Paraji and Bidan in Rancaekek : integrated medicine for advanced partnerships among traditional birth attendants and community midwives in the Sunda region of West Java, Indonesia

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Chapter VIII UTILISATION OF PLURAL MATERNAL AND CHILD HEALTH SYSTEMS

Chapter VIII presents a follow-up to earlier sections which have identified and described the various factors affecting the utilisation of Maternal and Child Health (MCH) systems as *emic* answers from respondents within the Rancaekek study area. Following recent advances in quantitative behavioural science, this study documents various factors categorised as determinants of human behaviour, within the complex health-seeking process during pregnancy and childbirth, expressed in terms of multiple and differential utilisation of plural MCH systems. Quantitative findings will complement the qualitative data presented in previous sections. Analysis using a conceptual model to research the utilisation of both traditional and modern MCH systems in Indonesia has revealed a set of factors which tend to influence how people regard Maternal and Child Health. Data gathered during the household survey yield information regarding the practices reported by pregnant and perinatal women during the 12-month period preceding the survey. Interaction between factors is analysed using a conceptual model in which the correlations between 'predisposing', 'perceived', 'enabling', 'institutional' and 'intervening' factors are analysed in conjunction with the two dependent variables for the utilisation of plural MCH systems in Rancaekek. At this stage of the study, one must question which factors clearly exert a greater influence on the utilisation of traditional and modern MCH systems in the study area. In order to answer this question, one must first examine how people regard both of these systems as well as the coherence between various blocks of factors.

To this end, bivariate analysis is applied to ascertain the correlation between factors which influence two dependent variables: *i.e. utilisation of traditional MCH* (ustra) and *utilisation of modern MCH* (usmod) systems. The following independent and intervening variables, distributed over the two dependent variables, will be cross-tabulated. In view of the fact that bivariate analysis indicates that coherence between the two sets of variables is not always systematic – *i.e.* statistical significance using Pearson's (chi-squared) χ^2, strength of association between variables using Cramer's *V* if at least one variable is nominal, it is essential to run multivariate and multiple regression analyses to gain a better understanding of the associations between all the model's related variables.

Consequently, the second step of the analysis aims to uncover the intra- and inter-relationships of all independent and intervening factors as well as their overall influence on the dependent variables. Multivariate analysis (OVERALS) makes possible not only the identification of specific determinants for the utilisation of MCH systems but also facilitates calculation of the relative effects of various variables within the overall patterns of MCH utilisation behaviour during pregnancy and childbirth. Finally, multiple regression analysis is implemented to uncover further associations between groups of variables, signified and represented as 'blocks' in the model, by observing relevant calculated regression values. The essential role of analysis is to clarify and help explain the predictive values for the overall interaction between variables in health-seeking behaviour in Rancaekek. Chapter VIII concludes with an interpretation and discussion of the outcomes of the analyses with regard to the model's structure.

Data from the quantitative survey are analysed using the *Statistical Program for Social Sciences* (SPSS), first converted to SPSS 15.0 and thereafter to SPSS 17.0 for quantitative analysis. Responses from all 127 respondents are first entered into the database. Then a series

of steps, explained below, are taken to prepare the data for final analysis. After completing this preparatory step, data is coded in order to build the final database, which can be viewed both in a numeric and textual format. Care must be taken to label the responses in such a way that makes them uniformly compatible during computation.

8.1 Bivariate Analysis of Maternal and Child Health Systems

8.1.1 Preparation for Analysis: Data Sets and Variables

First, bivariate analysis is applied to achieve a broad understanding of the relative effect of each independent and intervening factor on the two dependent variables for the use of modern and traditional Maternal and Child Health (MCH) systems. The factors, presented at an analytical level in Chapter III, are now redefined as variables and entered into the analytical model for further analysis. Results obtained from the qualitative data collected indicate that the use of traditional and/or modern MCH systems in Rancaekek is influenced not only by socio-demographic variables such as occupation and level of education but also by psycho-social variables such as beliefs, knowledge, perception of pregnancy and childbirth, as well as enabling and institutional factors. As a consequence, quantitative surveys have also sought to specify and measure operational and complex factors retrieved from collected responses (*emic*) using several relevant indicators – translated into a series of questions – in order to achieve a maximum level of understanding.

Findings during qualitative data collection in five sample villages document that the public faithfully respects *paraji* (TBA) not only for their role during pregnancy and childbirth but also as health consultant for other family members. The *paraji* is a respected senior member of the community experienced and knowledgeable about pregnancy and childbirth as well as health and healing in a broader perspective for babies, mothers and other family members in general (*cf.* Chapter I). However, one cannot deny that modern MCH systems, with the *bidan*(CMW), have recently improved as modern programmes are continuously being implemented by the Indonesian Government, international institutions and NGOs.

Finally, data analyses are carried out with the aim to elucidate complicated associations and interactions between various 'blocks' of factors in the analytical model. Several steps are necessary to prepare data for final analysis. This study follows the entire preparatory and coding processes which subsequently lead to final analysis of the data. These steps include the grouping of questionnaire responses, coding into similar or different variables and execution of mathematical computations. Open-ended responses are re-grouped and inserted into the data set. Here 'original responses'[1] refers to responses in the data set after the second entry. In preparation for multivariate analysis, structured according to the study's conceptual model, the total number of responses to 100 questions on related issues is first reduced to 23 variables provided with recalculated 3-response categories.

After completing the preliminary steps, included in the first and second data entries, frequencies for the data sets and single responses for multi-response questions are determined, questions re-grouped, variables labelled, and factors finally calculated into model-based variables[2]. Bivariate analysis has become the first statistical method to assess the relative influence of 'predisposing', 'enabling', 'perceived pregnancy', 'institutional' and 'intervening' factors on utilisation of plural MCH systems, both 'traditional' and 'modern'. Bivariate analysis basically seeks to give a general overview of the direct associations between the 21 independent and 2 dependent variables. While multivariate analysis (OVERALS) focuses more specifically on the interaction between independent and

dependent variables, finally, followed by multiple regression analysis to assess the correlation values (*r*) between various blocks.

Data Sets
Analysis basically includes the assessment of interactions between 23 variables divided between eight blocks of factors placed in two data sets; each variable with its specific label will be given in more detail below.

Set 1: Independent variables (Blocks 1–6):
Predisposing factors: socio-demographic variables (7)
Predisposing factors: psycho-social variables (9)
Enabling factor: socio-economic variable (1)
Perceived pregnancy factors: perceived pregnancy variable (1)
Institutional factors: institutional variables (2)
Intervening factors: intervening variable (1)

Set 2: Dependent variables (Blocks 7–8):
Utilisation of traditional MCH (1)
Utilisation of modern MCH (1)

Response categories for open-ended questions increase impressively, sometimes reaching as many as 40 combinations of categories. Therefore, they are re-grouped into new categories, simplified and made compatible for re-computation. Re-checking by means of frequency tables shows that many multiple responses should be re-grouped into fewer categories, put in order, and then ranked according to their labels valued from 'negative' to 'positive' and from 'little' to 'much'. Corrections are calculated and then entered into the data set. Several questions with multiple responses give a complicated output, *e.g*. questions about types of taboos during pregnancy, expanded from 6 to 40 combinations of categories.

The process of re-grouping multiple into fewer categories, which share logical meanings with regard to the topic of the study, is called 're-coding'. Re-coded data can then be used as fundamental material in the analytical process. Some respondent answers show that several questions were too complex to include in the quantitative analysis. These include responses to several questions in Block 1 about occupation; in Block 2 about decision making, belief in rituals, types of taboos; in Block 3 about unusual expenses; in Block 4 about the meaning of motherhood, perceptions about pregnancy, risks and problems during and after pregnancy and delivery, miscarriage, abortion, reasons for and experiences during abortion; in Block 5 about transportation needed to reach MCH facilities, financial arrangements needed during pregnancy and childbirth, and frequency of contacts between respondents and *paraji* or *bidan*; in Block 6 about MCH programmes and sources of information about programmes introduced in Rancaekek; in Block 7 about reasons for using *paraji* (TBA), stages of pregnancy in which to seek traditional MCH services; in Block 8 about reasons for employing *bidan* (CMW) and other modern services, stages of pregnancy in which to call upon the *bidan*.

Two types of analysis are run to gain a better understanding about the associations between independent and dependent variables. Bivariate analysis calculates statistical significance used to indicate correlations between independent and dependent variables. It is necessary to analyze the values of Pearson's χ^2 because, in this type of statistical hypothesis test, the statistics are distributed using a χ^2 method. Values obtained from the data are then

compared to a critical value from the χ^2 test, that value of 0.05 is established in the bivariate analysis. On the basis of statistics, calculating the values for χ^2 helps to determine the significance between two variables. Moreover, the Pearson's χ^2 test for independence permits Cramer's *V* which indicates the strength of associations, if at least one variable is nominal in the cross-tabulation. The absolute values for Cramer's *V* are between 0 and 1, where '0' means 'no association' and '1' means 'perfect association'. Subsequently, advanced multivariate and multiple regression analyses provide deeper insight into the coherence and interaction between all variables in the model. Significance in cross-tabulations is a first expression of the degree of probability which could not just have occurred by pure chance in a recorded association between variables[3].

