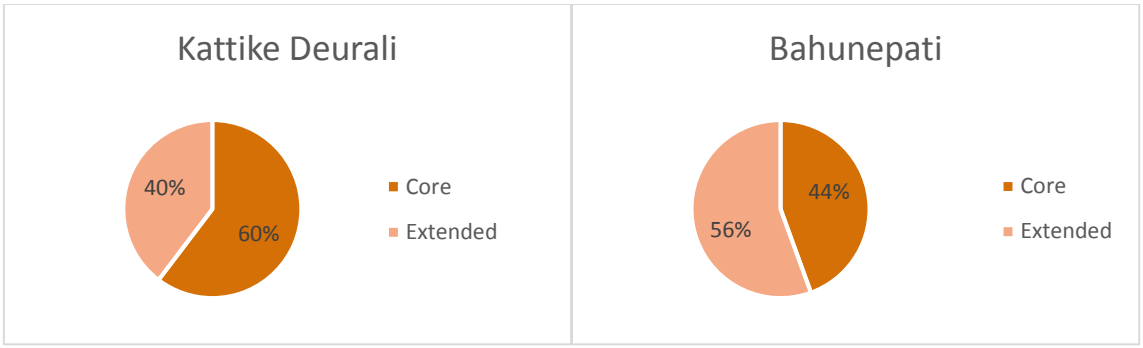


FIGURE 5: FAMILY TYPE

Though the co-payment attribute is not significant the model does explain a significant proportion of the variance as shows by the goodness of fit measures. The log-likelihood of the model is -273.2031 and the log-likelihood of a model with only a constant is -474.1127. This gives a χ^2-statistic (with 4 degrees of freedom) of 401.82 (p-value = 0.000). The McFadden's R^2 is 0.4238.

Excluding the co-payment attribute from the utility function gives the following model:

$$U = \beta_1 premium + \beta_3 core + \beta_4 extended \qquad (5.1)$$

The results of this model are shown in Table 7:

[14] Note that the premium is still per person per month. If the package is extended to the core family than every family member has to pay this premium.

TABLE 7: OUTPUT CONDITIONAL LOGIT MODEL WITHOUT CO-PAYMENT

	Total		Kattike Deurali		Bahunepati	
Statistic	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
Premium (β_1)	-0,0195	0.000	-0,0186	0,000	-0,0226	0,007
Core family (β_3)	2,5572	0.000	2,4990	0,000	2,7965	0,000
Extended family (β_4)	2,5462	0.000	2,5339	0,000	2,5999	0,000
WTP core family	131.21		133.87		123.68	
WTP extended family	130.64		136.23		114.99	
WTP extended-core	-0.56		2.36		-8.70	
LL-full model	-273,587		-211,438		-61,684	
LL-constant	-474,113		-361,823		-112,29	
X^2-statistic (3 df)	401,05	0,000	300,77	0,000	101,21	0,000
McFadden's R^2	0,4229		0,4156		0,4507	
# individuals	74		56		18	
# observations	1368		1044		324	

In this restricted model all parameter estimates are significant. The size of the estimates has overall increased a little, which might indicate some correlation with the attribute co-payment, but the signs of the estimates have not changed. This is also reflected in the WTP measures: their values have changed, but their signs have stayed the same.

The fit of the model has changed a little. The Log-Likelihood measures are lower, so the χ^2-statistic of the model is slightly lower, as is McFadden's R^2. To see if the difference in fit between the full and the restricted model is significant a Likelihood Ratio Test is performed on the full sample. This gives a χ^2 measure with one degree of freedom of 0.77 with a p-value of 0.3807. This rejects the null hypothesis that both models are equal $(\alpha = 0.05)$ and shows that the model without co-payment is significantly better.

So there are two main findings:

1. The co-payment does not have a significant influence on utility
2. The willingness to pay estimates for both core family and extended family are relatively high: women prefer to have a family package instead of an individual package.

For the first observation there may be several causes. First of all, it might be the case that the women just do not value the attribute that much, maybe because they just do not need the medicines that much. In KD the women have the opportunity to get some basic medicines for free in the local governmental health post. In BP, however, the local health post is very far away, so the existence of free medical services can not explain the non-significance of the co-payment attribute. Second, it might be difficult to comprehend the full effect of a co-payment on pharmacy on the health care costs. A co-payment has an indirect influence on health care spending: it only has to be paid in case of illness, whereas a monthly premium has to be paid also in case of non-illness. Another possible explanation is that there is conceptual overlap, because both premium and co-payment are cost-attributes. According to Mangham et al (2008) conceptual overlap between attributes might cause correlation between the attribute estimates. An analysis of the correlation matrix, given in table 8, shows that there is a very small positive correlation between co-payment and premium, but that this correlation is not significant. None of the attributes are significantly correlated except for the dummy variable core and extended, but that is of course because they represent two levels of the same attribute: type of package.

TABLE 8: CORRELATION MATRIX OF THE ATTRIBUTES (P-VALUES BETWEEN BRACKETS)

	Premium	Co-payment	Core	Extended
Premium	1.0000			
Co-payment	0.0022	1.0000		
	(0.9353)			
Core	0.0000	-0.0032	1.0000	
	(0.9999)	(0.9069)		
Extended	0.0019	0.0063	-0.5000	1.0000
	(0.9441)	(0.8146)	(0.0000)	

So there is no statistical correlation between the attributes premium and co-payment, but conceptual overlap might still be the case. Finally, the non-significance of the co-payment estimate might be caused by the design. The difference between the levels of the attribute is relatively small. The estimate might have been significant if the attribute levels would have been 25, 50 and 75 percent. The range of the attribute levels determines the model estimates for a large part. If the range is very small the attribute might seem less important. If the range is very large respondents might develop dominant preferences ((Kjaer, 2005; Kløjgaard et al., 2013; Ratcliffe, 2000).

To test the outcomes of the DCE a ranking question was added to the questionnaire (D15). The results are shown in Figure 6 below. 88 percent of the women ranked the type of package as the most important attribute. The co-payment was mostly shown as second most important attribute. To get an overview of the overall importance of the attributes three points were given to the attribute which was ranked first, two to the attribute that ranked second and one to the one that was least preferred. The fourth panel of Figure 6 shows the distribution of the total number of points over the three attributes. Overall, the type of package is seen as the most important with 48 percent and the premium and co-payment receive an almost equal amount of points with 25 percent and 27 percent respectively.

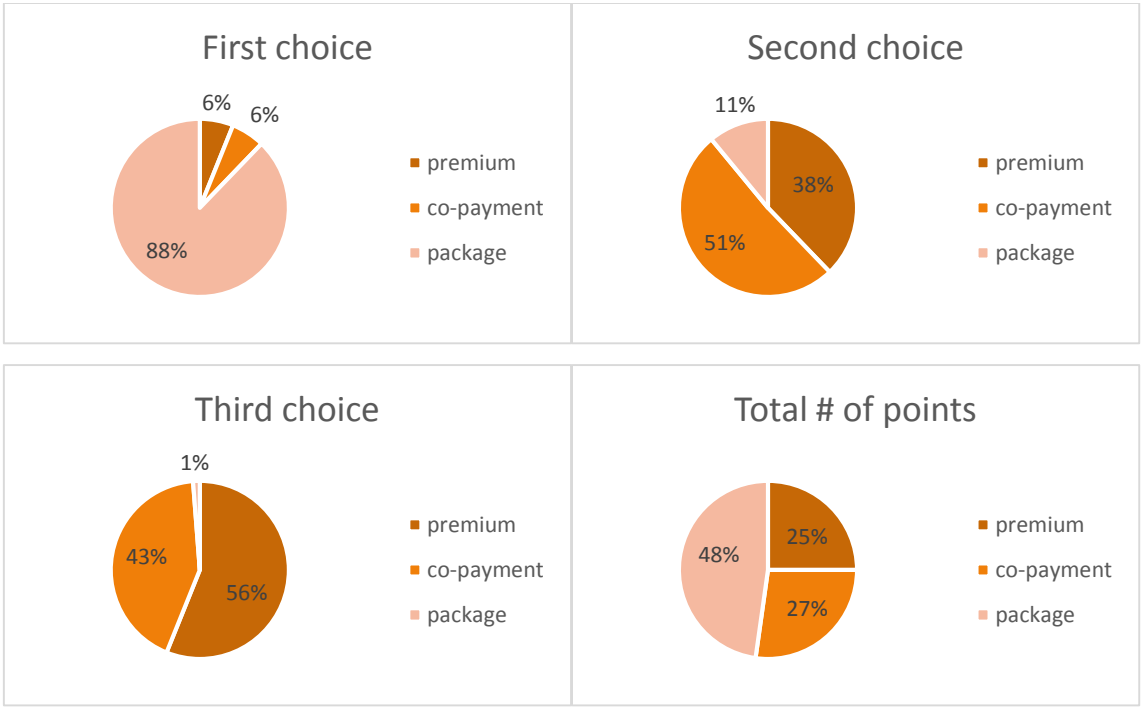


FIGURE 6: RANKING OF ATTRIBUTES (D15)[15]

So the type of package is overall considered as the most important attribute. This does not directly explain the high WTP for a package for the core or extended family, though. The WTP measure for core and extended family shows is relative to the reference level: individual package. Hence, it is determined by the difference in preference between the attribute levels. Figure 7 shows for each attribute level the percentage of times it was chosen. Each level appeared six times in the DCE, so if the percentage is 50 it is on average chosen 3 times by the respondents.

Both the levels core and extended family are on average chosen around 70 percent of the times they appeared in the choice sets and individual package only about 8 percent of the times. There is a small

[15] Data for the total sample.

difference between KD and BP which reflects the results of Figure 5. The attributes premium and co-payment show less difference between the levels. For both attributes the higher levels are chosen less, which supports the negative effect of both attributes on utility. This pattern is clearer for the premium than for the co-payment though. The premium of 100 NPR. is on average chosen 56 percent of the time, the premium of 120 NPR. 51 percent of the time and the premium of 140 NPR. only 41 percent of the time. The co-payment of 10 percent is on average chosen 53 percent of the times, the co-payment of 20 percent 51 percent of the times and the co-payment of 30 percent 45 percent of the times. Of course, each choice is based on the trade-off between the levels of the different attributes, but this figure does give an insight in the choice patterns that have been shown in the DCE.

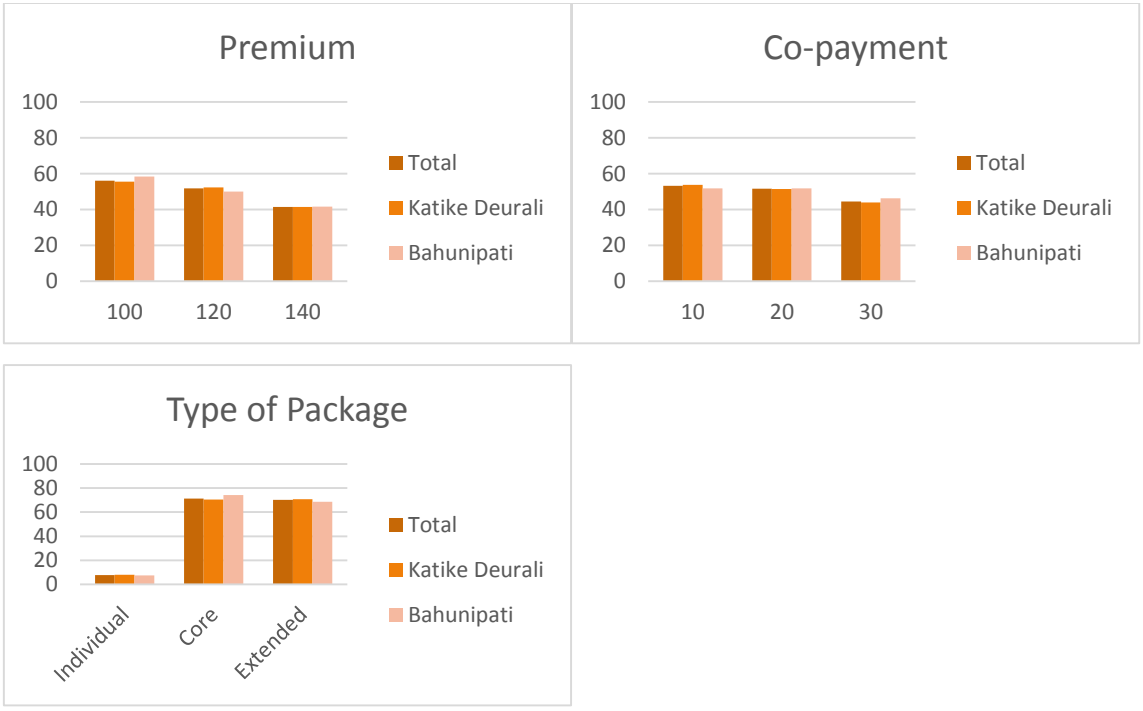


FIGURE 7: PERCENTAGE OF TIMES EACH ATTRIBUTE LEVEL IS CHOSEN BY RESPONDENTS

In sum, it is clear that a family package is preferred over an individual package and that the women are willing to pay more for that. However, how much they are willing to pay in total for the health insurance is not clear. The WTP estimates obtained from the data are marginal estimates, they only show the difference in WTP between individual and core or individual and extended family. To know the total WTP the WTP for an individual package should be known. As individual package serves as the reference level, this measure is normally confounded with the constant term in the model. Yet, the problem is that there is no constant term in the model, because all variables that do not change over the alternatives disappear from the model together with the individual specific parameter α_{nt}. So due to the design of the DCE and model used the total WTP for the health insurance package can unfortunately not be obtained. This will be discussed further in the next chapter.

The main findings of the DCE are that a package for core or extended family is preferred over a package for the women individually. Moreover no significant effect is found of the co-payment for pharmacy on the utility of the insurance package.

6. Discussion of results

Chapter 4 showed that the validity of the results is both dependent on the experimental design of the DCE and on the extent to which it is adjusted to the local setting. In this chapter I examine the quality of the DCE and I offer suggestions for improvements for future research. First, I evaluate the methodological choices I made for the design, execution and analysis of the DCE. Second, I evaluate the applicability of the DCE to the local circumstances of the research population. Third, I analyse other attributes and factors that are not included in the DCE, but that are crucial for the success of the health insurance programme.

6.1. Methodology

The methodological choices made concern the attributes and attribute levels, the experimental design, the data collection process and the data analysis. I will discuss these four research aspects subsequently.

6.1.1. Attributes and attribute levels

In this research the design of the Choice Experiment is relatively simple. Only three attributes are used. In the literature it is recommended to include all relevant attributes, because otherwise omitted variable bias may occur. In that case, the other attribute estimates may be overestimated (Lancsar & Louviere, 2008). However, in the micro health insurance programme of DH certain attributes are fixed in advance, because of the provider-based model (the number of services, the quality of the care, etc.). Therefore, not all possible attributes are included and the results of this research should be considered with that in mind. Other attributes and factors that influence the success of the micro health insurance scheme in the villages are discussed in § 6.3.

Possibly there is some conceptual overlap between the attributes premium and co-payment as both attributes are cost measures, though the correlation between the two estimates is not significant. In future research the relation between these two attributes should be studied. Understanding the trade-off between these attributes is crucial for the design of a sustainable micro health insurance package.