Variables

A total of 23 variables, divided between the above-mentioned eight blocks in two data sets – recalculated if necessary – have been labelled as follows:

Socio-demographic variables:

Variable *Type of village* (label: typvil), Responses were not recalculated. Original responses used in the analysis are: 'Jelegong', 'Haurpugur', 'Cangkuang', 'Sangiang', 'Tegal Sumedang'.

Variable *Age* (label age), Response categories have been re-group as: '11-20', '21–30', '31–40', '>40'.

Variable *Education of women* (label eduw), Recalculation was not required, Original responses used in the analysis are: 'no education', 'elementary school', 'junior high school', 'senior high school', 'university'.

Variable *Education of husbands* (label eduh), Recalculation was not required, Original responses used in the analysis are: 'no education', 'elementary school', 'junior high school', 'senior high school', 'university'.

Variable *Occupations of women* (label occuw), Response categories have been re-grouped as: 'housewife', 'peasant', 'factory labourer', 'small enterprise'.

Variable *Occupations of husbands* (label occuh), Response categories have been re-group. and some categories omitted for lack of replies: 'unemployed', 'peasant', 'factory labourer', 'employee', 'retired'.

Variable *Number of children* (label nuchil), Response categories have been re-group, based on the original responses, thus creating the following categories: '1–2', '3–4', '5-6' and '>6'.

Variable *Pregnancy status* (label presta), this variable has been omitted because the study is only interested in respondents who completed the process of pregnancy with external actions, commencing with the confirmation of pregnancy and ending in childbirth.

Psycho-Social variables:

Variable *Knowledge about pregnancy* (label knopre), Response categories have been re-group based on the original responses, thus creating the following categories: 'little knowledge', 'average knowledge', 'much knowledge'.

Variable *Knowledge about high-risk pregnancy* (label knohrp), Response categories have been re-group based on the original responses, thus creating the following categories: 'little knowledge', 'average knowledge', 'much knowledge'.

Variable *Knowledge about miscarriage* (label knomis), Response categories have been re-group based on the original responses, thus creating the following categories: 'little knowledge', 'average knowledge', 'much knowledge'.

Variable *Opinion about TBA skills* (label opitba), Response categories have been re-group, based on the original responses, thus creating the following categories: 'no opinion', 'negative opinion', 'between negative and positive opinion', 'positive opinion'.

Variable *Opinion about midwife skills* (label opimid), Response categories have been re-group based on the original responses, thus creating the following categories: 'no opinion', 'negative opinion', 'between negative and positive opinion', 'positive opinion'.

Variable *Health-seeking behaviour during pregnancy* (label hsbpr), Response categories have been re-group, based on the original responses, thus creating the following categories: 'little input', 'average input', 'much input'.

Variable *Health-seeking behaviour during delivery* (label hsbde), Response categories have been re-group, based on the original responses, thus creating the following categories: 'little input', 'average input', 'much input'.

Variable *Belief in pregnancy rituals* (label belrt), Response categories have been re-group, based on the original responses, thus creating the following categories: 'little belief in', 'average belief in', 'much belief in'.

Variable *Belief in taboos during pregnancy* (label betab), Response categories have been re-group, based on the original responses thus creating the following categories: 'little belief in', 'average belief in', 'much belief in'.

Enabling variables:

Variable *Socio-economic status* (label SES), Response categories have been re-group, based on the original responses, thus creating the following categories: 'poor', 'average', 'well to do'.

Perceived pregnancy variables:

Variable *Perception of experiences during pregnancy* (label percp), Response categories have been re-group, based on the original responses, thus creating the following categories: 'low perception', 'average perception', 'much perception'.

Institutional variables:

Variable *Geographical accessibility of traditional MCH* (label actra), Response categories have been re-group, based on the original responses, thus creating the following categories: 'near', 'average', 'far'.

Variable *Geographical accessibility of modern MCH* (label acmod), Response categories have been re-group, based on the original responses, thus creating the following categories: 'near', 'average', 'far'.

Intervening variables:

Variable *Impact of MCH programmes through participation* (label impac). Response categories have been re-group, based on the original responses, thus creating the following categories: 'low impact', 'average impact', 'much impact'.

Dependent (Plural MCH Systems) variables:

Variable *Utilisation of traditional MCH* (label ustra), the re-grouping of questions and recomputing of response categories is executed on the basis of the original responses, thus creating the following response categories: 'little use', 'average use', 'much use'. The original responses included categories to questions asking respondents how they had actually used MCH facilities during the previous 12-month period, with regard to various

components such as: pregnancy determination, pregnancy consultation, immunization, massage, childbirth, and post-natal/post-partum activities.

Variable *Utilisation of modern MCH* (label usmod), Re-grouping questions and recomputing response categories has been executed on the basis of the original responses, thus creating the following response categories: 'little use', 'average use', 'much use'. The original responses comprise categories for questions asking respondents how they actually used MCH facilities during the previous 12-month period with regard to various components such as: pregnancy determination, pregnancy consultation, immunization, massage, childbirth, and post-natal/post-partum activities.

Bivariate analysis was carried out by cross-tabulating the distribution of 23 independent variables, between 'predisposing', 'perceived', 'enabling', 'institutional', 'intervening' factors, over 2 dependent variables. As regards the determination of statistical significance, whether there exists a systematic correlation between two variables, calculated values of Pearson's χ^2, based on the criterion 95%, *i.e.* a value of 0.05, is indicated for each variable in Tables 8.1–8.4, Pearson's χ^2 assists in deciding whether there is a strongly significant correlation between variables on the basis of statistical calculations. In the null hypothesis, correlation between two factors is refuted, if Pearson's χ^2 is > 0.05. A strong correlation is indicated if Pearson's χ^2 is < 0.01. Cramer's *V* shows the strength of correlation, if at least one variable is nominal in the cross-tabulation. The absolute values of Cramer's *V* are between 0 and 1, where '0' means 'no' and '1' means 'perfect' association correlation.

Significance is basically regarded as an expression of the degree of probability that a calculated correlation between variables could not have emerged by chance; analysis of the research findings is extended beyond the bivariate analysis of cross-tabulation of variables to multivariate and multiple regression analyses with the objective to provide more information and insight into the coherence between all variables in the model.

8.1.2 Dependent Factors

During the overall analysis, assessment of the dependent factors *utilisation of traditional MCH* (ustra) and *utilisation of modern MCH* (usmod) has proven to be rather complicated. Pregnancy is a process for human reproduction, divided into trimesters based on development of the foetus. It is remarkable that the stages of pregnancy run parallel in both traditional and modern systems. Utilisation of MCH systems reflects the pregnant woman's needs according to the stages of her pregnancy. Every stage requires specific care, according to *Puskesmas*' strategy to assure a healthy pregnancy and live newborn such as: determination and conformity of pregnancy and immunizations. In contrast, the traditional MCH system focuses on how a pregnant woman feels. MCH utilisation behaviour is influenced by factors labelled as independent variables, mostly socio-economic status (SES). Further operationalisation of the concept for specific variables has been described in Chapter III (Table 3.8), based on the values for dependent variables within the model, as executed in respondent scores reported during a 12-month period prior to the household surveys in five sample villages in Rancaekek. To illustrate further the importance of the dependent variables for utilisation of traditional and modern MCH systems, additional related variables had to be analysed for tolerance to achieve the most realistic calculation of respondents' answers. While empirically observed scores for the utilisation of MCH systems during the 12-month retrospective period would be perfect.

Bivariate and multivariate analyses are employed to construct an analytical model. All components are inter-complementary and, at the end of the study, will provide the 'big picture' or a complete package of information about the community (*cf.* Chapter III. Sub-section 3.2.3), rendering the appropriate methodology for analysis of data collected in the research setting. Although the same limitations emerge during calculation of psycho-social factors in the analysis, individual opinions of the respondents are not only relevant for utilisation of MCH systems but even more so for various categories of independent and intervening factors.

8.1.3 Enabling Factor

Socio-economic status (label: SES). As explained in Chapter III, 'enabling' factors include variables at an individual level which can be regarded as characteristic for the respondent concerned but also depend on the socio-economic condition of the community in question. Analysis is carried out on a series of related factors, such as family income, financial resources, property consisting of land and animal resources, cost of living and social status, which renders a 3-level classification ('poor', 'average', 'well-to-do') to assess the individual use of MCH systems. An individual's socio-economic status (SES) within the household is strongly significant with *utilisation of traditional and modern MCH* (Pearson's $\chi^2 = 0.000$). This is understandable since MCH utilisation behaviour during pregnancy, most often during childbirth, is strongly correlated with socio-economic status (SES) of the household. One should recall that, in the traditional MCH system, the services offered by *paraji* (TBA) require no fixed fee; payment is based not on a family's financial situation but rather on the family's gratitude, expressed wholeheartedly by the husband or wife's family.

8.1.4 Predisposing Factors

Predisposing factors comprise two groups of variables, *i.e.* socio-demographic and psycho-social, which are assumed to influence the utilisation of MCH services during pregnancy and childbirth at an individual level and which, with regard to personal characteristics and respondent backgrounds, can be related to utilisation of MCH systems. The category 'socio-demographic' factors includes the variables: *type of village* (typvil), *age* (age), *education of husbands* (eduh), *education of women* (eduw), *occupation of husbands* (occuh), *occupation of women* (occuw), *and number of children* (nuchil). The category 'psycho-social' factors include the variables: *knowledge about pregnancy* (knopre), *knowledge about high-risk pregnancy* (knohrp), and *knowledge about miscarriage* (knomis), Table 8.1 shows the successive distribution of predisposing variables (N=287) over *utilisation of traditional MCH* and *utilisation of modern MCH* from the 287 contacts with the MCH services by the 127 respondents. As can be seen from the values of Pearson's χ^2, although not all bivariate correlations in these categories show significance, most variables are significant with a certainty of 95%, amounting to values for Pearson's $\chi^2 \leq 0.05$ discussed below.