The number of attribute levels in this research is symmetrical: all attributes have three levels. This was mostly done to make the experimental design easier. The more attribute levels are in the design, the more choice sets are needed to measure all effects well and the more difficult it becomes to find a suitable orthogonal array and to adjust it to a D-efficient design with the right properties. For scholars who have more experience with designing a DCE I would recommend to add more attribute levels. Specifically for the cardinal attributes premium and co-payment, adding more attribute levels might result in more precise estimates of the relative importance of these attributes. The levels chosen in

this research were mostly based on significance for policy making. They were based on the health insurance feasibility study (De Jong, 2012) and recommendations of the staff of the Department of Community Programmes of DH. Though, using attribute levels that are seen as realistic from a policy perspective, might not give the clearest results in a DCE. They might not give a clear insight in the preferences of the respondents, as is shown by the non-significant estimate of the co-payment. Adding some attribute levels outside the 'relevant policy range' might give more information about the relative importance of the attributes for the respondents.

More research is needed to understand the influence of the co-payment on the demand for micro health insurance and the trade-off between the premium of an insurance package and the co-payment for pharmacy. As stated in chapter 5, the non-significance of the co-payment attribute may be attributed to the number of co-payment levels included in the DCE or the small range between the levels. I would recommend including more levels for this attribute and also including levels that are outside the 'policy relevant range'.

6.1.2. Experimental design

In this research, a design with strength 2 is used. This means only main effects can be estimated and all interaction effects are assumed to be 0 (Kuhfeld, 2010; Street et al., 2008). This assumption is not so realistic. As there might be some conceptual overlap between the premium and co-payment, there might be some interaction between the two estimates. This means that the preference for the premium level might be different at different co-payment levels and the preference for the co-payment may be different at different premium levels. Moreover, the preference for the type of package might be different at different premium levels and the preference for the premium might be different for individual, core or extended family. Include these interaction terms, however, would mean complicating the design of the DCE significantly. Designs of strength 4 (which include two-way interaction) contain much more choice sets than designs of strength 2. One way to tackle this is to block the design into several groups of choice sets and randomly distribute them over the respondents (Johnson et al., 2013; Lancsar & Louviere, 2008; Street et al., 2008). This will reduce the size of this choice task and the cognitive burden on respondents. However, this can only be done if the sample size is large enough to ensure enough respondents per block. In this research the sample size was not large enough for such a design, but in DCE's with a larger population it is recommendable to use a blocked design so interaction effects can be estimated as well.

Another issue is the choice of the generator to produce the second alternative from the first. In this research the generator (111) was used to keep the design simple. Only after the experiment I was able to calculate the design efficiency (83 %). It would be advisable, however, to calculate the efficiency of

several different designs before the experiment and to choose the design with the highest efficiency (Kuhfeld, 2010; Street et al., 2008).

In addition, the number of alternatives chosen influences the results as well. Each choice set in the DCE in this research consists of two alternatives with different attribute levels. It is also possible to add more alternatives or to change one of the alternatives into a fixed comparator. A fixed comparator is an alternative that is the same in each choice set. Often, the initial situation of a programme is used and compared with other alternatives that represent changes: deviations from the initial programme (Amaya-Amaya et al., 2008). In this research the respondents are not yet enrolled in a micro health insurance, so there is no initial insurance package with which the alternatives can be compared. Yet, there is an initial situation in which people do not have a health insurance package. This is equal to a package without services, with a premium of 0, a co-payment of 0 and no family member enrolled. This package is the so-called opt-out: the choice for no health insurance (the initial situation) rather than the offered alternatives. In this research it was chosen not to include an opt-out, so the women would be forced to make a choice between the alternatives and reveal their preferences. Nonetheless, some women indirectly chose the opt-out, by choosing not to answer the DCE. If an opt-out would have been added to the DCE, these answers would have been included in the model as well[16].

An opt-out might also help for the interpretation of the dummy variables. The estimates of the dummy variables in the model represent the difference in utility between the levels in the model and the reference level. The estimates of core family and extended family represent the difference in utility between these options and an individual package. The reference level 'individual package' is part of the constant term in the model. In a regular logit model this constant would represent the utility of a model with all variable set to 0. All parameter estimates represent the deviation from a change in the parameter estimate form this 'base utility'[17]. Unfortunately, in conditional logit models this constant term is excluded from the model together with the individual specific fixed effect (see equation 4.5). Hence, the value of the constant can not be obtained and it is not clear what the utility of an individual package is. This makes it difficult to understand what the absolute values of the estimates are. The MWTP for a package for the core family is 131 NPR. Thus, the respondents are willing to pay 131 NPR. per person more for a package for the core family than for an individual package. But what are they

[16] Naturally, if an opt-out is chosen each choice, that choice becomes a fixed effect (It will not change over time) that is part of the individual specific fixed effect α_i (see equations 4.4 and 4.5). Only changes in the attribute levels enter the attribute estimates. But if respondents choose a non-opt-out alternative in one or more of the alternatives this information will become part of the model.

[17] The marginal effects

willing to pay for an individual package? This information is needed to understand the Total WTP for a certain package.

If an opt-out alternative is included the reference level becomes a health insurance for none of the family members. The WTP for such a package can be assumed to be 0 and the MWTP for a package for the core family becomes the difference between no package and a package for the core family. This might make it much easier to obtain the absolute values of the parameter estimates.

In sum, I have three mayor recommendations for the design of a DCE in future research. In case of a larger research population a design of strength four should be used, to coves interaction effects. The efficiency of several possible design should be calculated in advance to determine which is the most efficient. Plus, an opt-out alternative should be added to make the choices more realistic and to simplify the interpretation of the dummy variables.

6.1.3. Data collection

In this research one pilot testing was done with two interviews and a focus group discussions. For scholars who have more time and money available it is recommended to hold more comprehensive pilot sessions in which many more individuals do the DCE and reflect on it. It is also advisable to pilot the questionnaire again after each adjustment (Glenk & Weber, unknown; Kjaer, 2005; Mangham et al., 2009). The introductory meeting should also be piloted and practiced well in advance. After the first few group meetings of the research some adjustments were made to make the meeting shorter and to explain some concepts that did not seem to be clear enough. Clearly, this might influence the results a little as some women received more comprehensive information than others. So, it is advisable to practice the explanation and translation in the introductory sessions well in advance and to test its understandability.

A large part of the research population was included in the sample (76 %). The results can therefore be generalized for the whole research population. There might, however, be a small self-selection bias as participation was voluntary. Women who did not want to join any new programme of DH might not have joined the group meetings and the face-to-face interviews.

Although a large part of the research population was included in the sample, the total sample size was relatively small for a DCE, because the research population was also quite small. This might have influenced the precision of the estimates. Moreover, the population was not selected randomly and the results can not be generalized to other areas, or other microfinance groups for that matter. In BP for instance, only three out of the ten microfinance groups were included in the research, because the other seven groups are currently still enrolled in the microfinance programme. However, in the future

these other seven groups will probably also be eligible for the health cooperative and the health insurance. The results of the 24 women from BP who are included in this research might not be generalizable to the other groups. Hence, I would recommend to do a new demand study for the health insurance in the future.

The DCE method prescribes that the choice task should be done individually, so the answers really reflect the respondents' individual preferences. In reality, almost none of the interviews were fully individual. They attracted a lot of people who were interested. Furthermore, in two cases, the husband came to the introductory meeting because the wife was busy. I guess such issues are difficult to circumvent and are just part of doing research in a country with a very strong community culture as opposed to our western individualistic culture. It is not clear to which extend this influenced the results of the DCE. More research might be needed on this topic.

To conclude, I would recommend other researchers to pilot their DCE extensively and to study the influence of spectators and substitutes on the validity of the results.

6.1.4. Data analysis

For the analysis of the data a conditional logit model was used. As explained in § 4.4, an advantage of this model is that it captures the individual specific variation of the utility. A disadvantage is that the constant term disappears from the model, which makes it difficult to interpret the values of the dummy variables and the total WTP for certain packages. One possible way to forego this effect is to use effects coding of the variable instead of dummy coding. With effects coding the estimate of the reference level is not confounded with the intercept any more. It is internalised in the estimates of the levels of the dummy variable that are included in the model. In that case, the estimate for the reference level 'individual package' would be the negative sum of the estimates of core and extended family package. Effects coding is specifically suitable for designs in which a fixed comparator is used. For a further explanation read Beck & Gyrd-Hansen (2005).

Another disadvantage of the conditional logit model may be that the preferences of respondents are assumed to be homogenous. The influence of all individual specific effects are omitted from the model because they are fixed over time. Some scholars now use more complicated binary models to capture the preference heterogeneity across individuals, such as the mixed logit model[18], the latent class model, or the covariance heterogeneity model (Bliemer & Rose, 2010; Colombo et al, 2009; Green, 2007; Train, 1997; Train, 2003). For scholars with more experience with complicated econometric models these models should be considered for the analysis of a DCE.

[18] Also called the random parameter model

Hence, applying effects coding (for designs with a fixed comparator) and using more complicated preference heterogeneity models can be recommended for future research.

6.2. Adjustment of DCE to local circumstances

The validity of the research is not only dependent on the method used, but also on the adjustment of the choice task to the local circumstances. The hypothetical choice in the DCE should reflect real world decision making as close as possible (Ryan & Wordsworth, 2000; Viney et al., 2005). In this case the question is if women in rural Nepal normally also would have to make choices about health insurances. On the one hand, this is a very real choice because the health cooperative and health insurance programme of DH is in the first place aimed at the local low-income women. But, on the other hand, this may not be a decision these women usually make, specifically not on their own. Though 81 out of the 101 respondents stated they would be willing to enrol in the health cooperative if health insurance would be mandatory, only 74 women fully completed the choice task. Some women did not want to answer the DCE because they wanted to discuss it with their families first. DCE is a very Western method that studies individual decision making. Maybe these decisions are not taken individually in rural Nepal. In that case the results only represent the preferences of the women, but not the preferences of the households who will jointly make the decision whether or not to join the health insurance programme.

Moreover, the DCE method prescribes that the respondents should fully understand the hypothetical choices so they will have complete and stable preferences. Dror (2011) found in a research about micro health insurance in Nepal that respondents did not always fully understand the concept of health insurance. Therefore, in the introductory meetings the concept of health insurance was shown in the health insurance game and the attributes and their levels were explained in the introductory meeting and in the choice task. Moreover, the women's understanding of the concepts was tested during the interviews. They were asked to name the most important features of health insurance: paying a monthly premium; receiving basic health care when you are ill; and not receiving anything back if you do not get ill. To make sure the last feature was understood well, women were asked again what happened if they do not get ill in a month. In KD 63 percent of the women answered the first question right and 75 percent answered the second questions right. In BP this was 91 and 88 percent, respectively. This difference can be partially explained by the fact that in KD 76 percent of the respondents of the face-to-face interviews also joined the introductory meetings[19] and in BP all the respondents did. The difference may also partially be due to interviewer bias. The data assistants were

[19] Two of the women send their husbands on their behalf.

somewhat stricter in the beginning of the research (in KD) than later on (in BP). Whatever the reason, the results do show that a large majority of the women did understand the concept of health insurance.

Nevertheless, in an in-depth interview the group leader of one of the microfinance groups told us that after the game, most women understood the concept of health insurance. But when they explained it to their families after the interviews, their husbands complained that they should get their money back if they do not fall ill in a certain period. So, if DH decides to offer the programme to the whole (core or extended) families, they should clearly explain how the insurance works to the other family members as well.

The validity of the research is also dependent on how well the attributes and attribute levels are understood. A show card was used to make the attribute levels in the choice sets more comprehensive. As stated before the concept of co-payment may have been difficult to grasp as it has an indirect effect on the health care costs. This attribute was also more difficult to depict on the show card. The abstractness of the concept of co-payment may have negatively influenced the validity of the research.

An important assumption of DCE's is rationality of responses. People are expected to make a rational choice between the alternatives in the choice set in order to reveal their through preferences. In this research two simple rationality tests were used a dominance test and a transitivity test. Unfortunately, no additional information was obtained by the extra probing questions added to the transitivity test. The fact that most women systematically chose an alternative with core or extended family package may indicate that they applied heuristics. Heuristics are cognitive shortcuts that simplify the decision making (Gyrd-Hansen & Slothuus Skjoldborg, 2008). People often ignore part of the information that is given and base their choices on attributes that seem the most important for them. In this research the women seem to have a dominant preference for an insurance package that fits their family type. This is also shown by the results of the ranking exercise in Figure 6. These heuristics may be one of the reasons that the estimate for co-payment is not significant. More sophisticated tests and qualitative research may provide more insight in the rationality of choices.

In conclusion, the validity of the research may be compromised by the fact that the women were asked in the DCE to make choices that they would normally not make on their own. Their final decision to join the health insurance (and also health cooperative) scheme will be influenced be the rest of their family members. So, if DH decides to offer the programme to the whole (core or extended) families, if would advise them to explain their plans to the whole community. Moreover, the validity of the research may be affected by the abstractness of the co-payment attribute and the use heuristics in the decision making.

6.3. Other attributes and factors that influence the demand

The monthly premium, the co-payment for pharmacy and the type of package are only three aspects of the health insurance. There are many other attributes and external factors that influence the demand for health insurance. The International Labour Organisation (Matul et al., 2013) identifies four main determinants for the demand for micro health insurance: the value of the insurance package (services, quality and price), the trust in the insurance scheme and liquidity and behavioural constraints. These factors are vital for the success of the health insurance programme and will be discussed subsequently.

The value of the insurance package is dependent on the value of its attributes. Two important attributes that were not included in the DCE in this research are the services in the insurance package and the quality of the care. Because DH offers a provider-based health insurance (see § 2.2) these attributes are considered as fixed, but they clearly do influence the demand for the health insurance programme. To get an insight in the valuation of the care that is provided in the health centres some questions about the respondents' experience with the health centre were added to the questionnaire (Annex 3, Section B).

The valuation of the health care in the DH health centre is shown in Table 9. Most women in KD value the health care as good or average, but there are also some critical marks. On average the care is valued 2.5: in between average and good. In BP most women value the health care as good. The mean of 2.2 is closer to good than to average. Table 9 also shows the valuation of the health care in the governmental health post. In KD the valuation is very similar to the valuation of the health centre. In BP the nearest governmental health post is in the next village, relatively far away. Therefore, most women do not visit the governmental health post. They only visit the health centre and for more complex health care they go to DH[20].

[20] This about 2-3 hour by bus.

TABLE 9: VALUATION OF HEALTH CARE IN DHULIKHEL HOSPITAL HEALTH CENTRE AND GOVERNMENTAL HEALTH POST

	Dhulikhel Hospital Health Centre		Governmental Health Post	
Valuation	**Kattike Deurali**	**Bahunepati**	**Kattike Deurali**	**Bahunepati**
1. Very good	2	1	3	-
2. Good	38	18	40	-
3. Average	18	4	20	-
4. Poor	5	1	5	-
5. Very poor	3	0	3	-
Mean	2.5	2.2	2.5	-

In KD there are three health care providers a few hundred meters away from each other:

- The Dhulikhel Hospital Health Centre;
- A Governmental Health Post;
- And a private clinic

Consequently, there is much more competition in KD than in BP. This might affect the willingness to join the health insurance of DH. In response to the question: '*which health care provider would you visit when your family is ill?*', in BP all respondents answered: DH Health Centre. In KD, on the contrary, most of the women would go to the Governmental Health Post. This result is shown in Figure 8.

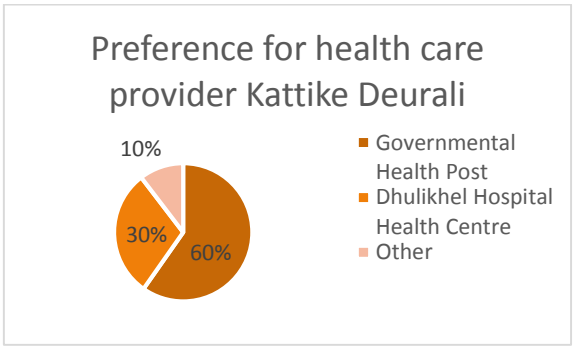


FIGURE 8: PREFERENCE FOR HEALTH CARE PROVIDER IN KATTIKE DEURALI

One of the staffs explained that many people first go to the governmental health post when they are ill, because the government offers over 20 different basic medicines for free. If the medicines they need can not be provided by the governmental health post they come to the health centre. Last year, 49 women in KD visited the DH Health Centre and 51 visited the governmental health post. On average the women visited both 10 times.

The women were also asked which things could be improved in the service of DH Health Centre. The results of this question are shown in Table 10[21]. There were many complaints about the number of facilities provided. In both KD and BP more facilities are demanded. Some specific facilities that were mentioned several times are an x-ray/ultrasound, fracture care and lab facilities. There is no fracture care in the health centres, if someone breaks a limp they have to go to a hospital. This can be a very long journey on very bumpy roads. So there is a big demand for fracture care and an x-ray machine was mentioned several times. Some women in BP told us that they are only willing to join the health insurance if the services in DH are included.

TABLE 10: PROPOSED IMPROVEMENTS IN AND COMPLAINTS ABOUT THE HEALTH CARE OF DHULIKHEL HOSPITAL

Improvements/complaints	Kattike Deurali	Bahunepati
More facilities/services needed	14	18
X-ray/ultrasound	11	9
More surgeries	1	1
Fracture care	3	3
Caesarean	1	0
More lab facilities	1	4
Facilities too expensive, more free services needed	10	0
Medicines do not work	3	0
More experienced/qualified staff needed	2	3
Some of the staff not friendly	5	0
Check-ups not done properly	3	0
Should be open on Saturdays	0	1
Care too far away	1	0
Torch light needed to cross river at night	0	1

It is interesting to see that in KD many respondents complained that the facilities are too expensive and that more free services are needed, while in BP no one mentioned this as a problem. In KD the women are used to the free medicines of the governmental health post. Moreover, the medicines offered by the private clinic are also cheaper than the one from DH health centre. One of the doctors told me that DH charges a slightly higher margin on medicines to compensate for the lower fees for surgeries and other services. Apparently, in a village like BP where there are no other health care providers this is not experienced as a big problem, but in KD where there is much more competition and people can easily compare the costs of the providers, this raises discontent. Some people even say that the medicines of DH health centre do not work properly.

[21] Each respond could give multiple answers.

In KD there are also some complaints about the staff: they are not experienced or qualified enough, check-ups are not always done properly and some of the staff are not so friendly. This last complaint was mentioned a lot in informal conversations with the women. The women are very fond of some staff members, but do not like others. In BP some women only complain about the qualifications of the staff. In the past there used to be a doctor situated in the health centre. Now the staff consists of two paramedics, a nurse-midwife, a lab-assistant and a cook. Doctors from DH visit ones a week in BP and ones every two weeks in KD.

So, some of the respondents are not fully satisfied with the services that are offered and the quality of the health care. Some of these issues may be difficult to address because the hospital is also on a tight budget, but there are already plans to change the health centres. The staff of the BP health centre told us that there are plans to expand the health centre in the future. An x-ray machine will be present and a fully qualified doctor will join the staff. In KD a new health centre is being built at the moment. It is not clear if there will be more facilities in the new building, but there will at least be more space[22].

Issues concerning the behaviour of the staff should be handled with care. The staff of the health care centre plays a very important role in the connection between DH and the local women. The behaviour of the staff may influence the trust the women have in DH and its community programmes. Trust is one of the most important determinants of the demand for health insurance (Dror & Koren, 2012; Matul et al., 2013). Therefore, it is important for the hospital to win the trust of the villagers. A few respondents in KD told us that some of the women do not trust DH health centre because the medicines are more expensive than in the private medical clinic. There are also some women that think that the health insurance programme is for the benefit of the hospital instead of the benefit of the women. DH might win the trust of the local communities if they provide information about why they charge a higher margin for medicines and why they offer the health insurance programme.

Albeit the trust issues and the complaints about the service included, a large part of the respondents is willing to join the health insurance, as is shown in Figure 9. When they were asked if they would be willing to join the health cooperative if the health insurance would be mandatory 61 women in KD answered 'Yes', 9 answered 'No' and 5 answered 'I do not know'[23]. In BP 19 respondents answered 'Yes', 3 answered 'No' and 2 answered 'I do not know'.

[22] The DH health centre in KD is now located in a very cramped old shed.
[23] 2 women did not answer the question

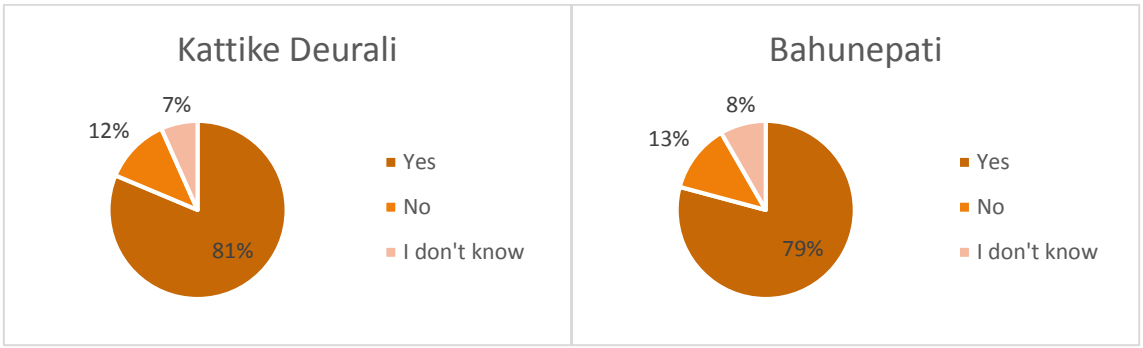


FIGURE 9: PART OF RESPONDENTS WHO WANT TO JOIN THE HEALTH COOPERATIVE WHEN HEALTH INSURANCE IS MANDATORY.

Interestingly, one of the microfinance groups in BP was asked to join the pilot of the health insurance programme a few years ago. At that moment the whole group decided they did not want to join the pilot insurance. But now, most women indicate that they want to join the programme.

Even if the women and their families want to join the health insurance programme, their success to do so may still be determined by other external factors such as liquidity constraints and behavioural constraints (Matul et al., 2013). The results of the DCE show that most women would their whole family to be able to join the health insurance. Yet, the question is if they can afford to pay the premium per person for all family members. One of the group leaders we spoke to in an in-depth interview thinks that most families in KD won't be able to pay the premium for the whole family because they do not have much income. In BP a group member told us that the women in her group were not so interested in the health insurance, because for more complicated health care they would have to go to DH and the care there would not be covered. So, when a family member needs more complicated health care, the families are still confronted with very high health care costs. I would recommend DH to include some kind of security net for the out of pocket health care costs that the families face even when they are enrolled in the health insurance programme. Armendáriz & Murdoch (2010) write that in some micro insurance schemes a parallel lending programme is introduced to help the insured to pay for co-payments and other out-of –pocket costs. The microfinance part of the health cooperatives programme can fulfil this need.

Furthermore the hospital needs a strategy for the payment of chronic health care costs. In the current health insurance programme care for chronic illnesses is excluded from the package. In KD 44 percent of the women have 1 or more chronically ill members in their family and 14 percent have one or more disabled family member[24]. In BP this is 33 respectively 0 percent. Including these people in the health insurance might significantly increase total health care expenditure. This might challenge the financial

[24] Either the woman herself or a family member.

sustainability of the health insurance scheme. However, excluding them is undesirable from a social perspective. One option might be to externally finance the high health care costs of the chronically ill/disabled. Besides financial constraints to pay for the programme and other health care costs, there may also be behavioural constraints to do so. As in every insurance scheme there is a risk of moral

DH should address all these aspects to make the health insurance programme a success.

Part B: Health cooperatives

7. Methodology

The second objective of this research is to get insight in the demand for the different aspects of the health cooperative programme of DH. For the design of a successful health cooperative programme it is important that all aspects of that programme are adjusted to the demand of the women. In part A the demand and willingness to pay for the health insurance part of the programme was already analysed. In this part the demand for the remaining parts of the health cooperatives will be analysed: the credit and saving, skills-based trainings and health education. Moreover, the demand for the overall health cooperative programme will be examined. In this chapter I explain the methodology for collecting the information of this demand study.

Questions about the different aspects were together with the DCE incorporated into a questionnaire and used in the individual face-to-face interviews with the eligible women in KD and BP. This questionnaire is shown in Annex 3. Section E addressed the women's experience with cooperatives and their willingness to join the health cooperative programme of DH. In the introductory meetings the concept of health cooperative and the plans of DH were explained. The knowledge testing questions in section C (C1 & C2) assessed the extent to which the women actually understood this explanation. In section F, G and H the credit and savings programme, skills-based trainings and health education sessions were addressed, respectively. Finally, in section A some general questions about the women's lives were asked for background information.

All questions were made in accordance with the staff of DH's Department of Community Programmes. The general questions in section A were partly based on the questionnaire used by De Jong (2012) and on previous questionnaires of the hospital to assure that they were adjusted to local circumstances. The questionnaire has been tested during the pilot interviews and small adjustments have been made to make the questions more comprehensive.

The introductory meetings before the face-to-face interviews served for explaining both the concept of health insurance and health cooperatives. The plans of the hospital were outlined and the different aspects of the health cooperatives were explained.

Besides the 101 face-to-face interviews 8 in-depth interviews with open questions were held with staff member and leaders and members of the microfinance groups (see §4.3.5). These in-depth interviews provided some more qualitative background information and are used as illustration and context of the results. Moreover, some information obtained by informal conversations with staff and group members will be used to illustrate and contextualise the results.

8. Results

In this chapter the results of the demand study for the health cooperative programme of DH are presented. First, the women's knowledge about cooperatives and their willingness to join the DH Health Cooperative is looked at. Second, the demand for the individual aspects of the health cooperative is sketched: the credit- and saving facilities, health education and skills-based trainings. These services were also included in the former microfinance programme. So, both the experience of the women with these services and their ideas and wishes for the future are described.

The response rates of the demand study are similar to the ones in the discrete choice experiment. In KD 77 women participated in the research and in BP 24. In KD 2 respondents did not finish the interview, so 75 fully completed questionnaires were obtained. In BP a few women have replaced group members who quit or passed away. These women could not provide information about their experience with the microfinance programme, but they could share their wishes for the cooperative programme.

8.1. Demand for health cooperatives

In the knowledge testing questions the women were asked what a cooperative is and who will own the cooperative. In KD only 37 percent of the respondents answered the first question correct, while in BP 88 percent of the women answered it correct. The second question was answered right by 66 percent of the respondents of KD and 88 percent of the respondents in BP. So, in KD the understanding of the cooperative was less than in BP. On the other hand, in KD more women were familiar with other cooperatives. 49 percent of the women knew someone who has been involved in a cooperative and 31 percent has been involved herself. In BP only 17 percent of the respondents know someone who has been involved and just 1 woman has been involved in a cooperative herself. Figure 10 shows the positive and negative aspects of cooperatives that were named by the respondents. The positive aspects that were named mostly concern access to certain services such as loans, savings, agricultural inputs and consumer goods. The negative aspects mainly concern managerial problems.

	Kattike Deurali	Bahunepati
Positive aspects		
Easy to take loan	13	2
Income interest/profit	3	0
Savings	2	2
Access to agricultural inputs	3	0
Access to consumer goods	2	0
Help	1	0
Market access	0	1
Negative aspects		
Bad services/fraud	3	0
Unequal distribution	2	0
Arguing	0	1

FIGURE 10: IDENTIFIED POSITIVE AND NEGATIVE ASPECTS OF COOPERATIVES

In sum, the women do have some understanding of the concept of cooperative in general and the plans for DH health cooperative specifically. In addition, a large part of the respondents is willing to join the DH health cooperative programme, as is shown in Figure 11. In KD 85 percent of the respondents wants to join the programme and in BP a staggering 100 percent wants to join.

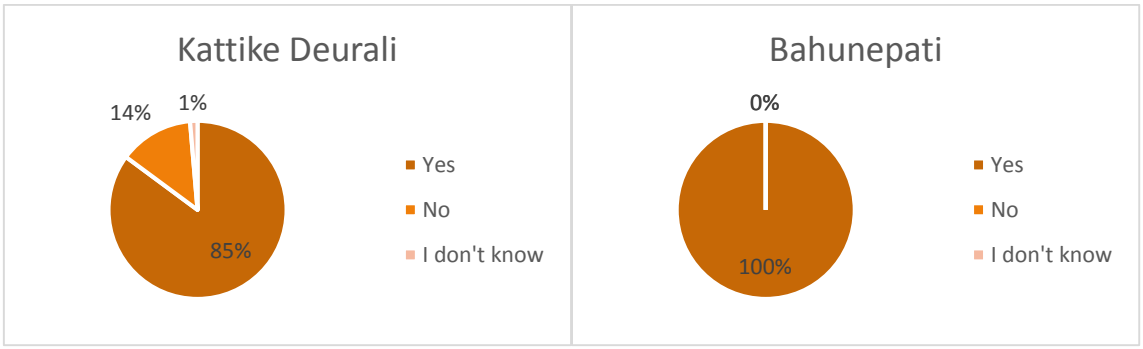


FIGURE 11: PART OF RESPONDENTS WHO WANT TO JOIN DHULIKHEL HOSPITAL'S HEALTH COOPERATIVE PROGRAMME.

8.2. Credit- and saving

The microfinance programme was introduced to empower local women and to improve their financial independence. The programme was aimed specifically at poor women with no or a very low income. In KD the women were selected by a local committee based on their income and their willingness to enrol. One of the staff members told us that about 75 percent of the loans was, as intended, given to the poorest women in the village, but 25 percent was provided to women with more money. These women are often mixed in KD. One respondent from KD told us that in her microfinance groups 5 poorer, low-caste women were selected together with 5 wealthier high-caste women. In BP, at first, most women in the village were not so interested in the programme and selection was mainly based

on willingness to enrol instead of income. Later, more women were willing to join and the staff of health centre selected the ones with the lowest income. The first two groups, therefore, consist of higher caste women and the latter groups of poorer, lower-caste women. Naturally, the caste of a woman does not directly influence the income, but it might influence the social structure within the group. I'll come to that later.

The in-depth interviews showed that overall the microfinance programme was a success. Most of the women (96 % in both villages) invested their loan in livestock[25]. In KD all women bought a goat and or some chickens. One woman bought a buffalo. In BP some women invested in pig-farming. This is much more profitable than goats as one pig can give birth to 15 piglets at ones. However, pig rearing is a quite novel business in Nepal and it is not suitable for everyone as many high caste women are not allowed to touch a pig. A staff member told me that in rural Nepal it is traditional that women own some animals. The animals are their private possessions and live in their houses. According to a staff member in KD investing in goats is relatively easy for the women KD, because they already have experience with it, they can do it in the house and they can buy and sell the animals on the local market.