Socio-Demographic

Type of village (label: typvil): For quantitative data collection, or the household survey, five villages were chosen from among 13 in Rancaekek Sub-District, *i.e.* Jelegong (A/B), Cangkuang (B), Haurpugur (B/C), Sangiang (C), and Tegal Sumedang (C). The variable *type of village* (see Table 8.1) is also very significant (Pearson's $\chi^2 = 0.000$) with respect to the two

dependent variables *utilisation of traditional MCH* (ustra) and *utilisation of modern MCH* (usmod) (Pearson's χ^2 = 0.000). Generally, in comparison, the traditional MCH system is used less frequently than the modern MCH system in the five sample villages in Rancaekek (traditional: 31.0%; modern: 79.0%). People in Tegal Sumedang and Sangiang, two villages categorized as having a low socio-economic status (SES: *cf.* Chapter III), relied more on traditional MCH services (Tegal Sumedang 55.6%; and Sangiang 53.1%) because this geographically remote village makes access to modern *Puskesmas* difficult.

Age (label: age): The variable *age*, for respondents pregnant during the preceding 12-month period, is less significant with respect to *utilisation of traditional and modern MCH* (Pearson's χ^2 = 0.003, Cramer's V = 0.003). Remarkably, women with high risks pregnancy are quite high (11-20 years = 11.1%; and 31->40 years = 38.3%). It shows that 49.4% women are facing risks of pregnancy.

Education (labels: eduw, eduh): Table 8.1 shows that both *education of women* (eduw) and *education of husbands* (eduh) are strongly significant, with *education of women* (eduw) showing significance for *utilisation of traditional and modern MCH* (Pearson's χ^2 = 0.000, Cramer's V = 0.000). Similarly, *education of husbands* (eduh) also shows significance for *utilisation of traditional and modern MCH* (Pearson's χ^2 = 0.000, Cramer's V = 0.000). This shows that correlation between education and utilisation of traditional and modern Maternal and Child Health is significant.

Occupation (labels: occuw. occuh): Variable *occupation of women* (occuw) show less significance comparing to the variable *occupation of husbands* (occuh) for *utilisation of traditional and modern MCH* (women: Pearson's χ^2 = 0.052; husbands: Pearson's χ^2 = 0.000). This shows that the variable of *occupation of women* (occuw) less correlated to the *utilisation of traditional and modern MCH*, while the variable of *occupation of husbands* (occuh) are strongly correlated with *utilisation of traditional and modern MCH*.

Number of children (label: nuchil): This variable shows not significance for *utilisation of traditional and modern MCH* (Pearson's χ^2 = 0.191) no correlation for *utilisation of traditional and modern MCH* (Cramer's V = 0.000).

Psycho-Social Variables

Knowledge about pregnancy (label: knopre): This variable is significant for both dependent variables *utilisation of traditional and modern MCH* (Pearson's χ^2 = 0.001). Knowledge about pregnancy including high-risk and miscarriage show strong correlations with the use of traditional and modern MCH services.

Knowledge about high-risk pregnancy (label: knohrp): This variable is significant for *utilisation of traditional and modern MCH* (Pearson's χ^2 = 0.001). After many programmes about knowledge on high-risk pregnancy have been introduced by the government and non-government organisations mostly to the *paraji* (TBA) and to the community, the referral system to the community midwife, health centers and hospital is escalating.

Knowledge about miscarriage (label: knomis): This variable is strongly significant for *utilisation of traditional and modern MCH* (Pearson's χ^2 = 0.000). It is interesting to note that

the correlation between *knowledge about miscarriage* (knomis) and *utilisation of traditional and modern MCH* is strongly significant. One should not forget that it is the *paraji* (TBA) who demonstrates concern and empathy when a woman suffers a miscarriage and who prepares herbal medicinal concoctions to cleanse her womb, monitors her health, as well as buries and performs rituals for the foetus.

Opinion about TBA skills (label: opitba): Table 8.1 shows that this variable shows significance for *utilisation of traditional and modern MCH* (Pearson's $\chi^2 = 0.003$). It is almost similar with the o*pinion about midwife skills* (label: opimid): this variable is significantly correlated with *utilisation of traditional and modern MCH* (Pearson's $\chi^2 = 0.000$).
Perceived Pregnancy Variable:

Perception of experiences during pregnancy (label: percp): This variable, which refers to the physical manifestations of a pregnant woman, correlates significantly with *utilisation of traditional and modern MCH* (Pearson's $\chi^2 = 0.000$).

8.1.5 Institutional Factors

Geographical accessibility of traditional MCH (label: actra). This variable shows no significance with respect to *utilisation of traditional MCH* (Pearson's $\chi^2 = 0.119$). The concept 'geographical accessibility' takes into account not only the physical distance but also the social distance as one of the concerns when using traditional, but not modern, MCH systems. Table 8.4 shows the use of traditional MCH services when geographically 'near' or accessible to the community, especially for villages such as Sangiang and Tegal Sumedang located in remote areas. Distance also refers to social contact between the community and *paraji* (TBA) who, as part of the community, shares the same culture, values, social life and language (*cf.* Chapter I).

Geographical accessibility of modern MCH (label: acmod). This variable, including social distance as explained above for the traditional MCH system, is neither significantly correlated with *utilisation of traditional MCH* (Pearson's $\chi^2 = 0.119$) nor with *utilisation of modern MCH* (Pearson's $\chi^2 = 0.422$). The public's interaction with *bidan* (CMW) is more formal in comparison to such interaction with Traditional Birth Attendants (*paraji*). As government employees in the *Puskesmas*, *bidan* wear uniforms and are most often posted in Rancaekek by the Department of Health. This explains the distance in social relationships, which becomes apparent when studying modern MCH systems, as demonstrated by the intervening factors.

Table 8.1 Multiple Care Utilisations in 287 Contacts with Traditional and Modern MCH Services Reported by 127 External Actions of Pregnant and Delivery Mothers in Five Sample Villages (N = 287)

Variable	Plural MCH Systems					
	Trad.	%	Modern	%	Total	
	N	%	N	%	N	%
Predisposing factors Socio-Demographic						
Type of Villages						
Jelegong	15	18.5	66	81.5	81	100.0
Haurpugur	18	45.0	22	55.0	40	100.0
Cangkuang	5	6.9	67	93.1	72	100.0
Sangiang	26	53.1	23	46.9	49	100.0
Tegal Sumedang	25	55.6	20	44.4	45	100.0
(Pearson Chi-Square .000/Phi Cramer's V .000)						
Age of Women						
11 – 20 years	15	16.9	17	8.6	32	100.0
21 – 30 years	52	58.4	93	47.0	145	100.0
31 – 40 years	18	20.2	82	41.4	100	100.0
>40 years	4	4.5	6	3.0	10	100.0
(Pearson Chi-Square .003/Phi Cramer's V .003)						
Education of Women						
No Education	2	50.0	2	50.0	4	100.0
Elementary School	58	45.3	70	54.7	128	100.0
Junior High School	24	25.3	71	74.7	95	100.0
Senior High School	5	9.1	50	90.9	55	100.0
University	0	0.0	5	100.0	5	100.0
(Pearson Chi-Square .000/Phi Cramer's V .000)						
Education of Husbands						
No Education	0	00.0	6	100.0	6	100.0
Elementary School	51	47.7	56	52.3	107	100.0
Junior High School	26	31.7	56	68.3	82	100.0
Senior High School	11	13.8	69	86.3	80	100.0
University	1	8.3	11	91.7	12	100.0
(Pearson Chi-Square .000/Phi Cramer's V .000)						
Occupation of Women						
Housewife	58	30.4	133	69.6	191	100.0
Peasant	11	50.0	11	50.0	22	100.0
Laborer	15	35.7	27	64.3	42	100.0
Small Enterprises	5	15.6	27	84.4	32	100.0
(Pearson Chi-Square .052/Phi Cramer's V .052)						

Table 8.1 Multiple Care Utilisations in 287 Contacts with Traditional and Modern MCH Services Reported by 127 External Actions of Pregnant and Delivery Mothers in Five Sample Villages (N = 287) (continued)