The staff of BP told me that the programme has been profitable for most women. The women only suffer a loss when the animal dies. Officially the rule is that in that case the women do not have to pay any interest over their loan. But they do have to show proof that the animal has died. In practice, nobody has applied this rule yet. In KD the programme was also a success. The staff of both KD and BP thinks that the women have become more financially independent. In the face-to-face interviews the women were asked who manages the money of the microfinance programme. In KD over 60 percent of the women manage the money themselves, 21 percent let's their husband handle it, 10 percent makes the decisions together with the husband and 1 woman let's her son manage it. In BP 87 percent of the women manage the loan themselves, 1 woman let's her husband handle it and 2 women decide together with their husband. The leader of a microfinance group told us in an in-depth interview that for four women in her group, the loan was handled by their husbands. The husbands even kept the profit themselves. So, the scheme might not have improved the financial independence of all the women, but in general it was quite profitable. Some positive aspects of the programme that were identified were the low interest rate, the health education sessions, the closer relationship between the hospital and the women and the opportunity for the women to come together in the group and share their thoughts and ideas. A relatively low interest rate of 4 percent per year was asked. The

[25] A few women have recently replaced another member of the microfinance group, so they have not had the opportunity to invest in anything yet.

microfinance groups serve as a way for the health centre to keep a close connection with the women and to provide health education.

Some negative aspects that were mentioned were the time range over which the loans had to be repaid, the small size of the loan, and some misunderstandings with the hospital. In the beginning of the programme the time range was set to be four years. After these four years the women had to have paid back the loan plus an interest of 4 percent per year. In KD, however, the programme was reduced to two years because a few women did not pay their monthly instalments. In BP the range was first 4 years, for later groups it was 2 years and at the moment even 6 months. The staff considers these 6 months too short. In an in-depth interview, some women in BP suggested to pay the whole sum in one term after 2-4 years, so they can invest in a buffalo. About the size of the loans different opinions exist. Some women considered the loans to be too small, while others said that it would be difficult to manage larger loans. The loan (6000 NPR) was in the beginning of the microfinance programme large enough to buy a goat, but at current market prices it is not. In BP there was some misunderstanding in the beginning of the programme about the interest rate. Some women claim that at first there was no interest rate charged, but that the hospital changed the rules during the programme. Therefore, some women decided to pay back the loans without interest rate.

While most of the loans from DH are paid back, the microfinance groups still serve as a saving facility. Women pay a small sum of money each month which serves as a fund from which they can take a loan. Most microfinance groups ask about 12 percent interest over these loans and they have to pay back the sum after 6 months. Some groups also provide loans to women outside the group for a slightly higher interest rate. A positive aspect of the savings is that they provide a way to get credit in case of an emergency. The savings can only be taken up through a loan. The women can not just decide to take their savings. This led to some discontent in one of the microfinance groups. Some women in KD stopped saving because the higher caste women in her group did not want to provide loans to the poorer women any more. Staff from both KD and BP told me that because of the savings the women are still in their microfinance group and through these groups health centres can reach them for health education and other programmes of DH.

Though there are some negative experiences with the microfinance programme, most women are interested in taking a loan in the future: 60 in KD (78 %) and 24 in BP (100 %). In both villages there are a few other places to get a loan such as mother's groups, cooperatives and informal lenders such as family or neighbours, but most women are interested in taking a loan from the Health Cooperative: 58 in KD (75 %) and 23 in BP (96 %). The kind of investments the women would like to engage in are

depicted in Table 11[26]. As in the previous programme, most women want to us the loan to invest in livestock.

TABLE 11: FUTURE INVESTMENTS WITH CREDIT FROM HEALTH COOPERATIVE PROGRAMME

Future investments	Kattike Deurali	Bahunepati
Livestock	39	17
Food & daily needs	8	1
New business	7	0
Equipment	3	0
Emergency expenditure	3	0
Education	1	0
Health care expenditure	2	0
Paying back another loan	2	0

In BP most women would prefer it if the Health Cooperative would provide one loan for the whole microfinance group together over having individual loans. In KD the preferences are more mixed half of the respondents prefer group loans and half prefer individual loans. In KD 16 percent of the women would like the interest rate to be flexible over time (for example higher in harvest season and lower during the winter) while in BP all women prefer a fixed interest rate.

8.3. Health education

Health education sessions are offered in the past as part of the microfinance programme. In BP most women (88 %) told us that they had taken part in some health education sessions. They have visited on average of 5.4 sessions. In KD, only 7 women (1 %) told us they had participated in health education sessions, with an average of 2.3 sessions per person[27]. This outcome is interesting because the nurse-midwife told us she provides health education sessions every week in different wards.

Out of the 7 respondents in KD who had joined health education sessions 5 rated them as very interesting and 2 as interesting[28]. Moreover, 3 rated them as very useful and 4 as useful[29]. In BP, 4 women thought the sessions to be very interesting and 17 though them to be interesting. Furthermore, 3 rated them as very useful and 18 as useful. Hence, overall the rating of the received health education sessions was positive.

[26] Multiple answers per person were possible
[27] One woman told us she joined 20 sessions, but her answer was heavily biased as the nurse-midwife was in the room, reminding her of all the sessions she provided.
[28] On a scale of 1:5 (1.) very interesting; (2.) interesting; (3.) neutral; (4.) uninteresting; and (5.) very uninteresting.
[29] On a scale of 1:5 (1.) very useful; (2.) useful; (3.) neutral; (4.) not so useful; and (5.) not useful at all.

The health education session will be continued in the health cooperative programme, so we asked the women if they are willing to join them in the future. Furthermore, to adjust these sessions to the needs of the women we asked them how often they would like to attend health education session, if there are specific topics to would like to have discussed and if they would like to combine the sessions with other activities.

In KD 45 women (58 %) are willing to join the health education sessions in the future and in BP 18 women (75 %). The preferred frequency is ones every month followed by ones every three months in both villages. Some women told us the health educations should be held in winter season when they are less busy with other work. Others would prefer it if the sessions are held in their ward, because it is too far for them to come to the health centre.

Table 12 below shows the proposed topics for health education sessions with only women and sessions with men and women together[30]. In KD 11 women (14 %) were in favour of having such mixed health education sessions and in BP 3 (12.5 %) women were in favour of the idea. The most mentioned topics for sessions with only women are women's health, child health and general health. The proposed topics for combined sessions were women's health and domestic violence.

TABLE 12: PROPOSED HEALTH EDUCATION TOPICS FOR SESSIONS WITH ONLY WOMEN AND MAN AND WOMEN TOGETHER

	Women		Men & Women	
Topics	**Kattike Deurali**	**Bahunepati**	**Kattike Deurali**	**Bahunepati**
Women's health	7	1	2	0
Child health	5	0	0	0
General health	3	0	0	0
Family planning & Permanent sterilization	0	1	1	1
Domestic violence	0	0	3	0
Women empowerment & education	1	0	1	0
Menstruation	0	1	0	0
Smoking and drinking	0	1	0	0
Blood pressure	0	1	0	0
New topics	0	1	0	0
New programmes of Dhulikhel Hospital	1	1	0	0
I do not know	3	0	5	2

[30] Multiple topics could be suggested.

Finally, 21 women in KD (27 %) would like to combine the health education sessions with other activities: mostly with child health programmes (9 women), health screening (2 women) or skills-based trainings (1 woman)[31]. In BP 3 women (12.5 %) want to combine the health education sessions with other activities: child health (1 woman)[32].

8.4. Skills-based trainings

Skills-based trainings (sbt's) give women the opportunity to learn new skills that can be used to increase their income and financial empowerment. These trainings have been provided by DH in the past as part of the microfinance programme. In KD, 29 respondents (38 %) have participated in one or more sbt's. These trainings included mushroom cultivation, candle making, knitting and goat rearing. In BP, only 2 respondents (0.08 %) told us they had participated, but they couldn't tell in which training. The staff of the health centre in BP mentioned that in the last two years a candle making training, a veterinary training and a fodder planting training have been provided in the village, but these might have also been given to women of the newer microfinance groups.

In the past, staff from the Department of Community Programmes of DH decided which sbt's would be provided in which village. In the cooperative the women have to decide for themselves which training they need.

When asked if they were interested in taking sbt's in the future 57 respondents (74 %) in KD and 21 respondents (0.88 %) in BP answered 'Yes'. Table 13 depicts which trainings the women in both villages were interested in. The most important ones are tailoring, cattle rearing (either goats or pigs), candle making, soap cultivation and cash crop training.

TABLE 13: DEMANDED SKILLS-BASED TRAININGS

Skills-based training	Kattike Deurali	Bahunepati
Cattle rearing	8	5
Tailoring	11	5
Candle making	8	5
Mushroom cultivation	0	2
Cash crop training	3	0
Knitting	1	0
Fruit farming	2	0
Goat rearing	1	0
Soap making	6	0
Machinal sweater making	1	0
Aloe vera cultivation	1	0

[31] The rest (9 women) answered: I do not know.
[32] The rest (2 women) answered: I do not know.

Which sbt is suitable in which village is dependent on the local circumstances. For example: in KD some women received a mushroom cultivation training. For the cultivation of mushrooms a lot of water is needed. Yet, there is a big lack of water in KD. When asked how often in the past year their families had to go without water, many women answered 'several times', 'many times' or 'always'. In contrast, in BP most women answered 'never' or 'just ones or twice'. Furthermore, the mushrooms should be cultivated on the remainders of the rice plants, but these are also used as fodder for the animals. So, the women in KD lack the inputs for mushroom cultivation. Perhaps, mushroom cultivation would be more suitable for a village like BP. BP is located around a river, so there is a lot of water available and because of its favourable climatic conditions there are two rice cultivation seasons per year, so there may be enough rice plants left to use for mushroom cultivation. Some women in BP told us in an in-depth interview that they would be interested in having a mushroom cultivation training. Yet it is important for them to know all the requirements of the cultivations process before they can decide if the training is suitable for them and if they would actually use the information in practice. Some women in KD told us that mushroom cultivation is a very difficult and long process. So the women really have to make a commitment if they want to start this occupation and invest their money from the health cooperative in it.

Likewise, for some occupations they will have to work together with other women in the village. For example: in KD a candle making training was provided. To make candles the women first have to invest in the equipment. A few women told us that it was too expensive for them to buy the equipment. It would take more than the size of the loan of the microfinance programme and it would involve quite some risk because they did not know if they would be able to sell the candles afterwards. Besides, the candle making training was only one day and this did not make them confident enough to start the whole undertaking. Thus, besides the training the women might need some help in coordinating the new occupation. This role can be fulfilled be staff of the health centres, but it can also be taken up by the group leaders or other group members. One group leader in KD was very passionate about making soap. She would probably be able to involve the whole microfinance group in a soap making project and arrange the inputs and distribution of the product.

Some occupations are easier to combine with daily work than others. The main occupation of most respondents is agriculture, therefore cattle rearing is suitable. Also, the women are much busier in summer time, during rice planting season than in winter time. Therefore, occupations that can be done seasonally may be suitable as well. For example, candle making or soap making could be done at any favourable moment. The staff in KD thinks that a candle making and tailoring training would be suitable

for the local climate. In BP the staff suggests a veterinary training as most women work in agriculture already.

Some women in BP told me that they do not trust DH, because in the past sbt's were promised, but these programmes never came. The staff however, states that there were sbt's provided in the past, but that very few women showed up. Furthermore, the staff states that the women expect too much from the hospital. They expected to receive a sewing machine if they would join a tailoring training. Eventually the tailoring training was not held, because the women could not afford the machines.

So, in order for sbt's to be a success, they should be adjusted to the local circumstances and the demand of the women and the women should be committed to investing in the occupation themselves. In the health cooperative the women will have the opportunity to choose together which kind of trainings they want. To do so, they need to know in advance if the occupation is suitable for their environment and their live and what they will have to invest to make it a success.

9. Discussion of results

This demand study has just given a light sketch of the experiences of the women with past programmes and their wishes for the different aspects of the health cooperative. In general a large part of the respondents seems to be willing to join the health cooperative. However, the actual willingness to join will be dependent on the design of each individual cooperative in each village. The success of the health cooperative programme is dependent on management of the cooperative and on the rules and regulations of the cooperative. These will be discussed below.

9.1. Management

The idea behind the health cooperative is that it will be managed by the women themselves, independent from DH. DH does, however, wants to keep connection to the cooperatives. They want to assist them with the start of the cooperative, the implementation of the health insurance and by providing health education and sbt's.

So for the health cooperative to be a success the women should be willing to work together with each other; to lead the programme; and to work together with DH. In the in-depth interviews the respondents were asked if they think that the women in their village would be willing to do so.

In BP, some women were not so keen on working together with other microfinance groups. In a group interview they told me that they do not want to give loans to women from low caste groups as they are scared that the women will not be able to pay back their loans. They prefer to stay an independent microfinance group and handle the money themselves. This is interesting, because a lower caste member of another group told us that she pities the higher caste women, because they made much less profit with their loans then her, as their caste prevented them from buying pigs. She thinks that the women of her group are willing to work together with the other groups and lead the programme. One staff-member of the health centre thinks that the women from the three microfinance groups in BP would be willing to work together, but that they will need rules and guidelines from the hospital. Another staff member thinks that it will be difficult to coordinate the groups. There were some disputes in the past because some women did not want to give any loans to low caste group members as they didn't trust them to be able pay it back. There is also quite some cast discrimination between the groups. During a training in the health centre some high caste women were angry that they were offered the cookies that were touched by low caste women first. Now the health centre only invites groups of similar casts together for a training or health education. Both the women and the staff think that the women will not be able to coordinate the cooperative without the help of DH. The women

that preferred to stay in their independent microfinance group even would prefer to have more help from the hospital in organising the credit and getting other women in the group to pay back their loans.

In KD, caste discrimination seems less of a problem. According to the staff in KD the women are willing to work together and manage the cooperative. The women we spoke to think so as well. One of the women did, however, tell me that some women she knows do not trust DH and the new programme, because they think the hospital will benefit from it and not the women. Some other women do not trust the hospital because of the high medicine costs, so it is not clear if they would want to join the programme. There may be enough women who will want to lead the cooperative, but the staff stresses that they will need proper training as most of them are uneducated. Besides they will need help from the hospital for the supervision, monitoring and implementation of the programme. The nurse-midwife explained that there is no cast discrimination in KD, but that some lower cast women just think that other women will not trust them. One group member who we interviewed was herself lower caste and she stated that she would be willing to fulfil a managing role if the other women would select her, but she would not step up by herself, because she fears that no one will listen to her as she is lower caste. In her microfinance group a few women stopped saving because there were no more loans provided to the poorer women.

No clear conclusions can be drawn about the question if the women are willing to work together with each other and with the hospital. Obviously, this question is also dependent on how that 'working together' will be arranged. If the women are against sharing money with other microfinance groups this may be incorporated in the design, but if they are against sharing a room or some cookies with women from another cast, that may become difficult. First of all, it should be made clear what the cooperation between the parties actually means. What are the benefits over staying in the own microfinance group? How much autonomy do the microfinance group have to hand over to the cooperative? What kind of things will have to be arranged by the management of the cooperative and what can still be arranged within the microfinance group? There will be several parties involved in the cooperative: the women in the microfinance groups, the management of the cooperative, the staff of the DH outreach centre and the staff of Dhulikhel Hospital. It is important that the role and rights and duties of each of these parties is clearly defined.

9.2. Rules and regulations

Besides choices about the management of the cooperative choices should be made about the rules and regulations of the cooperative. These technical issues have not been discussed in the interviews, but they do influence success of the programme and the demand for it.

There are issues to consider for the technical design of the cooperative. For example: the distribution criteria for loans and other benefits, the size of the loans, the interest rate to be asked, the amount of savings to be contributed by each group, etcetera. What exactly are the costs for the women to join the cooperative? To start an official cooperative a group needs a certain amount of starting capital. The savings of all the microfinance groups together will be enough to reach this sum, but I do not know if the women are willing to contribute their group savings to the cooperative fund. The women need to know first if and how they can lay claims on their savings in the future. Moreover, there should be enforcement mechanisms implemented and rules for what happens if women can not pay their loan or the interest for the health insurance in time. Guidelines should be set up for new members or for members who want to quit the programme. In KD some neighbours who did not attend or finish the microfinance programme were also interested in joining. Besides, quite a few women indicated that they would let their (grand-) daughters participate in the programme. Who is allowed to join the programme? And what happens if someone wants to quit the programme? Do they get part of their savings back?

These are but a few choices that have to be made. In practice there are many more. Before the cooperative is introduced, a clear organisational structure and clear rules and regulations should be defined. As the cooperative will be run by the women of the villages themselves, it is important to involve the women in the design of the cooperative. I would suggest to bring together a cooperative design committee in each village in which local representatives of the women, staff of the health centres and staff of DH's Department of Community Programmes is united. The leaders of the current microfinance groups may represent the women in this committee, but other group members who are interested may also be included.

10. Conclusions and recommendations

In this research the demand for the Health cooperative programme of Dhulikhel Hospital was studied in Kattike Deurali en Bahunepati. A large part of the research concerned the demand for the health insurance scheme that is planned to be part of the cooperative programme. A Discrete Choice Experiment was used to examine the relative importance of three attributes of the health insurance: the premium, a co-payment for pharmacy and the type of package (individual, core family or extended family). This led to two main finding. First, no significant influence was found of the co-payment for pharmacy on total utility of the insurance. It is unclear what exactly caused this result. First of all, it may be that the women just do not value the co-payment that much. It may, however, be due to the relative abstractness of the concept of co-payment, what makes it difficult to assess the effect of the co-payment on total health care expenditure. Or it may be due to the design of the choice experiment. The range between the attribute levels might have been too small, making the alternatives too similar. Moreover, there might have been some conceptual overlap of the co-payment with the premium, as both are cost attributes. It is also possible that the respondents have applied heuristics, basing their choice on the levels of the one attribute they value the most, instead of all the attributes together. This brings me to the second main finding: an insurance package for core family or extended family was preferred significantly over an individual package. Unfortunately, the total willingness to pay for such packages could not be obtained, due to the design of the experiment.

The health insurance scheme is but one aspect of the health cooperative programme, the other aspects are: credit and savings, health education and skills-based trainings. The second part of this research addressed the demand for these aspects individually and for the health insurance as a whole. A great majority of the women who were interviewed are interested in joining the health cooperative programme. The overall experience with the former microfinance programme has been positive and some suggestions have been made for the improvement of the services. There are, however, many technical and managerial issues that are not addressed by this research, but that have to be considered in the design of a successful health cooperatives.

10.1. Research recommendations

The total willingness to pay for the health insurance package and the influence of a co-payment for pharmacy should be studied more intensively in the future. In this research a relatively simple experimental design is used, this could be improved on several levels. First, I would recommend including more attribute levels for the premium and co-payment attribute and also including levels that are outside the ‘policy relevant range’. Second, a more elaborate experimental design should be used in which both the main effects and the interaction effects can be obtained. In choosing the most

suitable design, the efficiency of several possible designs should be calculated and compared before the experiment. An opt-out alternative should be included in the choice sets to make the choices more realistic and to simplify the interpretation of the dummy variables. Similarly, in choosing the most efficient design, the respondent's efficiency should be considered and the choice task should be adjusted to local circumstances. The obtained DCE should be piloted extensively to test to which extend the choice task is realistic and understandable. For the analysis of the DCE I would recommend using effects coding for the dummy variable and to consider more complicated preference heterogeneity models. Finally, the importance of rationality and the influence of non-rational responses on the validity of the results was only briefly touched upon. This should be studied further in future research.

10.2. Policy recommendations

This research only provides an indication of the willingness of the eligible women in Kattike Deurali and Bahunepati to join the health cooperative programme of Dhulikhel Hospital. Their actual willingness to join will be dependent on design choices that still have to be made. First, it should be specified how the cooperative will be managed and what the responsibilities are of all the parties involved. Second, the rules and regulations of the cooperative should be clearly defined in advance. Technical choices have to be made about the size of the loans, the height of the premiums, the enrolment criteria, the enforcement mechanisms and many more issues. Nepal is a land with many cooperatives, so I would advise DH to visit other similar cooperatives and learn from their experiences.

For the health insurance I would clearly advise to offer an extended family package (so the core family is incorporated). Total willingness-to-pay could not be calculated in this research and the co-payment for pharmacy was not found to be significant. Further research is needed to get more insight into these factors. Nevertheless, given the low willingness-to-pay estimates from previous research; the indications of several respondents that it would be difficult for them to pay the premium for the whole family; and the findings of the pilot insurance scheme that medicine uptake define for a large part the loss of the programme, I would recommend to offer a family package for a premium of 100 NPR. with a co-payment of 30 percent of the pharmacy costs. But piloting of such a programme will be needed to be certain about the financial viability of such scheme in practice. Moreover, I would recommend to introduce a parallel lending system for the out-of-pocket payments for pharmacy and more complicated treatments that are not included in the package. I would also recommend to not exclude the chronically ill or disabled community members from the scheme as this would be unethical and will adversely influence the trust in DH. Possibly, external financing could be arranged for this specific group. Moreover, DH should address the other attributes and factors that were not included in the

DCE, but that do influence the demand for the health insurance: the services offered, the quality of the care, the trust in the staff and the programmes of DH and liquidity and behavioural constraints.

Finally, for the success of the whole health cooperative programme it is important that clear communication is provided to the women and their families about the specifics of the programme. That way they can make a well-informed decision about whether or not they want to join.

11. References

Amaya-Amaya, M. , K. Gerard and M. Ryan (2008) Chapter 1: Discrete choice experiments in a nutshell, In: M. Ryan, K. Gerard and M. Amaya-Amaya, *Using Discrete Choice Experiments to Value Health and Health Care*, Springer, pp. 13-46.

Armendariz, B., & J. Murdoch (2010) *The Economics of Microfinance*, 2nd edition, MIT Press, Massachusetts Institute of Technology, Cambridge Massachusetts.

Bech, M., & D. Gyrd-Hansen (2005) Effects coding in discrete choice experiments, *Health Economics*, Vol. 14, pp. 1079-1083.

Bekker-Grob, E.W. de, M. Ryan, K. Gerard, E.W. Steyenberg and M.L. Essink-Bot (2009) Applying discrete choice experiments to value health and health care: a review of the literature, In: E.W. de Bekker-Grob, *Discrete Choice Experiments in Health Care, Theory and Applications*, Dissertation, Erasmus University Rotterdam,

Banerjee, A., E. Duflo (2011) *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty*, Public Affairs, New York.

Bliemer, C.J. & J.M. Rose (2010) Construction of experimental designs for mixed logit models allowing for correlation across choice observations, *Transportation Research*, Vol. 44, pp. 720-734.

Chamberlain F. (1980) Analysis of Covariance with Qualitative Data, *Review of Economic Studies*, Vol. 47, pp. 225-238.

Colombo, S., N. Hanley & J. Louviere (2009) Modeling preference heterogeneity in stated choice data: an analysis for public goods generated by agriculture, *Agricultural Economics*, Vol. 40, pp. 307–322.

Danthurebandara, V.M., J. Yu & M. Vandebroek (2011) Effect of choice complexity on design efficiency in conjoint choice experiments, *Journal of Statistical Planning and Inference*, Vol. 141, pp. 2276-2286.

Dhulikhel Hospital (2012) *Microfinance Proposal, third project (draft version)*, Department of Community Programmes, Dhulikhel Hospital.

Dhulikhel Hospital (2013a) *official website*, http://www.dhulikhelhospital.org/ (last viewed, 08-05-2013).

Dhulikhel Hospital (2013b) *Informal conversations with staff of Dhulikhel Hospital*, Department of Community Programmes, Dhulikhel Hospital.

Dhulikhel Hospital (2013c) *Concept note for Cooperative*, Department of Community Programmes, Dhulikhel Hospital.

Dougherty, C. (2011) *Introduction to Econometrics*, Oxford University Press, Fourth Edition.

Dror, I. (2007) Demystifying micro health insurance package design. Choosing health plans all together (CHAT), *Microfinance Insights*, Vol. 4, pp. 17–19.

Dror, D. (2011) Reaching People through Micro Insurance: The Case of India & Nepal, Can we assume that people understand insurance principles?, *Bulletin of Medicus Mundi Switzerland*, No. 120.

Dror, D. & R. Koren (2012) The elusive quest for estimates of willingness to pay for health microinsurance, Chapter 7 In: *Protecting the Poor, A microinsurance compendium, Volume II*, International Labour Office, Geneva, Switserland.

Drummond, M.F., M.J. Sculpher, G.W. Torrance, B.J. O'Brien and G.L. Stoddart (2005) *Methods for the Economic Evaluation of Health Care Programs*, Oxford University Press, Oxford.

Escobar, ML, C.C. Griffin & R.P. Shaw (2010) *Impact of health insurance in low- and middle-income countries*, The Brookings Institution, Washington, United States.

Gates, R., C. McDaniel and K. Braunsberger (2000) Modeling Consumer Health Plan Choice Behavior to Improve Customer Value and Health Plan Market Share, *Journal of Business Research*, Vol. 48, pp. 247-257.

Gerard, K., M. Shanahan & J. Louviere (2008) Chapter 5: Using Discrete Choice Modelling to Investigate Breast Screening Participation, In: M. Ryan, K. Gerard and M. Amaya-Amaya, *Using Discrete Choice Experiments to Value Health and Health Care*, Springer, pp. 117-137.

Glenk K. & Weber R. (unknown), *Design and Administration of Choice Experiment Surveys in So-Called Developing Countries: Issues and Challenges*, unpublished.

Green, W.H. (2007) Chapter 18: Discrete choices and event counts, in: *Econometric Analysis*, 6th edition, Prentice Hall, Upper Saddle River, New Jersey, pp. 760-832.

Gyrd-Hansen, D. and U. Slothuus Skjoldborg (2008) The Price Proxy in Discrete Choice Experiments: Issues of Relevance for Future Research, In: M. Ryan, K. Gerard and M. Amaya-Amaya*, Using Discrete Choice Experiments to Value Health and Health Care*, Springer, pp. 175-193.

Johnson, F.R., E. Lancsar, D. Marshall, V. Kilambi, A. Mühlbacher, D.A. Regier, B.W. Bresnahan, B. Kanninen and J.F.P. Bridges (2013) Constructing Experimental Designs for Discrete-Choice

Experiments: Report of the ISPOR Conjoint Analysis Experimental Design Good Research Practices Task Force, *Value in Health*, Vol. 16 No. 1, pp. 3-13.

Jong, A. de (2012) *Insuring the Poor, A Combined Micro Health Insurance Feasibility and Demand* study for Rural Nepal, Master Thesis, University of Groningen, Groningen.

Ke, X., D. B. Evans, G. Carrin, A.M. Aguilar-Rivera, P. Musgrove & T. Evans (2007) Protecting households from catastrophic health spending, *Health Affairs*, Vol. 26 No. 4, pp. 972–983.

Kerssens, J.J. & P.P. Groenewegen (2005) Consumer preferences in social health insurance, European *Journal of Health Economics*, Vol. 50, pp. 8-15.

Kløjgaard, M.E., M. Bech & R. Søgaard (2013) Designing a Stated Choice Experiment: The Value of a Qualitative Process, *Journal of Choice Modelling*, Vol. 5 No. 2, pp. 1-18.

Kuhfeld, W.F. (2010) Experimental Design: Efficiency, Coding, and Choice Design, In: *Marketing Research Methods in SAS, Experimental Design, Choice, Conjoint, and Graphical Techniques*, SAS Institute Inc., Cary, United States.

Lancsar, E. and J.J. Louviere (2008) Conducting Discrete Choice Experiments to Inform Healthcare Decision Making: A user's guide, *Pharmacoeconomics*, Vol. 26 No. 8, pp. 661-677.

Lancsar, E., J.J. Louviere and T. Flynn (2007) Several methods to investigate relative attribute impact in stated preference experiments, *Social Science & Medicine*, Vol. 64, pp. 1738-1753.

Lattin, J., J.D. Carroll and P.E. Green (2003) *Analyzing Multivariate Data*, Brooks/Cole – Thomson Learning, First Edition.

Leatherman, S., L. Jones Christensen & J. Holtz (2012) Innovations and barriers in health microinsurance, Chapter 5 in: *Protecting the Poor, A microinsurance compendium, Volume II*, International Labour Office, Geneva, Switserland.

Leppert, G. (2010) *Micro health insurance in developing countries: What are the solutions to insurance-related weaknesses of the mutual model?*, draft version, Department of Cooperative Studies, University of Cologne.

Louviere, J.J., D.A. Hensher & J.D. Swait (2000) *Stated Choice Methods, Analysis and Application*, Cambridge University Press, Cambridge, United Kingdom.

Mangham L.J., K. Hanson & B. McPake (2009) How to do (or not to do) … Designing a discrete choice experiment for application in a low-income country, *Health Policy and Planning*, Vol. 24, pp. 151-158.

Matul, M., A. Dalal, O. De Bock & W. Gelade (2013) Why People do not buy Microinsurance and what can we do about it, *ILO Micro Insurance Paper*, No. 20, International Labour Organisation, Geneva.

McFadden, D. (1973) Conditional logit analysis of qualitative choice behaviour, In: P. Zarembka, *Frontiers in Econometrics*, Academic Press, New York, United States, pp. 105-142

Ratcliffe, J. (2000) The use of Conjoint Analysis to elicit Willingness to Pay. Proceed with caution?, *International Journal of Technology Assessment in Health Care*, Vol. 16 No. 1, pp. 270–290.

Ryan M. and K. Gerard (2003) Using discrete choice experiments to value health care programmes: current practice and future research reflections, *Applied Health Economics and Health Policy*, Vol. 2 No. 1, pp. 55-64.

Ryan M. and S. Wordsworth (2000) Sensitivity of Willingness to Pay Estimates to the Level of Attributes in Discrete Choice Experiments, *Scottish Journal of Political Economy*, Vol. 47, pp. 504-524.

Street, D.J., L. Burgess & J. Louviere (2005) Quick and Easy Choice Sets: Constructing Optimal and Nearly Optimal Stated Choice Experiments, *International Journal of Research in Marketing*, Vol. 22, pp. 459-470.

Street, D.J., L. Burgess, R. Viney & J. Louviere (2008) Chapter 2: Designing Discrete Choice Experiments for Health Care, In: M. Ryan, K. Gerard and M. Amaya-Amaya, *Using Discrete Choice Experiments to Value Health and Health Care*, Springer, pp. 47-72.

Sloane, N.J.A. (2005) *A Library of Orthogonal Arrays*, http://www2.research.att.com/~njas/oadir/

Train, K.E. (1998) Recreation Demand Models with Taste Differences Over People, *Land Economics*, Vol. 74 No. 2, pp. 1-23.

Train K.E. (2003) *Discrete Choice Methods with Simulation*, Cambridge University Press, Cambridge, United Kingdom.