Variable	Plural MCH Systems					
	Trad.	%	Modern	%	Total	
	N	%	N	%	N	%
Occupation of Husbands						
Unemployed	6	60.0	4	40.0	10	100.0
Peasant	29	48.3	31	51.7	60	100.0
Laborer	35	26.7	96	73.3	131	100.0
Small Enterprises	3	5.8	49	94.2	52	100.0
Employee	7	50.0	7	50.0	14	100.0
Civil Servant	4	40.0	6	60.0	10	100.0
Retired	5	50.0	5	50.0	10	100.0
(Pearson Chi-Square .000/Phi Cramer's V .000)						
Number of Children						
1 - 2	50	29.8	118	70.2	168	100.0
3 - 4	26	30.6	59	69.4	85	100.0
5 - 6	11	34.4	21	65.6	32	100.0
> 6	2	100.0	0	0.0	2	100.0
(Pearson Chi-Square .191/Phi Cramer's V .001)						
Predisposing Factors Psycho-social						
Knowledge about Pregnancy						
Very little knowledge	26	48.1	28	51.9	54	100.0
Little knowledge	29	34.5	55	65.5	84	100.0
Average knowledge	27	30.3	62	69.7	89	100.0
Much knowledge	5	9.8	46	90.2	51	100.0
Very much knowledge	2	22.2	7	77.8	9	100.0
(Pearson Chi-Square .001/Phi Cramer's V .001)						
Knowledge about High-risk Pregnancy						
Very little knowledge	17	37.0	29	63.0	46	100.0
Little knowledge	39	43.3	51	56.7	90	100.0
Average knowledge	23	26.1	65	73.9	88	100.0
Much knowledge	10	21.7	36	78.3	46	100.0
Very much knowledge	0	0.0	17	100.0	17	100.0
(Pearson Chi-Square .001/Phi Cramer's V .191)						
Knowledge about Miscarriage						
Very little knowledge	26	46.4	30	53.6	56	100.0
Little knowledge	41	45.6	49	54.4	90	100.0
Average knowledge	21	17.8	97	82.2	118	100.0
Much knowledge	1	4.3	22	95.7	23	100.0
(Pearson Chi-Square .000/Phi Cramer's V .000)						

Table 8.1 Multiple Care Utilisations in 287 Contacts with Traditional and Modern MCH Services Reported by 127 External Actions of Pregnant and Delivery Mothers in Five Sample Villages (N = 287) (continued)

Variable	Plural MCH Systems					
	Trad.	%	Modern	%	Total	
	N	%	N	%	N	%
Opinion about TBA Skills						
No opinion	0	0.0	14	100.0	14	100.0
Negative opinion	10	38.5	16	61.5	26	100.0
Between negative &positive	6	14.6	35	85.4	41	100.0
Positive opinion	73	35.4	133	64.6	206	100.0
(Pearson Chi-Square .003/Phi Cramer's V .003)						
Opinion about Midwife Skills						
No opinion	8	100.0	0	0.0	8	100.0
Negative opinion	6	42.2	7	53.8	13	100.0
Between negative &positive	10	66.7	5	33.3	15	100.0
Positive opinion	65	25.9	186	74.1	251	100.0
(Pearson Chi-Square .000/Phi Cramer's V .000)						
MCH Care Utilisation Behaviour during Pregnancy						
Little Input	35	33.0	71	67.0	106	100.0
Average Input	9	25.0	27	75.0	36	100.0
Much Input	45	31.0	100	69.0	145	100.0
(Pearson Chi-Square .668/Phi Cramer's V .668)						
Health-seeking Behaviour during Delivery						
Little Input	26	22.6	89	77.4	115	100.0
Average Input	10	55.6	8	44.4	18	100.0
Much Input	53	34.4	101	65.6	154	100.0
(Pearson Chi-Square .008/Phi Cramer's V .008)						
Belief in Pregnancy Rituals						
Very Little Belief in	10	38.5	16	61.5	26	100.0
Little Belief in	0	0.0	12	100.0	12	100.0
Average Belief in	4	10.3	35	89.7	39	100.0
Much Belief in	53	43.1	70	56.9	123	100.0
Very Much Belief in	22	25.3	65	74.7	87	100.0
(Pearson Chi-Square .000/Phi Cramer's V .000)						
Belief in Taboos during Pregnancy						
Don't Belief in	7	87.5	1	12.5	8	100.0
Very Little Belief in	4	16.7	20	83.3	24	100.0
Little Belief in	7	21.9	25	78.1	32	100.0
Much Belief in	28	25.5	82	74.5	100	100.0
Very Much Belief in	43	38.1	70	61.9	113	100.0
(Pearson Chi-Square .001/Phi Cramer's V .001)						
General Total	89	31.0	198	79.0	287	100.0

Table 8.2 Distribution of Socio-Economic Status Variable over the Utilisation of Traditional and Modern MCH Systems in Five Sample Villages (N = 287)

Variable	Plural MCH Systems					
	Trad.	%	Modern	%	Total	
	N	%	N	%	N	%
Socio-Economic Status						
Poor	63	44.1	80	55.9	143	100.0
Average	24	21.2	89	78.8	113	100.0
Well to Do	2	6.5	29	93.5	31	100.0
(Pearson Chi-Square .000/Phi Cramer's V .000)						
General Total	89	31.0	198	79.0	287	100.0

Table 8.3 Distribution of Perceived Pregnancy Variable over the Utilisation of Traditional and Modern MCH Systems in Five Sample Villages (N = 287)

Variable	Plural MCH Systems					
	Trad.	%	Modern	%	Total	
	N	%	N	%	N	%
Perceived Pregnancy						
Perceptions of Experiences during Pregnancy						
Very Low Perceptions	24	33.8	47	66.2	71	100.0
Low Perceptions	35	29.9	82	70.1	117	100.0
Average Perceptions	7	25.0	21	75.0	28	100.0
High Perceptions	11	19.6	45	80.4	56	100.0
Very High Perceptions	12	80.0	3	20.0	15	100.0
(Pearson Chi-Square .000/Phi Cramer's V .000)						
General Total	89	31.0	198	79.0	287	100.0

Table 8.4 Distribution of Institutional Variable over the Utilisation of Traditional and Modern MCH Systems in Five Sample Villages (N = 287)

Variable	Plural MCH Systems					
	Trad.	%	Modern	%	Total	
	N	%	N	%	N	%
Geographical Accessibility of Traditional MCH System						
Near	60	34.9	112	65.1	172	100.0
Average	10	33.3	20	66.7	30	100.0
Far	19	22.4	66	77.6	85	100.0
(Pearson Chi-Square .119/Phi Cramer's V .119)						

Table 8.4 Distribution of Institutional Variable over the Utilisation of Traditional and Modern MCH Systems in Five Sample Villages (*N* = 287)

Variable	Plural MCH Systems					
	Trad.	%	Modern	%	Total	
	N	%	N	%	N	%
Geographical Accessibility of Modern MCH System						
Near	34	29.8	80	70.2	114	100.0
Average	13	25.0	39	75.0	52	100.0
Far	42	34.7	79	65.3	121	100.0
(Pearson Chi-Square .422/Phi Cramer's V .422)						
Impact of MCH Programmes through Participation						
Some Impact	37	63.8	21	36.2	58	100.0
Average Impact	39	18.7	170	81.3	209	100.0
Much Impact	13	72.2	5	27.8	18	100.0
Very Much Impact	0	0.0	2	100.0	2	100.0
(Pearson Chi-Square .000/Phi Cramer's V .000)						
Utilisation of Traditional MCH System						
Very Little Use	1	5.0	19	95.0	20	100.0
Little Use	0	0.0	6	100.0	6	100.0
Average Use	19	18.8	82	81.2	101	100.0
Much Use	0	0.0	2	100.0	2	100.0
Very Much Use	69	43.7	89	56.3	158	100.0
(Pearson Chi-Square .000/Phi Cramer's V .000)						
Utilisation of Modern MCH System						
Very Little Use	8	100.0	0	0.0	8	100.0
Little Use	2	10.0	18	90.0	20	100.0
Average Use	20	40.8	29	59.2	49	100.0
Much Use	41	44.1	52	55.9	93	100.0
Very Much Use	18	15.4	99	84.6	117	100.0
(Pearson Chi-Square .000/Phi Cramer's V .000)						
General Total	89	31.0	198	79.0	287	100.0

8.1.6 Intervening Factors

Impact of MCH programmes through participation (label: impac). This intervening variable, which concerns the implementation of MCH programmes introduced in the Rancaekek community, is clearly correlated and strongly significant for *utilisation of traditional and modern MCH* (Pearson's χ^2 = 0.000). Several programmes implemented in the area have had an increased impact on the use of modern MCH facilities: especially the UNICEF 'Safe Motherhood' Programme in Cangkuang village, and the Minister of Women's Affairs programme 'Mothers' Friendly Movement' in Sangiang, Tegal Sumedang, Jelegong and Haurpugur.

Overall, it is clear that, using bivariate analysis, several variables show significant correlation with either the reported utilisation of traditional or modern MCH systems or, in few cases, with both. Predisposing socio-demographic factors which include *type of village* (typvil), *education of women* (eduw), *and education of husbands* (eduh) only correlate significantly with *utilisation of traditional and modern MCH* through the contacts to the services starting during the women feel that they are pregnant until parturition.

Among the psycho-social factors, *knowledge about pregnancy* (knopre) and *knowledge about miscarriage* (knomis) show a strongly significant correlation with reported *utilisation of traditional MCH* as well as to the *utilisation of modern MCH.* The variables *opinion about TBA skills* (opitba) and *opinion about midwife skills* (opimid) demonstrate a strong significance with both *utilisation of traditional and modern MCH*.

The variable *health-seeking behaviour during pregnancy* (hsbpr) shows no significance with the reported *utilisation of traditional and modern MCH*. Indeed, the variable *socio-economic status* (SES) of respondents shows very strong significance for the reported *utilisation of traditional MCH* and *utilisation of modern MCH*. The factor 'institution' for MCH systems in the study area concerning respondents' villages not only shows a weakly significant correlation with *utilisation of modern MCH* but also a non-significant correlation with the reported *utilisation of traditional MCH*. Finally, the intervening variable *impact of MCH programmes through participation* (impac) shows a significant correlation with both reported *utilisation of traditional MCH* (ustra) and *utilisation of modern MCH* (usmod).