Verbeek, M. (2012) *A guide to modern econometrics*, 4th edition, John Wiley & Sons Ltd., West Sussex, United Kingdom.

Vroomen & Zweifel (2011) Preferences for health insurance and health status: does it matter whether you are Dutch or German?, *European Journal of Health Economics*, Vol. 12, pp. 87-95.

Wittington, D. (2002) Improving the performance of contingent valuation studies in developing countries, *Environmental and Resource Economics*, Vol. 22 No. 1, pp. 232-367.

Annex 1: Design efficiency calculations

The calculations in this annex are based on Street et al. (2005) and Street et al. (2008).

The design efficiency of a design d can be calculated by the equation:

$$D - efficiency = \left[\frac{\det(C_d)}{\det(C_{opt})}\right]^{\frac{1}{p}}$$

In which $\det(C_d)$ is the determinant of the information matrix C of the design d and $\det(C_{opt})$ is the determinant of the D-optimal design, the design with the largest value for $\det(C)$ with the same number of attributes, attribute levels and alternatives.

The determinant of the D-optimal design is given by the equation:

$$\det(C_{opt}) = \prod_{q=1}^{k}\left[\frac{2S_q l_q}{m^2(l_q - 1)L}\right]^{l_q - 1}$$

In which:

- k is the number of attributes (= 3 in this research),
- l_q is the number of levels per attribute (= 3 for each attribute)
- m is the number of alternatives in the choice sets (= 2)
- L is the total number of different alternatives that can be made with all attributes and attribute levels (= $3^{3attributes}$ = 27 different alternatives)
- S_q is the largest number of pairs of options that can have different levels for attribute q in a choice set (= $m(m-1)/2$ = 1)

The determinant of the design used in this research is obtained by first calculating the Information matrix C_d given by the equation:

$$C_d = B\Lambda B'$$

In which

- B is the matrix of contrasts for the effects to be estimated. (For this design with 3 levels per alternative, for each alternative a linear contrast and a quadratic contract is obtained. This results in a B-matrix with 6 rows and 27 columns. The contrasts are normalized by dividing the entries by the square root of the sum of the squares in each row.)
- Λ is '*the matrix of second derivatives of the likelihood function, under null hypothesis of no differences between the effects of the levels of each attribute, Λ contains the proportions of choice sets in which pairs of profiles appear together*'. (There are 27 different alternatives in the design in this research, so the Λ-matrix is 27x27)

The Λ and B- matrices for the experimental design in this research are given below as well as the calculations for the information matrix. Furthermore, the calculations for the determinant of this design and the determinant of the D-optimal design and for the D-efficiency of the design are provided. This gives a design efficiency of 83 percent.

$\Lambda = (1/36)[\Lambda_1, \Lambda_2]$:

Λ_1=

1	0	0	0	0	0	0	0	0	0	0	0	0	-1
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	1	-1	0	0	0	0
0	0	0	0	0	0	0	0	-1	1	0	0	0	0
0	0	0	0	0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
-1	0	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	-1	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	-1	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	-1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	-1	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	-1	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0

Λ_2=

0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	-1	0
0	0	0	0	0	0	-1	0	0	0	0	0	0
0	0	0	-1	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	-1	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	-1	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	0	0	0	-1	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	-1	0	0	0	1	0	0	0	0	0	0	0
0	0	0	0	0	0	1	0	0	0	0	0	0
0	0	0	0	0	0	0	1	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0

$B = [B_1, B_2]$:

B_1=

-0.2357	-0.2357	-0.2357	-0.2357	-0.2357	-0.2357	-0.2357	-0.2357	-0.2357	0	0	0	0	0
0.136083	0.136083	0.136083	0.136083	0.136083	0.136083	0.136083	0.136083	0.136083	-0.27217	-0.27217	-0.27217	-0.27217	-0.27217
-0.2357	-0.2357	-0.2357	0	0	0	0.235702	0.235702	0.235702	-0.2357	-0.2357	-0.2357	0	0
0.136083	0.136083	0.136083	-0.27217	-0.27217	-0.27217	0.136083	0.136083	0.136083	0.136083	0.136083	0.136083	-0.27217	-0.27217
-0.2357	0	0.235702	-0.2357	0	0.235702	-0.2357	0	0.235702	-0.2357	0	0.235702	-0.2357	0
0.136083	-0.27217	0.136083	0.136083	-0.27217	0.136083	0.136083	-0.27217	0.136083	0.136083	-0.27217	0.136083	0.136083	-0.27217

B_2=

0	0	0	0	0.235702	0.235702	0.235702	0.235702	0.235702	0.235702	0.235702	0.235702	0.235702
-0.27217	-0.27217	-0.27217	-0.27217	0.136083	0.136083	0.136083	0.136083	0.136083	0.136083	0.136083	0.136083	0.136083
0	0.235702	0.235702	0.235702	-0.2357	-0.2357	-0.2357	0	0	0	0.235702	0.235702	0.235702
-0.27217	0.136083	0.136083	0.136083	0.136083	0.136083	0.136083	-0.27217	-0.27217	-0.27217	0.136083	0.136083	0.136083
0.235702	-0.2357	0	0.235702	-0.2357	0	0.235702	-0.2357	0	0.235702	-0.2357	0	0.235702
0.136083	0.136083	-0.27217	0.136083	0.136083	-0.27217	0.136083	0.136083	-0.27217	0.136083	0.136083	-0.27217	0.136083

$C_d = B\Lambda B'$=

0.026	-0.00267	-0.00154	-0.00267	3.086*10^	0
-0.00267	0.023	-0.00267	-0.00463	5.346*10^	0
-0.00154	-0.00267	0.026	-0.00267	3.086*10^	0
-0.00267	-0.00463	-0.00267	0.023	5.346*10^	0
3.086*10^	5.346*10^	3.086*10^	5.346*10^	0.022	0
0	0	0	0	0	0.028

$$Design\_Efficiency := \left(\frac{det\_Cd}{det\_Copt}\right)^{\frac{1}{p}}$$

$$det\_Cd := |Cd|$$

$$det\_Cd = 1.531 \times 10^{-10}$$

$$det\_Copt := \prod_{k}\left[\frac{2 \cdot sq \cdot lq}{M^2 (lq - 1) \cdot Lf}\right]^{lq-1}$$

$M := 2$

$lq := 3$

$sq := 1$

$Lf := 27$

$k := 1..3$

$$p := \sum_{k}(lq - 1)$$

$$det\_Copt = 4.594 \times 10^{-10}$$

$$Design\_Efficiency = 0.833$$

Annex 2: Health Insurance Game

The Health Insurance Game was obtained from De Jong (2012) and adapted to this research.

Each game consisted of two parts. In the first part the situation without a health insurance was simulated. The women all got 10 coins per person in the beginning of the game. Each round represented a month in which everyone had the same chance of falling ill. This chance was presented by rolling a dice.

There were four different outcomes:

- Throwing 1, 3 or 5 would mean that the woman did not get ill that month and did not lose any of her coins to health care expenditure;
- Throwing 2 would mean that the woman would get just a little bit ill that month and would lose 1 coin to health care expenditure;
- Throwing 4 would mean that the woman would get somewhat more ill that month and would lose 2 coin to health care expenditure;
- Throwing 6 would mean that the woman would get severely ill that month and would lose 4 coin to health care expenditure.

Each round all women would have the same chance of getting ill and having to pay a health care cost. 3 rounds would be played until one or more of the women did not have enough money to pay for their health care costs. Then, the woman would be asked what she would do in that case. It was explained that some women had some money left, but that others could not afford the health care costs.

In the second part, a situation with a health insurance was simulated. The women would start again with 10 coins and the chances of falling ill were the same as above. This time, however, each round (month) the women had to pay a premium of 3 coins to an insurance fund. Additionally, 5 extra coins were added to the fund, representing the contributions of other member of the insurance scheme. Each time a women got ill during the month the money would now be paid out of the insurance fund instead of by the woman herself. In case there were not enough coins in the fund to cover all health care costs of the month, the coins would be added by DH and paid back from the insurance fund of the month after. In this part of the game also three rounds were played after which the women were explained that now everybody still had one coin left and no one had to lend money to pay for their depths.

Annex 3: Questionnaire

Questionnaire

Introduction:

Hello, my name is … , and this is Selma from the Netherlands.

As you've heard this morning we are doing a survey about health cooperatives. We want to get an idea about what you want so we can adjust the programme to your needs.

Your participation in this survey is voluntary, and all the information you share will be treated confidentially. The information will not be used to grant or deny you access to any of Dhulikhel Hospital's programmes and facilities, it will just be used to design the health cooperative programme in such a way that it will meet the demand of you and the other eligible women in your community.

This survey consists of several parts: We will start with some personal questions about you and your household and your experience with the Outreach Centre of Dhulikhel Hospital. Subsequently the different parts of the health cooperatives will be discussed: the health insurance, credit and saving programme, skills-based trainings and health education. The total survey will take around 30-45 minutes. You can choose not to answer a question, or stop the interview at any time you want.

We will write down your answers. But they will be handled with confidence.

Name respondent	
Age	
Health centre	
Ward	
Name microfinance group	
Date of survey	

AI	Do you want to participate in this research? 1. Yes 0. No	
AII	Did you visit the introductory meeting this morning? 1. Yes 0. No	

If not: briefly explain the main aspects of the cooperative and the health insurance!

	Section A: Introductory questions:	**Code**
A1	What is your civil status? 1. Single/unmarried 2. Married 3. Separated 4. Widow 5. Other: ……	
A2	In what type of family do you live? 1. Core 2. Joint 3. Extended	
A3	How many family members live in your house? 1. Women ……. 2. Man ……. 3. Children ……	-----
A4	How many people in your household are chronically ill? ……	-----
A5	How many people in your household are disabled? ……	-----
A6	How many family members in your household have an income? ……	-----
A7	Do you smoke? 1. Yes, regularly 2. Yes, sometimes 0. No	

A8	Do you drink alcohol? 1. Yes, regularly 2. Yes, sometimes 0. No	
A9	How would you rate your health status compared to people of your age? 1. Below average 2. Average 3. Above average	
A10	What is your religion? 1. Hindu 2. Buddhist 3. Christian 4. Other ……	
A11	What is your main language? 1. Nepali 2. Tamang 3. Newar 4. Other ……	
A12	What is your highest education? 1. Illiterate 2. Informal education 3. Primary education 4. Secondary education 5. Higher education	
A13	What is your husband's highest education? 1. Illiterate 2. Informal education 3. Primary education 4. Secondary education 5. Higher education	
A14	What are your main occupations (max. 3)? 1. Inactive 2. Farmer of crops 3. Farmer of livestock 4. Farmer of crops & livestock 5. Shop keeper 6. Administrative job 7. Teacher 8. Student 9. Housewife 10. Other ……	
A15	What are your husband's main occupations (max. 3)? 1. Inactive 2. Farmer of crops 3. Farmer of livestock 4. Farmer of crops & livestock 5. Shop keeper 6. Administrative job 7. Teacher 8. Student 9. Construction worker 10. Other …… 11. Husband is abroad 12. No husband	
A16	What was the total household expenditure in the last month? *	….. Rs
A17	Rank your four main expenses: (No. 1 indicates the highest expense, No. 4 a lower, but still important expense) □ Education □ Investments for your occupation □ Health □ Consumer goods □ Food □ Others …… □ Ceremonial expenses	
A18	Over the past year, have you or your family ever gone without the following? If yes, how often? 1 = never 2 = just one or twice 3 = several times 4 = many times 5 = always DK = do not know a. Enough to eat …….. b. Enough clean water for home use …….. c. Medicines or medical treatment …….. d. Enough fuel to cook your food …….. e. A cash income ……..	
A19	What are the major sources of income of the household? Rank the main three: (1 = most important, 2 = second most important, 3 = third most important) □ Agriculture □ Business (e.g. a shop) □ Service (e.g. teaching) □ Labour □ Remittances from abroad □ Other ……	
A20	Does your household income vary over the months? 1. Yes, a lot 2. Yes, a little 0. Not at all	
A21	What was the total household income in the last month? (DK = do not know)	….. Rs

A22	Do you have the following possessions? (1 = yes, 0 = no) 1. Television 2. Radio 3. House 4. Transport (car/truck) 5. Land 6. Animals 7. Others ……	 ….. ….. ….. ….. ….. ….. …..
A23	How many animals do you have? 1. Cows/bulls/buffalos: ……. 2. Hens/chickens: ……. 3. Pigs: ……. 4. Goats: ……. 5. Ducks/geese: ……. 6. Others: ……. specify: ……..	
A24	Do you own land? (1 = yes, 0 = no) How many ropanies? …….	
A25	Do you rent land or use land for free that you do not own? (1 = yes, 0 = no) How many ropanies? …….	

*(DK = do not know; DU = do not understand)

	Section B: Experience with Dhulikhel Hospital	**Code**
B1	How often did you visit the Outreach Centre of Dhulikhel Hospital last year? * ……..	
B2	How often did your family visit the Outreach Centre of Dhulikhel Hospital last year (combined)? ……. *	
B3	What do you think of the quality of the care you received in the Outreach Centre of Dhulikhel Hospital? 1. Very good 2. Good 3. Average 4. Poor 5. Very poor 6. Do not know	
B4	How far is the Outreach Centre of Dhulikhel Hospital away from your house (walking)? …….. minutes	
B5	How often did you visit the Governmental health post last year? * ……..	
B6	How often did your family visit the Governmental health post last year (combined)? * …….	
B7	What do you think of the quality of the care you received in the governmental health post? 1. Very good 2. Good 3. Average 4. Poor 5. Very poor 6. Do not know	
B8	How far is the Governmental health post away from your house (walking)? …….. minutes	
B9	If your family is ill to which health centre would you go? 1. Governmental health post 2. Dhulikhel Hospital Outreach Centre 3. Other ……	
B10	How much money did your family spend on health expenses last year? *	…… Rs

B11	Which things could be improved in the service of Dhulikhel Hospital's outreach centre? (ask as open question, but add to right category or other) Service: Problem: 1. Staff ……. 2. Equipment ……. 3. Services ……. 4. Other …….	

*(DK = do not know; DU = do not understand)

	Section C: Knowledge testing questions	**Code**
C1	What is a cooperative? *Check if they include the following main points:* • *Organisation in which different microfinance groups are combined* • *The organisation is owned and operated by the women themselves* • *Includes extra benefits such as health education, skills-based trainings and health insurance* 1. Understood well (*mentioned all three points*) 0. Not understood well	
C2	Who will own the cooperative? 1. Hospital 2. Cooperative board 3. Women themselves ←!	
C3	What are the most important features of health insurance? *Check if they include the following main points:* • *You pay a monthly premium* • *In turn you will receive basic health care from the Outreach Centre when you are ill* • *You will not receive your premium back if you do not get ill* 1. Understood well (*mentioned all three points*) 0. Not understood well	
C4	What happens if you do not get ill in a month? 1. I will receive the premium back 2. Nothing, I won't get the premium back ←! 3. At the end of the year I will receive back what I haven't used	

*(DK = do not know; DU = do not understand)

Section D: Health Insurance Choice Experiment

This part will address the health insurance. As explained this morning for a health insurance a monthly premium has to be paid. The premiums of all the participating women will be gathered in the pool fund of the health insurance. When one of the women becomes ill their health costs will be paid from the pool fund. There are several services that are included in the health insurance package:

- Consultation
- Lab facilities
- One-night hospitalization (including small surgeries from surgical camp)
- Pharmacy

The last few years a pilot has been done in one of the other outreach centres. There, it showed that most of the costs of the health care came from the medicines used. Hence, the costs of the medicines have a big influence on the total health costs and the height of the premium. Therefore, a balance has to be found between the height of the premium and the part of the medicines that is covered by the health insurance.

In this part of the questionnaire we ask you several times to choose between different health insurance packages. These choices are just like the choices that you have to make when you buy a product such as a telephone. The telephones you have to choose from have different characteristics. They may differ in colour, in number of functions they have and in the price. In your choice for a telephone you consider all these characteristics at the same time. In the choices we present to you we ask you to do the same.

A possible choice you would have to make would look like this:

Telephone 1	**Characteristics**	**Telephone 2**
Red	Colour	Blue
Calling, internet and photocamera	Functions	Calling and photocamera
1000 Rs.	Costs	800 Rs.

D1	Which one would you prefer? 1. Telephone 1 2. Telephone 2	

Now we ask you to make the same kind of choice between two health insurance packages. The health insurance packages have different premiums, co-payment for medicines and are either for you individually, for your core family (husband and children) or for your extended family (also other family members that live in your household).

** Use the showcard to explain the characteristics and their levels **

Please consider <u>all</u> the characteristics before making a choice, so we can really understand how important different aspects are for you.

D2 Choice set 1 (dominant): Code

Health Insurance 1	**Characteristics**	**Health insurance 2**
120 Rs.	Premium per month	120 Rs.
10 %	Co-payment for pharmacy	20 %
Core family	Type of package	Core family

D3 Choice set 2: Code

Health Insurance 1	**Characteristics**	**Health insurance 2**
100 Rs.	Premium per month	120 Rs.
10 %	Co-payment for pharmacy	20 %
Individual	Type of package	Core family

D4 Choice set 3: Code

Health Insurance 1	Characteristics	Health insurance 2

100 Rs.	Premium per month	120 Rs.
20 %	Co-payment for pharmacy	30 %
Core family	Type of package	Extended family

D5 Choice set 4: Code

Health Insurance 1	Characteristics	Health insurance 2
100 Rs.	Premium per month	120 Rs.
30 %	Co-payment for pharmacy	10 %
Extended family	Type of package	Individual

D6 *Choice set 5:* Code

Health Insurance 1	Characteristics	Health insurance 2
120 Rs.	Premium per month	140 Rs.
10 %	Co-payment for pharmacy	20 %
Core family	Type of package	Extended family

State again that they have to consider all the characteristics together before making a choice

D7 Choice set 6: Code

Health Insurance 1	Characteristics	Health insurance 2
120 Rs.	Premium per month	140 Rs.
20 %	Co-payment for pharmacy	30 %
Extended family	Type of package	Individual

D8 Choice set 7: Code

Health Insurance 1	Characteristics	Health insurance 2
120 Rs.	Premium per month	140 Rs.
30 %	Co-payment for pharmacy	10 %
Individual	Type of package	Core family

D9 Choice set 8: Code

Health Insurance 1	Characteristics	Health insurance 2
140 Rs.	Premium per month	100 Rs.
10 %	Co-payment for pharmacy	20 %
Extended family	Type of package	Individual

D10 Choice set 9: Code

Health Insurance 1	Characteristics	Health insurance 2
140 Rs.	Premium per month	100 Rs.
20 %	Co-payment for pharmacy	30 %
Individual	Type of package	Core family

D11 Choice set 10: Code

Health Insurance 1	Characteristics	Health insurance 2
140 Rs.	Premium per month	100 Rs.
30 %	Co-payment for pharmacy	10 %
Core family	Type of package	Extended family

D12 *<u>Choice set 11 (rationality test):</u>* Code

Characteristics	Health insurance 1	Health Insurance 2	Health Insurance 3
Premium per month	120 Rs.	140 Rs.	100 Rs
Co-payment for pharmacy	10 %	20 %	30 %
Type of package	Core family	Extended family	Individual

D13	*(for assistant) is choice of D12 (choice set 11) in line with choice of D6 (choice set 5)?* 1. Yes (*go to D15*) 0. No (*go to D14*)	
D14	Why did you prefer HI … in choice set 5 and HI … in choice set 11? On which consideration did you base your choice? * …… ……	
D15	Please rank the characteristics in order of importance (1 = most important; 3 = least important) □ Premium □ Co-payment □ Type of package (indiv/family)	
D16	Do you want to involve in the health cooperative if health insurance is mandatory? 1. Yes 0. No If no: why not? ……	

*(DK = do not know; DU = do not understand)

	Section E: Health Cooperatives	**Code**
E1	Have you ever been involved in a cooperative? 1. Yes 0. No	
E2	Do you know anyone who has been involved in a cooperative? 1. Yes 0. No	
E3	Have you experienced/heard any negative aspects of cooperatives? 1. Yes 0. No (*go to E5*)	
E4	If yes what are negative aspects of cooperatives according to you? ……	
E5	What are positive aspects of cooperatives according to you?	

	……..	
E6	Would you like to join a cooperative? 1. Yes 0. No (*go to F1*)	
E7	Would you like to join the cooperative programme of Dhulikhel Hospital? 1. Yes 0. No	

*(DK = do not know; DU = do not understand)

	Section F: Credit and saving programme	**Code**
F1	What kind of investment did you do with the money from the credit programme? 1. Food & daily needs 2. Emergency expenditure 3. Education 4. Buying equipment / machines (expanding business) 5. Starting a new business 6. Buying livestock 7. Buying land 8. Other …….	
F2	Are there other places to get a loan in your village? * 1. Yes 0. No	
F3	Would you like to take a loan in the future? * 1. Yes 0. No (*Go to G1*)	
F4	If yes, would you be interested in taking a loan from the cooperative? * 1. Yes 0. No (*Go to G1*)	
F5	What kind of investment would you like to engage in? * 1. Food & daily needs 2. Emergency expenditure 3. Education 4. Buying equipment / machines (expanding business) 5. Starting a new business 6. Buying livestock 7. Buying land 8. Other …….	
F6	Would you like to have individual loans or group loans in the health cooperative? * 1. Individual 2. Group	
F7	Who will manage the money after it is borrowed? * 1. Self 2. Husband 3. Family in law 4. Other ……	
F8	Would you like the interest rate to be flexible over time (for example to be higher in harvest season and lower in winter)? * 1. Yes 0. No	

*(DK = do not know; DU = do not understand)

	Section G: Skills-based training	**Code**
G1	Have you ever taken any skill-based training in the microfinance programme? If yes, which? 1. Yes 0. No ……..	
G2	Would you like to be involved in skill-based training? 1. Yes 0. No (*Go to H1*)	
G3	What kind of skills would you like to learn? 1. Cattle farming 2. Tailoring 3. Candle making 4. Mushroom cultivation 5. Other: ……	

*(DK = do not know; DU = do not understand)

	Section H: Health Education	**Code**
H1	How many health education sessions have you visited in the previous year? …… (*If 0, go to H4*)	
H2	How interesting where these trainings on a scale of five? 1. Very interesting 2. Interesting 3. Neutral 4. Uninteresting 5. Very uninteresting	
H3	How useful where these trainings on a scale of five? 1. Very useful 2. Useful 3. Neutral 4. Not so useful 5. Not useful at all	
H4	Would you like to attend health education sessions in the future? 1. Yes 0. No (*Go to I1*)	
H5	How often would you like to attend the Health Education meetings? 1. Ones every 3 months 2. Ones every 2 months 3. Ones every month 4. Ones every 2 weeks	
H6	Are there any specific topics you would like to have discussed? If yes, which? 1. Yes 2. No ……	
H7	Would you like some topics to be discussed with both men and women together? If yes which? 1. Yes 2. No ……	
H8	Would you like to combine the health education with other activities? 1. Yes 2. No (*Go to I1*)	
H9	Which activities would you like to combine with health education? 1. Health screening (weight, blood pressure) 2. Child health programme (screening / vaccination) 3. Others, specify: ……	

*(DK = do not know; DU = do not understand)

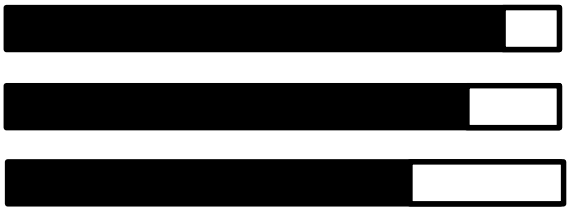
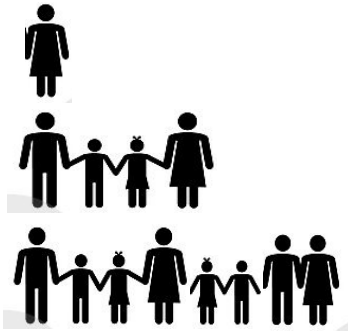
I1 This is the end of the questionnaire. Is there anything else you would like to add and share with us?

……
……
……
……

Thank you very much for your cooperation. You've helped us a lot with your information. In a few months the staff of Dhulikhel Hospital will come to speak with all the women who have finished their credit programme about the health cooperatives. The answers of all the respondents will be taken into consideration in making the plans for the health cooperative, but your answers will be handled with confidence.

Annex 4: Show Card

Health Insurance show card

Characteristic	Levels
Premium	100 Rs. 120 Rs. 140 Rs.
Co-payment	10 % 20 % 30% 
Package	Individual Core family Extended family 

Co-payment example:

- Ten painkillers for a headache (paracetamol) will cost 10 Nrs.. Hence, you will have to pay yourself:
    - 10 %: 1 Nrs.
    - 20 %: 2 Nrs.
    - 30 %: 3 Nrs.
- One medicine against a severe chest infection (antibiotics) will cost 800 Nrs.. Hence, you will have to pay yourself:
    - 10 %: 80 Nrs.
    - 20 %: 160 Nrs.
    - 30 %: 240 Nrs.

Annex 5: In-depth interviews

Kattike Deurali

Buddha Maya Nepali, group member (Ward 2)

Microfinance programme:

- *What did you think of the Microfinance programme?*

She liked the programme. They first got 4000 NPR. and later 2000 more. From 6000 NPR. she bought one goat (she paid 2000 herself). She sold the first baby goat to buy clothes for her children and the second to pay back her loan. She still has one baby and mother goat remaining. The money was enough for 1 goat at that time, because prices were lower. Her neighbours even had more profit than her.

- *What are positive aspects of the Microfinance programme?*

Low interest rate.

- *What are negative aspects of the Microfinance programme?*

Some people do not pay back the loan. So she would like the credit to be provided to trustworthy people in the future. She thinks it is strange that those people still dare to come to the health centre.

- *How are the savings of the groups arranged?*

She saved 50 NPR. per month., now she saved a total of 500 NPR. But she stopped saving, because her group didn't provide any more loans for poor people from the savings.

- *How were the women selected for the Microfinance programme?*

Selected by the Health Centre based on trust.

Ward 2 selection based on cast. 5 low cast and 5 high cast together in 1 mf-group.

- *Who handles the money of the Microfinance programme (women/their husbands)?*

She handles the money in the household herself, in other households the husband decides. Her husband supports her decisions.

Health cooperative:

- *Do you think the women would like to join the cooperative?*

She likes the coming programmes of DH. She would like to participate in the future. She would like to participate in the future and buy more goats.

- *Do you think the women in the village would be willing to lead the health cooperative?*

She wants to take part in the programme, but she doesn't want to be a leader as she feels that nobody will listen to her as she is only low cast and uneducated. But if other people would select her, she would like to be a leader.

- *Do you think the women in the village would be willing to work together?*

She is glad that there is no cast discrimination in the programme. The hospital informed all the women for every programme.

She is not sure if people want to work together, because she feels like the Microfinance programme also was not a success. Some of her neighbours also stopped saving.

- *Do you think the women in the village would be willing to work together with the hospital?*

She does trust DH, but she doesn't like one the staff. According to her they do not give good medicines. So she went to the private clinic for treatment in the past.

Other women do not trust DH and the new programme. They think it is made for the benefit of the hospital instead of the benefit of the women. She's doesn't agree.

Sita Lama, Nurse-midwife of the DH Health Centres in KD

<u>Microfinance programme:</u>

- *What are positive aspects of the Microfinance programme?*

Microfinance has a positive impact on the women. Women are more active now in sharing their views and making decisions for themselves. They have more money now and their livelihoods have improved.

- *What are negative aspects of the Microfinance programme?*

Some people did not manage to pay back the loan. Some thought that the hospital was making profit of the programme. That's why they do not want to pay back. (5/6 women)

- *How were the women selected for the Microfinance programme?*

First leaders were selected from each ward. Then the leaders suggested the names of the women. Mostly poor persons were selected. Later the people who were interested were selected. For the last three groups the selected women have to prove that they are poor by bringing people who can confirm it.

- *Who handles the money of the Microfinance programme (women/their husbands)?*

Women first consult with their husbands if they want to join.

- *How are the savings of the groups arranged?*

The savings of the MF-groups are meant for the women and not for the hospital. The saving is a way to keep the women in a group after the Microfinance programme. Started after 2 terms. (Women have to pay back every 6 months) The savings serve as minimum requirement for officially registering the saving group. Which gives extra benefits from the village development committee (lowest level government office), such as skills-based trainings.

If the women leave the group, than they won't get the money back. Only if the whole group stops, they can get back the money. The group-leader manages the money together with the secretary and the treasurer. If the women want to take a loan from the saving pool than they have to pay 20 percent interest over the whole period.

- *Why do people prefer Dhulikhel Hospital's health centre over the other health care providers in the village?*
    - Trust; relation with the staff; behaviour of the staff.
    - Emergency 24-hours service.
    - Opening hours: 08.00-16.00h (much longer than the governmental health post.

Health cooperative:

- *Do you think the women in the village would be willing to lead the health cooperative?*
- *Do you think the women in the village would be willing to work together?*

She thinks that the women are willing to work together and manage the group, no matter the caste. There is no discrimination, but people from the lowest casts think themselves that other people won't trust them. Most people are uneducated so proper training is needed.

Extra information:

Both health centre and the governmental health post give health education at least ones a month in the ward, but the women say that they didn't get it. (even though there are records of who went)

The birthing centre is a cooperation between DH Health centre and the governmental health post. Sita sister goes to the health post whenever there is a delivery, because the equipment in the health centre is not so good. There are financial incentives to get the women to the health centre:

- 4 x 100 for antenatal care
- 1 x 1000 for delivery (1500 in mountain region and 500 in terai region (transportation costs))
- (blanket from the management committee of DH + health post)

For emergency health care there is an extra charge of 25 NPR. In case of emergency people are allowed to pay the next day. There is a charity trust for very poor people.

Informal education programme (government): It is becoming compulsory to write your signature if you apply for any governmental services such as pension subsidy. Therefore, more people will join the informal reading and writing classes of the government.

Firoz brother, paramedic and 'In charge' of the DH Health Centres in KD

He has been working for 6 years as an 'in charge'[33]. He finds it a difficult job.

- *What did you think of the Microfinance programme?*

Not fully successful because the money is not used as intended. Only 75 percent of the loans are given to the poor and 25 percent to people who do not really need it. This selection is done by the local committee.

- *What are positive aspects of the Microfinance programme?*

[33] The 'in charge' is the manager of the health centre, mostly a paramedic.

Is good for the poor people. 6000 NPR. Is a large sum for the poor women, they can buy a goat. The interest rate is low. The programme had a positive impact on the income of the women. Almost all women bought a goat. Only one woman bought a buffalo. The loan makes them more independent.