The overall pattern also reveals that respondents in the villages sampled use both types of traditional and modern MCH systems, illustrated most markedly in the higher scores for 'average' and 'much' use. This demonstrates that, although the use of modern MCH services is increasing, some respondents still prefer to seek help from the traditional system during some stages of pregnancy because of the type of services offered by a *paraji* (TBA) such as: massage, rituals, *jamu* (herbal concoctions), moral and psychological support.

Cross-tabulation of direct correlations between variables, namely using bivariate analysis, generally shows strongly significant correlations between 'predisposing', 'enabling', 'perceived' and 'intervening' variables, on one hand, and the two dependent variables, on the other hand (see Tables 8.1–8.5). In Section 8.2, ways are examined in which variations in the use of traditional and modern MCH systems can be explained in more detail in terms of correlations and interactions between all variables and 'blocks' using the analytical model selected for this study.

8.2 Multivariate Analysis: OVERALS

Bivariate analysis of cross-tabulations between quantitative data from the household survey discussed above demonstrates the relation between 'predisposing', 'perceived', 'enabling' and 'intervening' factors, on one hand, and the two dependent variables *utilisation of traditional MCH* (ustra) and *utilisation of modern MCH* (usmod), on the other hand. Following the pattern arising within the first four categories of factors, variations are discovered between separate correlations between these and the dependent variables *utilisation of traditional MCH* (ustra) and *utilisation of modern MCH* (usmod). As described in Chapter III (*cf*. Figure 3.1), the conceptual model and its components have been developed and are implemented as an explanatory model for the use of MCH systems in Rancaekek.

Although bivariate analysis can test complex quantitative data reflecting interaction between independent and intervening *versus* dependent variables, the overall complicated process cannot be explained by simple cross-tabulation. Explicitly, hundreds of tables would

be necessary in order to analyse the interactions between the study's 23 variables, resulting in a rather disorderly analysis and rendering identification of significant correlations extremely subjective. As described in Chapter III, the application of various multivariate analyses offers the advantage that related research can draw upon many years of experience of researchers such as Greenlick *et al*. (1973) and Kohn & White (1976) who developed the early models for analysis of human behaviour, and such as Gifi (1981) and Van der Burg, De Leeuw & Verdegaal (1983; 1988) at the Department of Data Theory, Leiden University, who went on to further develop related multivariate analysis models. Thereafter, Slikkerveer (1990; 2001) has developed a particular analytical model for the study and analysis of transcultural utilisation behaviour of health care in Sub-Saharan Africa, thus providing the basis for the present analytical model, *i.e*. using non-linear canonical correlation analysis OVERALS for advanced multivariate analysis of the utilisation of MCH systems in Indonesia.

Non-linear canonical correlation analysis makes possible the determination of coherence between categories of independent and intervening variables and dependent variables for the utilisation of MCH systems in the research setting, thus subsequently enabling the interpretation of such coherence by incorporating data into the final explanatory model. OVERALS is an explanatory analysis technique, the method of which can be seen as factor analysis of two sets of variables. A factor from the first set should show maximum correlation with a factor from the second set. Such 2-factor correlation is called *canonical correlation* (*r*).

8.2.1 OVERALS Canonical Correlation Analysis

The OVERALS programme for analysis of quantitative data collected during the household survey is implemented in the canonical correlation model for utilisation of MCH systems by 23 variables, grouped into eight 'blocks' as described in Chapter III (*cf.* Fig. 3.1).
Canonical correlation analysis of two sets of variables through alternating least-squares offers the advantage not only to specify the number of sets, each containing variables, but also to enumerate the dimensions. Plotting the resulting projection of variables in canonical space indicates the quantifications and coordinates of the category. The analogous to the use of multiple regressions and canonical correlation analysis, OVERALS, an up-dated version of CANALS, focuses on the correlation between two sets of variables (*cf.* Agung 2005).

OVERALS analysis employs an itemized list of 23 variables, with the number of categories and the ordinal or single nominal scaling levels specified for each variable. The list of variables with their labels is grouped according to the following blocks of the model:

- Block 1 includes socio-demographic factors: *type of village* (label: typvil); *age* (label: age); *education of husbands* (label: eduh); *education of women* (label: eduw); *occupation of husbands* (label: occuh); *occupation of women* (label: occuw); *number of children* (label: nuchil).
- Block 2 includes psycho-social factors: *knowledge about pregnancy* (label: knopre); *knowledge about high-risk pregnancy* (label: knohrp); *knowledge about miscarriage* (label: knomis); *opinion about TBA skills* (label: opitba); *opinion about midwife skills* (label: opimid); *health-seeking behaviour during pregnancy* (label: hsbpr); *health-seeking behaviour during delivery* (label: hsbde); *belief in pregnancy rituals* (label: belrt); *belief in taboos during pregnancy* (label: betab).

Table 8.5 Distribution of Component Loadings for both Dimensions between Set 1 and Set 2 with a Total of 23 Variables Surveyed (N=287)

Component Loadings			
Set	Label	Dimension	
		1	2
1	typvil(a.b)	0.514 (4)	0.311 (3)
	agew(b.c)	–0.190	–0.090
	eduh(b.c)	–0.391	0.285 (5)
	eduw(b.c)	–0.585 (2)	0.064
	occuh(a.b)	–0.076	0.194
	occuw(a.b)	–0.365	–0.196
	nuchil(b.d)	–0.101	–0.296 (4)
	knopre(b.c)	–0.212	0.120
	knohrp(b.c)	–0.143	–0.062
	knomis(b.c)	–0.029	–0.188
	optba(a.b)	0.429 (4)	–0.232
	opmid(a.b)	–0.233	–0.201
	hsbpr(b.c)	–0.120	0.068
	hsbde(b.c)	0.171	0.171
	belrt(b.c)	0.200	0.150
	betab(b.c)	0.200	0.079
	percep(b.c)	–0.111	–0.136
	SES(b.c)	–0.576 (3)	0.316 (2)
	actra(b.c)	–0.427	0.172
	acmod(b.c)	0.009	0.148
	impac(b.c)	–0.136	0.049
2	ustra(b.c)	0.876 (1)	–0.337 (1)
	usmod(b.c)	–0.130	0.244

a. Optimal Scaling Level: Single Nominal
b. Projections of the Single Quantified Variables in the Object Space
c. Optimal Scaling Level: Ordinal

- Block 3 includes perceived pregnancy factor: *perception of experiences during pregnancy* (label: precp).
- Block 4 includes enabling factor: *socio-economic status* (label: SES).
- Block 5 includes institutional factors: *geographical accessibility of traditional MCH* (label: actra); *geographical accessibility to modern MCH* (label: acmod).
- Block 6 includes intervening factor: *impact of MCH programmes through participation* (label: impac).

Finally, 'utilisation of plural MCH systems' is sub-divided into two blocks, each having a dependent variable:

- Block 7 includes *utilisation of traditional MCH* (label: ustra).
- Block 8 includes *utilisation of modern MCH* (label: usmod).

Calculated correlations represented as component loadings (Table 8.5) show that both dimensions definitely confirm a significantly high correlation between Set 1 with independent and Set 2 with dependent variables, for utilisation of both traditional and modern MCH

systems (resp. 0.876 and –0.130 *versus* –0.337 and 0.244). Four strong factors influence the *utilisation of traditional MCH* (ustra) and *utilisation of modern MCH* (usmod) in the first dimension for Rancaekek. The strongest variable is *socio-economic status* (SES: –0.576) for households, followed by *education of wives* (eduw: –0.585), *opinion about TBA skills* (opitba: 0.478), and *geographical accessibility of traditional MCH* (actra: –0.429). These variables are related to knowledge and understanding about a woman's reproductive process during pregnancy, childbirth, and thereafter. As head of the household, the educational background of the husband is quite influential regarding the use of traditional and/or modern MCH systems because, as decision maker, the husband is also responsible for his wife's pregnancy and the type of assistance sought for delivery. This high correlation between component loadings further supports the close relationship between knowledge, belief, perception, and opinion towards pregnancy, delivery and MCH systems in the study area and the sample surveyed.

Most component loadings in Dimension 1 (D_1) confirm the results using bivariate analysis, indicating that variables with a significant correlation are the strongest in the solution. These underscore, among the background variables, *the use of traditional MCH system* (ustra: Pearson's χ^2 = 0.000; Phi Cramer's V .000) with regard to component-loading D_1 = –0.876 and D_2 = –0.337) where knowledge of the reproductive process, *i.e*. during and after pregnancy, indeed shows a strong correlation with and influence on the use of MCH systems in the study setting. Moreover, it also calculates results for: *knowledge about pregnancy* (knopre: Pearson's χ^2 = 0.001; component loading D_1 = –0.212), *knowledge about miscarriage* (knomis: Pearson's χ^2 = 0.001; component loading in D_1 = –0.029), and *opinion about TBA skills* (opitba: Pearson's χ^2 = 0.003) in relation to Dimension 1 component-loading (D_1 = 0.429).