- *What are negative aspects of the Microfinance programme?*

Part of the loans are provided to the richer villagers.

No continuity of the Microfinance programme. No proper implementation and no proper supervision and monitoring of the programme. Some goats have died and people were not able to pay back the loan. The hospital did not understand and just stopped the programme. (only because of these 5 women) The programme was planned for four years but the management committee decided to stop it after two years.

- *Why do people prefer Dhulikhel Hospital's health centre over the other health care providers in the village?*
    - Opening hours (health post is 10.00-14.00h)
    - Emergency care
    - Hygiene
    - Health post only provides limited free medicines

Patient flow has decreased in the last years because there are no proper facilities, like lab and x-ray. (People can go to KTM now, because as new road has been build). During camps there are no specialised doctors and no proper equipment. So people do not want to come any more. The Health Centre can only provide first aid treatment, because they do not have enough room or equipment.

<u>Health cooperative:</u>

- *Do you think the women in the village would be willing to lead the health cooperative?*

The programme might be successful if there is proper supervision, monitoring and implementation. If not, the programme will not be continued and will not be a success.

- *Do you think the women in the village would be willing to pay a higher interest rate for the loans?*

It depends on the person if they can pay back the loan with the higher interest rate. If they do a proper investment, it will be easier for them to pay for the high interest rate. Investing in goats is easy for the women because they have experience with it and can do it from their homes and there is a local market for the products. It will be difficult for them to learn new skills and to sell the products.

- *Which skills-based trainings would be useful for the women?*

He thinks it is good to start a garment industry (in a group instead of individual). So tailoring would be a good Skills-based training. Candle making would also be a good option.

<u>Extra information:</u>

Women of the Village Development Committee, Kattike Deurali are active.

According to him most of the men do not work.

Bisnu Maya Khadka, group leader of ward 7 and member of the health service management committee

Microfinance programme:

- *What did you think of the Microfinance programme?*

The Microfinance programme helped a lot in ward 7. Though, some women thought the loan was too small. But 6000 was enough to buy a goat at that time. As many women did not have enough money to buy a goat, it helped a lot. Most of the women got profit from selling the goats. One woman (or her husband) even sold 9 goats.

- *What are negative aspects of the Microfinance programme?*

They had to pay back the loan in 2 terms only. That made the interest rate quite high.

In ward No. 7, 6 and 4 some women did not pay back their loans in time. So the programme was reduced to two years.

- *How were the women selected for the Microfinance programme?*

From her ward, the poor and the widows were selected. First a meeting was conducted under local leaders. And those selected the women for the programme.

- *Who handles the money of the Microfinance programme (women/their husbands)?*

First the women discuss with their family before taking a loan. They won't make any decisions without their family. The money of 4 women in the group was handled by their husbands, who also kept the profit. Most other women managed the money themselves.

Cooperative:

- *Do you think the women in the village would be willing to lead the health cooperative?*
- *Do you think the women in the village would be willing to work together?*

The women do want to work together in coordination. Women who were not involved in the microfinance groups would like to participate in the cooperative as well. And also lead it.

- *Do you think the women in the village would be willing to work together with the hospital?*

The women complain that the medicines in the health centre are more expensive than in the private medical clinic. Therefore, the women do not trust the health centre. The women thought that the Health Centre came there to serve them, but as the medicine costs are so high, they feel negative about it.

She thinks that most of the women won't be able to pay for the health insurance premium, especially not for the whole family. They do not have any income and are very poor. After the game, the women understood the concept of health insurance. But the husbands think that they should get there premium money back if they do not fall ill in a period.

Bahunepati

Nanu Majhi, member of Microfinance group ward 2

She has been in the MF-group for 6 years

Microfinance programme:

- *What did you think of the Microfinance programme?*

The Microfinance programme was good. Most women in her ward bought pigs from the loan. The money was at the time enough to buy 5 pigs. Now, 1 piglet (1 month old) can be bought for 3500 NPR.

- *What are positive aspects of the Microfinance programme?*

The programme had a positive impact on her income. She earned 48000 NPR. from selling piglets. She sold 9 piglets for 28000 last month. They also sell mature pigs for meat, mostly in Kathmandu. They receive 210 NPR. Per kg. The meet is also eaten in BP, but mostly sold in KTM. 1 pig gives around 15 piglets. She also bought a goat and already sold three of its babies. All the women in her ward gained from the investment.

For women in the upper ward it was more difficult to pay back the loan. As they are high cast they could not invest in pigs, but bought goats instead. These are much less profitable.

- *What are negative aspects of the Microfinance programme?*

First it was told that no interest rate would be charged. After the second term they had to pay back the last part of the loan with 800 rupees interest. Some groups decided not to pay the interest rate, but only the loan itself. Her group did pay back the interest rate.

The loans had to be paid back over a period of 4 years in 2 terms.

- *How are the savings of the groups arranged?*

The savings are very useful for new loans. The women pay 12 percent interest over the loans in total. And women from outside the group have to pay 13 percent interest. They have to pay back within 6 months. How much money women can borrow is dependent on their capacity. It is often between 1000 and 4000 NPR.. The highest sum provided was 30000 NPR.. Most women buy livestock (pigs).

Usually the women do not want to take larger loans because they do not want to do big investments. The smaller loans are easier to pay back.

- *How were the women selected for the Microfinance programme?*

They were selected by the female community health volunteer in the ward based on their income (the group leader of another group).

- *Who handles the money of the Microfinance programme (women/their husbands)?*

The money is mostly handled by the women themselves, but they make the decisions together with their husbands.

Health cooperative:

- *Do you think the women would like to join the cooperative?*

She would like to join the health insurance. But would have to discuss it with the group first. The women have to discuss with their families before joining the cooperative.

The positive aspects of the programme seem to her the health insurance and the possibility to take bigger loans.

- *Do you think the women in the village would be willing to pay a higher interest rate for the loans?*

It is no problem if the interest rate will be higher in the cooperatives, because they already pay a higher interest rate over their savings. (12 %)

- *Do you think the women in the village would be willing to lead the health cooperative?*
- *Do you think the women in the village would be willing to work together?*

She thinks the women of the group are willing to work together with other groups and to lead the programme.

- *Do you think the women in the village would be willing to work together with the hospital?*

The women do not trust the hospital, because they first were told that no interest rate would be charged in the Microfinance programme and later still had to pay it. Moreover, veterinary and tailoring trainings were promised by the staff and were never provided.

Extra information:

She would like to go on an outing with the group to visit other villages and see what the women there did with their groups and their loans.

Sujan Lamichhani, paramedic and manager DH health centre in BP

Microfinance programme:

- *What did you think of the Microfinance programme?*

He was not here in the beginning of the programme.

The amount of money was first 5000, now 7000 NPR. (for the new Microfinance groups). There are 10 groups in BP now. He thinks the size of the loans is fine. Almost all women have invested in livestock. From 7000 women can buy a young goat, pig, cow or buffalo and use the remaining money to fix the shed or buy inputs.

If the animal dies the rule is that the women won't have to pay the interest rate if they provide proof (a picture). But this has not happened in practice. They tell it after burying the animal.

In the running groups the women get 4 years to pay back their loans (every 6 months) this is enough. Every term the interest rate is 4 percent.

- *What are positive aspects of the Microfinance programme?*

The programme is very good. The women are committed to the group. The hospital has built a relationship with the women here. And he can teach the women things about health. The women learned a lot from the health education.

- *What are negative aspects of the Microfinance programme?*

The women expected more, bigger programmes. The Microfinance programme is not able to meet all the demands of the local women. If a tailoring programme is offered, the women expect to get a sewing machine afterwards.

- *How were the women selected for the Microfinance programme?*

Selection: The cook gave information about the income of the women. Later the staff of community department has visited the women to select the poorest of them.

Few groups were selected on the basis of their economic status, even though they might not be able to pay back. Some got more time to pay back. The staffs give advice and monitors what the women invest in. The women only suffered a loss when the goats or pigs died.

- *How are the savings of the groups arranged?*

The groups save 100 NPR. per person per month and provide loans for 10-12 percent interest. The Health Centre manages 5 groups, the others manage their savings themselves. Women can quit and get their money back. They can not just take up their own savings for themselves. They have to officially take a loan and pay interest rate. In case of emergency they can borrow a small sum of money for their expenses and pay back later. It is easy to take loans from the savings.

Each month one women gets a loan. In case of emergency women can get a loan more often.

- *Who handles the money of the Microfinance programme (women/their husbands)?*

The women handle the money themselves. The goats are the personal possessions of the women.

<u>Cooperative:</u>

- *Do you think the women would like to join the cooperative?*

Only few women can decide for themselves if they want to use the HI. Very few are supported by their husbands, they often drink and do not care.

- *Do you think the women in the village would be willing to lead the health cooperative?*
- *Do you think the women in the village would be willing to work together?*

It will be very hard for the women to run the cooperatives. He assumes that it will be difficult to coordinate between the groups. He thinks that there are no women who can completely run the cooperative. They will need the help of the hospital. He is scared that disputes might arise about who gets a loan and who doesn't. In some groups there are already disputes about the distribution of the loans among the women. So, it will be difficult for the staff to coordinate these women. There is still some cast discrimination within the groups. The women do not want to give the loans to some low cast people because they do not trust them to pay back. Ones the women were invited in the health centre and the higher cast women were mad that they were offered cookies that were touched by the lower casts.

- *Do you think the women in the village would be willing to work together with the hospital?*

The women do want to work together with the hospital. He thinks they trust the hospital.

- *Do you think the women in the village would be willing to pay a higher interest rate for the loans?*

The 10-12 percent interest would be too high for the women if it is not added to the savings. Now it is 4 percent per 6 months. 12 percent per 1 month would be too high, per 6 months would be reasonable.

- *Which skills-based trainings were provided through the Health Centre?*

Trainings in last 2 years:

- Candle making training 3 day
- Veterinary training 1 day
- Fodder planting training 1 day
- Tailoring training was not provided because the women told that they could not buy the machines.

The women do not utilize the knowledge of the training in practice. The hospital does give information on where to sell the product (for instance the candles) and where to buy the inputs.

The Department of Community Programmes of Dhulikhel Hospital decides which trainings are given. First all groups were invited together, but some disputes arose between groups of different casts. Now two groups are invited who are similar in caste, as to make it easier to coordinate, but only a few women come.

- *Which skills-based trainings would be useful for the women?*

Only veterinary training would be useful: first aid, medicines, and animal rearing. In the training the women learn that they should keep the pigs a few meters away from the house in a shed, but people do not have the money to do so and keep them inside the house.

Group interview with Chaundika Nepal, Sargali Nepal, Mandira Nepal (group members) and Gita Nepal (group leader).

- *What did you think of the Microfinance programme?*

The Microfinance programme was good for the group. The amount of money was fine, because it would be more difficult to handle a higher sum of money.

Almost all women got profit from the programme. One woman earned 35000 from the 4500 rupees (50000 for 11 women). For one woman the goat died after getting a baby. So, she did not gain much, but did not lose any either.

- *What are positive aspects of the Microfinance programme?*

The positive aspect is that the women properly utilized the money and got profit of it. They got more information about health and health education through this group. It was also very easy to get credit from the savings.

- *What are negative aspects of the Microfinance programme?*

They were told trainings would come, but they did not receive any.

They were the second group. In the first group no interest was asked, but one of the staffs decided that they did need to pay 4 percent.

It would be better for them to pay back the loan in one term after 2/3/4 years, because they would like to invest in a buffalo.

They received a stretcher to bring ill people to the Health Centre, but it broke the first time they used it.

- *How were the women selected for the Microfinance programme?*

As they were already a group (mothers group) they were selected for the Microfinance programme.

- *How are the savings of the groups arranged?*

From the saved money women can take a loan with an interest rate of 12%. They have to pay back in 6 months with the interest. (12 % per 6 months). They have not given credit to women outside of the group.

Who handles the money of the Microfinance programme (women/their husbands)?

All the women handle the money by themselves. But they discuss a little with the family. If they take a loan and buy something that would be their own property.

<u>Cooperative:</u>

- *Do you think the women would like to join the cooperative?*

They would rather have a programme similar to the Microfinance programme, but with bigger sum of money. They would rather not handle the money by themselves.

They have to discuss about joining the insurance within the group, but most of the women did not want to participate. They would be willing to join if services in Dhulikhel Hospital would also be included.

- *Do you think the women in the village would be willing to lead the health cooperative?*
- *Do you think the women in the village would be willing to work together?*

If all the groups are combined, than it would be hard for them to give the loan to the low cast women, because they do not know if they would be able to pay it back. Conflicts may arise with the other groups. Therefore, they'd rather have the loan within their group.

- *Do you think the women in the village would be willing to work together with the hospital?*

They would like to work together with the hospital in organising the credit. That would make it easier for them to get other women to pay back the loan.

- *Do you think the women in the village would be willing to pay a higher interest rate for the loans?*

The 10-12 percent interest would be too high, they could easily get credit with this rate elsewhere.

- *Which skills-based trainings would be useful for the women?*

They would like to get mushroom cultivation as a training.

Extra information:

There was a midwife training ten years ago (traditional birth attendant). The women of the training started a group. In the past they would assists with births. But now since institutional training is promoted they can not be used much.

Bacchu Ram Nepal, cook and office helper of DH health centre in BP

Microfinance programme:

- *What did you think of the Microfinance programme?*

The programme is good. The women are more independent in terms of money.

- *How were the women selected for the Microfinance programme?*

First, the women were not so much interested in the programme so the women were selected based on their willingness to join. Someone from the hospital convinced two groups to join. Later, more women wanted to join. Then, staff from the hospital came to select the poorest women.

- *What are negative aspects of the Microfinance programme?*

The time to pay back first was 4 years, later 2, now 6 months. The latter may be too short to earn something and pay back. He thinks it would be better to give 2 years to pay back the loan.

- *What are positive aspects of the Microfinance programme?*

The savings help to keep the women in the group and reach them for trainings and health education. The possibility to take credit helped the women a lot in case of emergency expenditure.

Interest rate was good. The interest rate to take a loan in village is 25% per year (for example from neighbours). In mothers group it is 12 percent. The 4 percent is per year. 2 percent per half a year.

- *Who handles the money of the Microfinance programme (women/their husbands)?*

There was a positive impact on the income of the women. The women would own the goat themselves and do not have to share it with their family. It is their private money. The women are the ones that handle the money themselves. In the rural part of Nepal it is traditional that all the women have their own private animals in the house (often goat, cow or hens).

Health cooperative:

- *Do you think the women would like to join the cooperative?*

It is very difficult for the women to join the health insurance without consulting the families.

Both the eligible women and the women in the pilot are not so satisfied with the health insurance programme. They want all services to be free, even up to DH, then they will join the scheme. In the beginning of the pilot the premium was supposed to be 100 rupees, but the women thought this was too much. Later it was decreased to 50 rupees. The scheme is currently at loss. He thinks the women won't be willing to pay 100 rupees now.

In the dermatology camp they were disappointed that they did not get all the medicines for free.

- *Do you think the women in the village would be willing to lead the health cooperative?*

- *Do you think the women in the village would be willing to work together?*

The women would like to work in coordination with each other, but need rules and guidelines of the hospital.

- *Do you think the women in the village would be willing to work together with the hospital?*

The women would like to work with the hospital. It will be difficult to organize without the help of the hospital.

Extra information:

There are plans to expand the health centre in the coming years. Then, there will be x-ray facilities and a trained doctor.