In the analysis, the score (D_1 = –0.576) for component-loading Dimension 1 is for *socio-economic status* (SES), again underscoring the role of household socio-economic status when choosing MCH systems (SES: Pearson's χ^2 = 0.000; and Phi Cramer's V 0.000). Not surprisingly, the variable *impact of MCH programmes through participation* (impac), for programmes implemented by the Government and international organisations in collaboration with NGOs, shows coherence with *utilisation of modern MCH* (usmod: Pearson's χ^2 = 0.000; D_2 = 0.151).

As a consequence, multivariate analysis demonstrates that the impact of MCH is strongly related to the *utilisation of modern MCH* (usmod) in the study area.

8.2.2 Projection of Variables and Objects in Canonical Space

A graphical representation, or scatter plot, of all the variables already described can be used to gain a better understanding of the complex coherence between variables by projecting the correlations in the canonical space (*cf*. Figure 8.1). The length of a vector, between the locus of a respective variable and zero, will indicate the relative importance of the variable.

Both dependent variables *utilisation of traditional MCH* (ustra) and *utilisation of modern MCH* (usmod) have been projected in canonical space in relation to 23 predictor variables. Figure 8.1 shows the scatter plot for 23 optimally scaled variables from the survey data in canonical space, including the two dependent variables. The figure shows the divergence between *utilisation of traditional MCH* (ustra) and *utilisation of modern MCH* (usmod) variables which have been projected in canonical space in relation to 21 predictor variables.

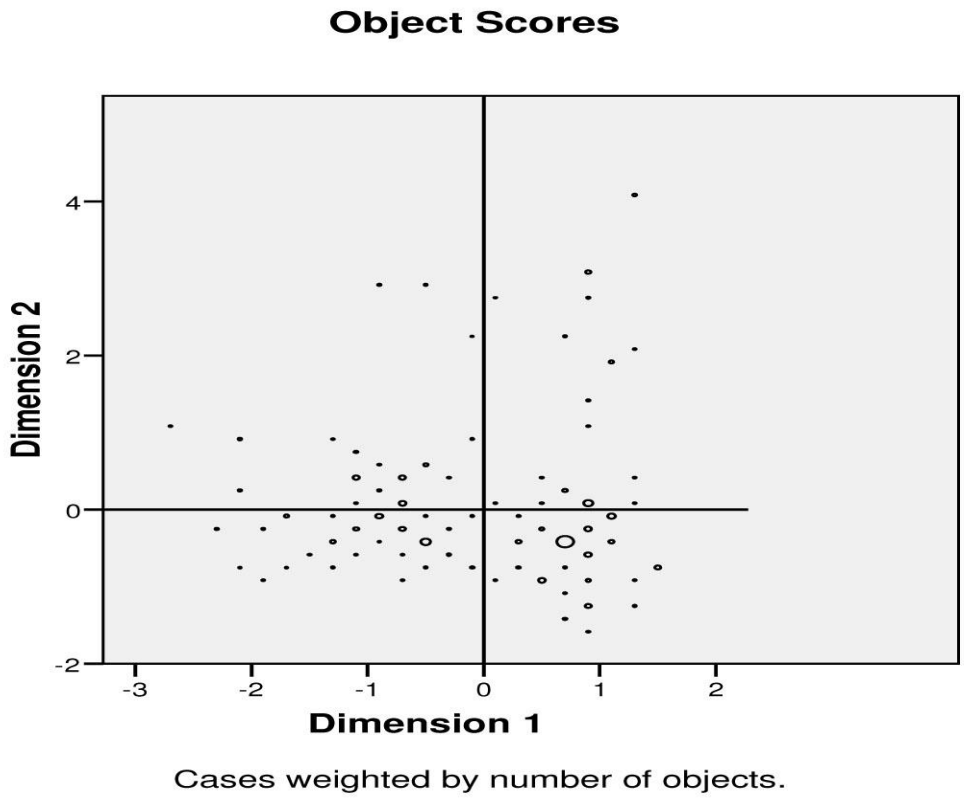

Figure 8.1: OVERALS analysis of the utilisation of Maternal and Child Health systems: Projection of 23 optimally scaled variables from Set 1 and Set 2 in canonical space (variables are labelled)

From the scatter plot it becomes clear that *utilisation of traditional MCH* (ustra) and *utilisation of modern MCH* (usmod) variables are forming different dimensions. A very strong correlation emerges between *opinion about TBA skills* (optba: 0.429 in D_1) *versus utilisation of traditional MCH* (ustra: 0.876 in D_1). In contrast to traditional MCH, *utilisation of modern MCH* (usmod: –0.244 in D_2) shows a high correlation with *geographical accessibility of modern MCH* (acmod: 0.148 in D_2). Indeed, as already observed during qualitative research, the use of both MCH systems is complementary and integrated, depending on women's needs during the trimesters of pregnancy.

Utilisation of traditional MCH (ustra: Traditional Birth Attendant (TBA) or *paraji*) shows a strong coherence with *opinions about TBA skills* (opitba): *i.e*. how pregnant and perinatal women view the *paraji*'s specific skills such as: determination of stages of pregnancy using fingers for measurement, ability to massage both pregnant and perinatal women, knowledge of rituals, and especially knowledge and ability to use medicinal plants for the preparation of *jamu*. In contrast, *utilisation of modern MCH* (usmod: Community Midwife (BDD) or *bidan*) shows a strong correlation with the 'intervening' factors: *i.e*. 'Safe Motherhood' programmes introduced by the Government (Ministry of Health, Ministry of Women's Affairs, West Java Health Office/*Dinas Kesehatan*), international organisations such as WHO, UNICEF, FHI (Family Health International); and several NGOs such as WHOCC–UNPAD, Frontiers for Health (F2H), *Gerakan Pita Putih* (MNH), etc.

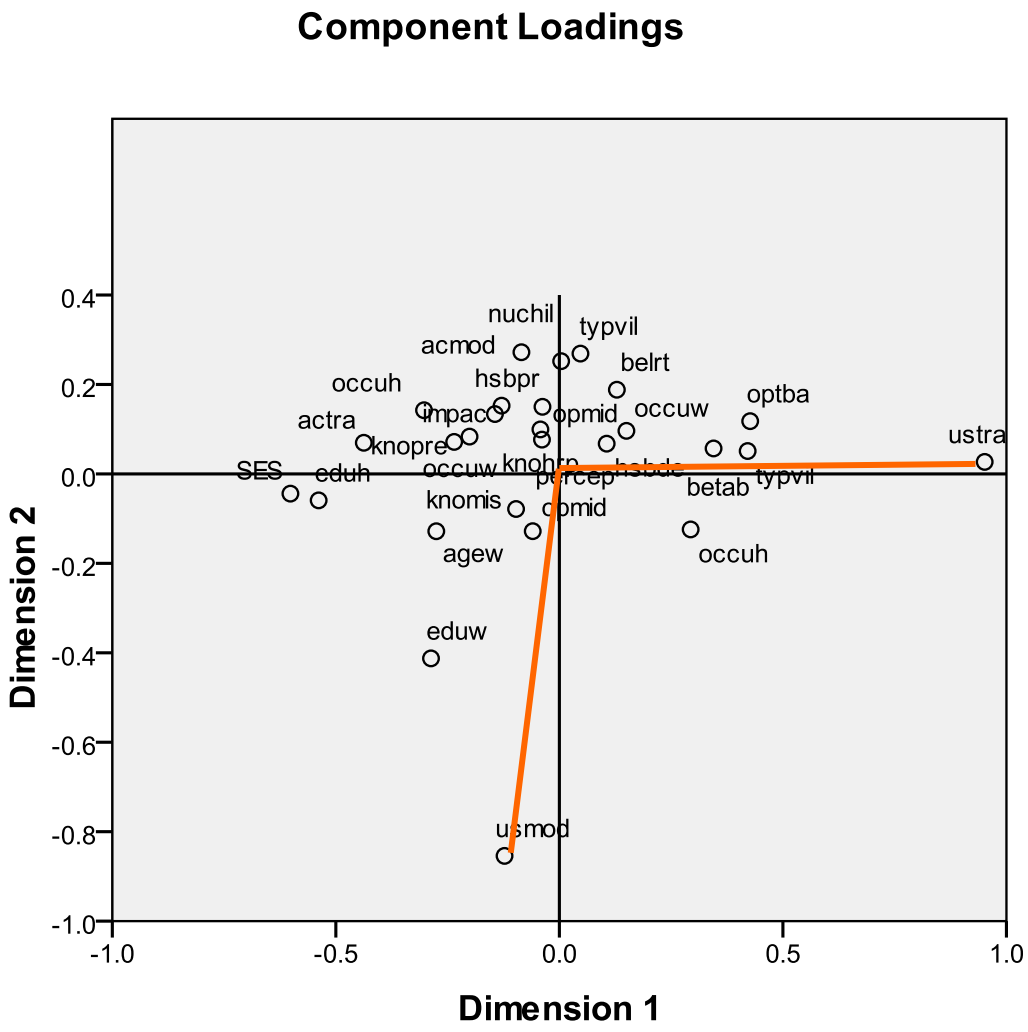

Figure 8.2: Projection of respondents in the sample survey as objects in canonical space, specified according to their relevant variables

The scatter plot in Dimension 1 further substantiates that the variables *socio-economic status* (SES) and *perception of experiences during pregnancy* (percp) show a similar strong coherence with both dependent variables, validating their value as relevant indicators for either utilisation of traditional or modern MCH systems, depending upon the needs of women during the stages of pregnancy. *Utilisation of traditional MCH* (ustra) shows a strong coherence with *health-seeking behaviour during delivery* (hsbde), *belief in taboos during pregnancy* (betab), *opinion about TBA skills* (opitba), thus verifying their strong significance between the independent variables with regard to the use of traditional and modern MCH systems within the Rancaekek community. In contrast, *utilisation of modern MCH* (usmod) shows a strong coherence with *education of women* (eduw), *knowledge about high-risk pregnancy* (knohrp), *health-seeking behaviour during pregnancy* (hsbpr), *opinion about midwife skills* (opimid), and *geographical accessibility to modern MCH* (acmod). In view of these rather fascinating results from multivariate analysis, it is interesting not only to establish

to what extent the variants and variables are correlated but also to project the objects or individuals of the survey in canonical space. Figure 8.1 shows the projection of individuals surveyed in canonical space (N=287). In this scatter plot, the position of each respondent is a function of his/her scores across all variables.

The overall projection of respondents shows a tendency among objects/respondents towards separation into one relatively larger group, mainly located in the upper-left quadrant in canonical space in which the variable *utilisation of modern MCH* (usmod) is plotted. This quadrant is dominated by the variables for *socio-economic status* (SES), *knowledge*, (knopre, knohrp, and knomis), *health-seeking behaviour*s (hsbpr, hsbde), *education* (eduh, eduw), and *opinion about midwife skills* (opimid: *bidan*). In contrast, the other grouping, mainly located in the upper-right quadrant in canonical space, is dominated by the variables *type of village* (typvil), *occupation of husbands* (occuh), *belief in taboos during pregnancy* (betab), *opinion about midwife skills* (opimid), and *perceptions of experiences during pregnancy* (percp) (*cf.* Figure 8.2).

Comparison of the projections of variables in Figure 8.1 and objects in Figure 8.2 in canonical space confirms the existence of a strong correlation and predictive value in both Dimensions 1 and 2 (D_1, D_2) between the location of objects from two comparable sub-groups in the sample survey in relation to their scores as variables for *utilisation of traditional MCH* (ustra) and *utilisation of modern MCH* (usmod) in the research setting.

8.3 Multiple Regression Analysis

8.3.1 Calculation of Multiple Correlation Coefficients

In view of the fact that one of the main objectives of this study is to develop an explanatory model for the utilisation of plural MCH systems, multivariate analysis should now be broadened to enable the testing of correlations between the model's blocks of factors (predisposing, perceived, enabling, institutional, and intervening) and to determine their interaction with the factor 'utilisation of plural MCH systems', originally employed to conceptualize the actual use of plural MCH systems in Rancaekek.

As reminder from Section 8.1.1, Set 1 encompasses 21 independent variables divided between six blocks of factors: (1) socio-demographic: *type of village* (typvil), *age* (age), *education of women* (eduw), *education of husbands* (eduh), *occupation of women* (occuw), *occupation of husbands* (occuh), and *number of children* (nuchil); (2) psycho-social: *knowledge about pregnancy* (knopre), *knowledge about high-risk pregnancy* (knohrp), *knowledge about miscarriage* (knomis), *opinion about TBA skills* (opitba), *opinion about midwife skills* (opimid), *health-seeking behaviour during pregnancy* (hsbpr), *health-seeking behaviour during delivery* (hsbde); *belief in pregnancy rituals* (belrt), *belief in taboos during pregnancy* (betab); (3) Perceived Pregnancy: *perception of experiences during pregnancy* (percp) (4) Enabling: *socio-economic status* (SES); (5) Institutional: *geographical accessibility of traditional MCH* (actra), *geographical accessibility of modern MCH* (acmod); and (6) Intervening: *impact of MCH programmes through participation* (impac). Set 2 includes the dependent variable 'utilisation of plural MCH systems', divided into *utilisation of traditional MCH* (ustra) and *utilisation of modern MCH* (usmod).

The process of analysis runs as follows; 21 independent variables are set against 2 dependent variables and tested using canonical correlation analysis. Using bivariate and multivariate analyses, all variables in the survey are checked for correlation without discriminating between categories or blocks of variables. This has brought to the fore and

helps facilitate recognition of conclusions related to correlation, interaction and estimation, using OVERALS canonical correlation analysis.

In order to establish the relative importance of each of the six 'blocks' of independent variables, in relation to the two 'blocks' of dependent variables *utilisation of traditional MCH* (ustra) and *utilisation of modern MCH* (usmod), multiple regression analysis is carried out, based on the calculation of multiple correlation coefficients with optimal scaling using OVERALS. The advantage of multiple regression analysis is that it enables assessment of the overall contribution of the five 'blocks' of variables in predicting patterns for *utilisation of traditional MCH* (ustra) and *utilisation of modern MCH* (usmod) in Blocks 7 and 8, respectively. In order to calculate the multiple correlation coefficients (*r*), the following formula is used: $pd = 2 \times Ed - 1$ (*cf.* Van den Burg 1983). In this analysis, the single nominal variables can be scaled differently, while the quantifications of the OVERALS solution are used. Table 8.6 shows the correlation coefficients (*r*) for Blocks 1–8 of the model.

Table 8.6 Calculated Multiple Correlation Coefficients between Eight Blocks in the Model

Block <—> Block		Calculation (*Ed*)	Multiple Correlation Coefficients (*r*)
1 <———>	2	2 x 0.868 – 1 = 1.736 – 1 =	0.736
		2 x 0.819 – 1 = 1.638 – 1 =	0.638
1 <———>	3	2 x 0.669 – 1 = 1.338 – 1 =	0.338
1 <———>	4	2 x 0.858 – 1 = 1.716 – 1 =	0.716
1 <———>	5	2 x 0.808 – 1 = 1.616 – 1 =	0.616
		2 x 0.729 – 1 = 1.458 – 1 =	0.458
1 <———>	6	2 x 0.730 – 1 = 1.460 – 1 =	0.460
1 <———>	7	2 x 0.843 – 1 = 1.686 – 1 =	0.686
1 <———>	8	2 x 0.734 – 1 = 1.468 – 1 =	0.468
2 <———>	3	2 x 0.749 – 1 = 1.498 – 1 =	0.498
2 <———>	4	2 x 0.791 – 1 = 1.582 – 1 =	0.582
2 <———>	5	2 x 0.717 – 1 = 1.434 – 1 =	0.434
		2 x 0.665 – 1 = 1.330 – 1 =	0.330
2 <———>	6	2 x 0.751 – 1 = 1.502 – 1 =	0.502
2 <———>	7	2 x 0.791 – 1 = 1.582 – 1 =	0.582
2 <———>	8	2 x 0.658 – 1 = 1.316 – 1 =	0.316
3 <———>	4	2 x 0.791 – 1 = 1.582 – 1 =	0.582
3 <———>	5	2 x 0.595 – 1 = 1.190 – 1 =	0.190
3 <———>	6	2 x 0.535 – 1 = 1.070 – 1 =	0.070
3 <———>	7	2 x 0.527 – 1 = 1.054 – 1 =	0.054
3 <———>	8	2 x 0.526 – 1 = 1.052 – 1 =	0.052
4 <———>	5	2 x 0.694 – 1 = 1.388 – 1 =	0.388
4 <———>	6	2 x 0.602 – 1 = 1.204 – 1 =	0.204
4 <———>	7	2 x 0.774 – 1 = 1.548 – 1 =	0.548
4 <———>	8	2 x 0.615 – 1 = 1.230 – 1 =	0.230
5 <———>	6	2 x 0.552 – 1 = 1.104 – 1 =	0.104
5 <———>	7	2 x 0.693 – 1 = 1.386 – 1 =	0.386
5 <———>	8	2 x 0.580 – 1 = 1.160 – 1 =	0.160
6 <———>	7	2 x 0.561 – 1 = 1.122 – 1 =	0.122
6 <———>	8	2 x 0.529 – 1 = 1.058 – 1 =	0.058

The values in the calculation are the eigenvalues in the first and second dimensions of the solution in OVERALS between the various 'blocks' of the model.

From the calculations in Table 8.6 it becomes clear that there exists a relatively strong coherence between the five blocks of independent variables, confirming the significant role which these categories of variables play in the overall configuration of the analytical model, as under-reported by the preceding qualitative and quantitative bivariate and multivariate analyses. Calculated values from multiple regression analysis indicate that the prediction for the traditional MCH system in the first dimension is strongly dominated by the predisposing psycho-social variables in Block 2 ($r_1 = 0.736$) and predisposing socio-demographic variables in Block 1 ($r_1 = 0.638$).

Interestingly, *opinion about TBA skill* (opitba: trust and home visits) is the strongest independent variable in Block 2 ($a = 0.582$) and shows a strong coherence with the dependent variable *utilisation of traditional MCH* (ustra) in Block 7 ($b = 0.582$), while *opinion about midwife skills* (opimid) is weaker ($b = –0.130$, $c = 0.244$) (*cf.* Table 8.1). In addition, prediction for *utilisation of traditional MCH* (ustra) and *utilisation of modern MCH* (usmod) in Dimension 1 is clear, with the intervening variables which elevate *utilisation of modern MCH system*s (traditional: $r_1 = 0.122$; modern: $r_1 = 0.058$) (*cf.* Figure 8.3).

To determine the relative importance of each of the six 'blocks' of variables, another analysis is carried out using multiple regression, based on the calculation of multiple correlation coefficients with optimal scaling using OVERALS. The advantage of using stepwise multiple regression analysis is that it enables assessment of the overall contribution of the six 'blocks' of variables in predicting the pattern of utilisation for the dependent variables (Block 7 and Block 8). The formula used is $pd = 2 \times Ed - 1$ (*cf.* Van der Burg 1983). The single nominal variables can be scaled differently, while the quantifications of the OVERALS solution are used. Table 8.6 shows the correlation coefficients (r) for Blocks 1–8 of the model.

Coherence between Independent Variables

The calculated correlation coefficients (r) show a relatively strong coherence between the six blocks of independent variables, confirming the significant role the groups play in the overall configuration of the model as substantiated by the preceding qualitative study. A particular strength in coherence is found for the correlation coefficients for Blocks 1-2 ($r = 0.736$ and $r = 0.638$); Blocks 1-3 ($r = 0.716$); Blocks 1-4 ($r = 0.338$); and Blocks 2-4 ($r = 0.498$).

Coherence between Independent versus *Dependent Variables*

There is coherence between the independent and dependent variables. Of particular strength is the coherence for Blocks 1-7 ($r = 0.686$); Blocks 2-7 ($r = 0.582$); Blocks 4-7 ($r = 0.584$); Blocks 1-8 ($r = 0.468$); and Blocks 4-8 ($r = 0.230$).

8.3.2 Final Model for Utilisation of Plural Maternal and Child Health Systems

Figure 8.3 shows the process of Maternal and Child Health (MCH) utilisation behaviour in the selection of MCH systems, which can also be studied as MCH utilisation behaviour (*cf.* Millon 1975) based on an individual's position within the household and community. This can be seen in the basic model for utilisation of MCH systems which encompasses eight blocks of independent, intervening and dependent variables, in which the main multiple correlation coefficients (r) calculated are presented, each indicating the relative value for interaction between the blocks.

On the basis of the multiple correlation coefficients (r), show in Figure 8.3, the values in the model not only confirm the relatively strong coherence between the five blocks of

independent variables but also render highly predictive the values of these blocks of variables for the utilisation of MCH systems. Since the objective of this study includes the development of an explanatory model, using sample surveys, with regard to the use of MCH systems, multivariate analysis should now be applied to test for correlation between blocks of factors: *i.e*. predisposing, perceived, enabling, institutional, intervening, and utilisation of plural MCH systems.

Blocks 7 and 8 in the model refer to overall utilisation of plural MCH care, *i.e*. both traditional and modern systems. Using stepwise multiple regression analysis and OVERALS enables assessment of the contribution of both blocks of variables in predicting utilisation patterns for MCH systems.

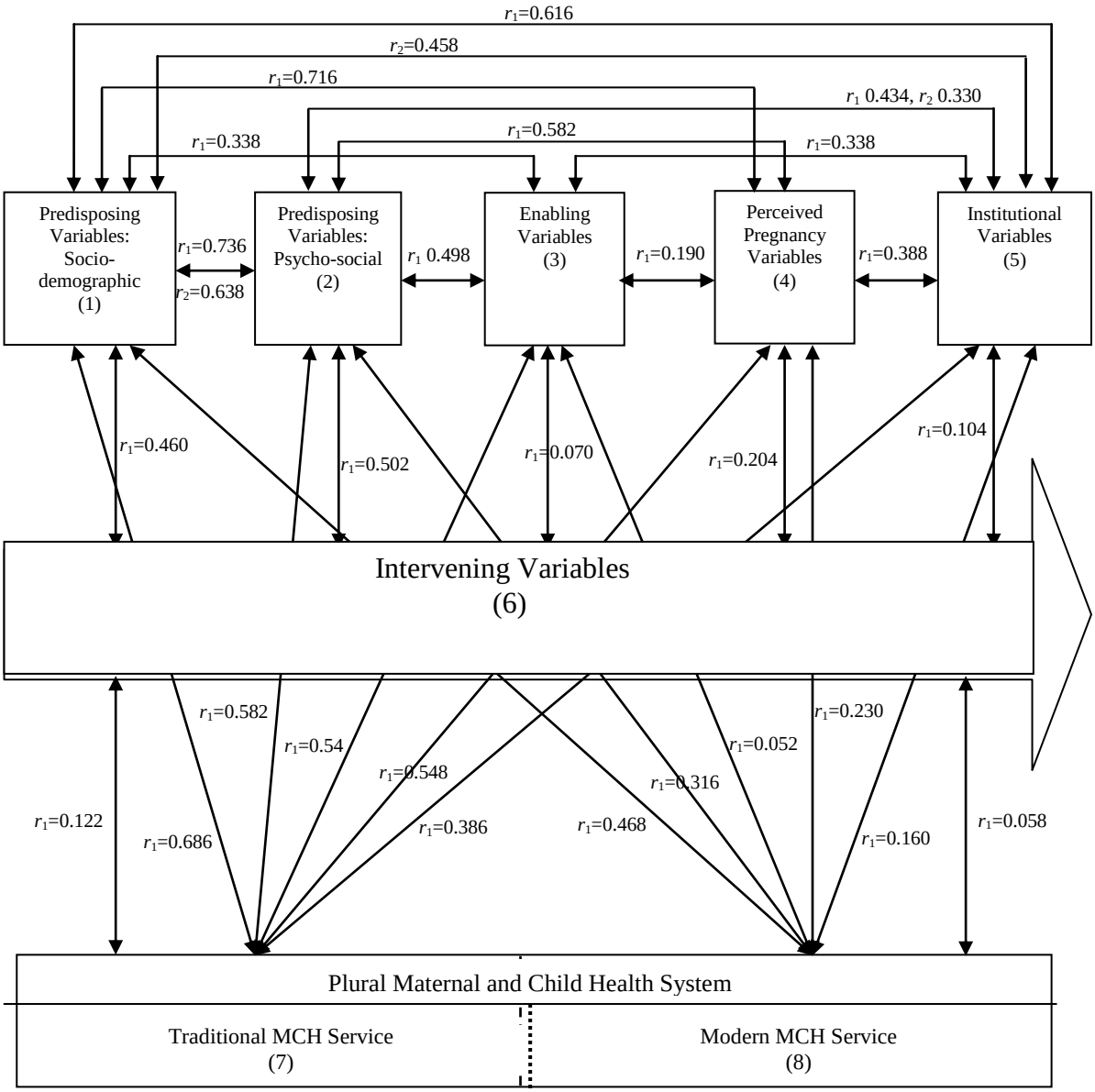

Figure 8.3 Conceptual Model on Utilisation of Plural Maternal and Child Health Care Systems *Paraji* and *Bidan* in Rancaekek: Integrated Medicine for Advanced Partnerships amongst Traditional Birth Attendants and Community Midwives in the Sunda Region in West Java, Indonesia.

The highest direct contribution to the prediction of utilisation of MCH systems in Dimension 1 is first provided by Block 1 (predisposing, socio-demographic variables: resp. $r_1 = 0.686$ and $r_1 = 0.468$), followed by Block 2 (predisposing, psycho-social variables: resp. $r_1 = 0.791$ and $r_1 = 0.658$). It should be noted that Block 1 is dominated by the variables: *education of husbands* (eduh: *b,c* = 0.285), *education of women* (eduw: *b,c* = –0.585), and *occupation of husbands* (occuh: *a.b* = 0.194). The model also clearly illustrates the relatively high correlation values between Block 1 and Block 2, both in the first ($r_1 = 0.736$) and second ($r_2 = 0.638$) dimensions.

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In the model, contributions to *utilisation of traditional MCH* (ustra) from Block 1 ($r_1 = 0.686$), Block 2 ($r_1 = 0.582$), Block 4 ($r_1 = 0.584$), and Block 5 ($r_1 = 0.386$) are indeed emerging as relatively high, underscoring the close correlation between independent and dependent factors for use of the traditional MCH system. In the context of modern MCH care, a strong correlation is shown for Block 1 ($r_1 = 0.468$), Block 2 ($r_1 = 0.316$) and Block 4 ($r_1 = 0.584$). Indeed, *utilisation of traditional MCH* (ustra: $r_1 = 0.122$) and *utilisation of modern MCH* (usmod: $r_1 = 0.058$) are closely correlated with the intervening variables in Block 6.

8.4 Interpretation of the Results of the Analysis

The results from the bivariate analysis is presented in the first part of this chapter, show realistic correlations between the independent, intervening and dependent variables for utilisation of traditional and modern Maternal and Child Health (MCH) systems in the research setting Rancaekek. Quantitative analyses clearly demonstrate that, among the categories or 'blocks' of variables, the independent socio-demographic variables play a dominant role: *i.e*. *type of village* (typvil, according to socio-economic categorisation), (formal) *education of husbands/women* (eduh, eduw), *occupation of husbands/women* (occuh, occuw), *age* (age), and *number of children* (nuchil). The psycho-social variables confirm the significant role some variables play in the utilisation of MCH systems in the research area: *i.e*.

knowledge about pregnancy (knopre), *knowledge about high-risk pregnancy* (knohrp), *knowledge about miscarriage* (knomis), *opinion about TBA skills* (opitba), *opinion about midwife skills* (opimid), *health-seeking behaviour during pregnancy* (hsbpe), *health-seeking behaviour during delivery* (hsbde), *belief in pregnancy rituals* (belrt), *belief in taboos during pregnancy* (betab), and *perception of experiences during pregnancy* (percp).

Bivariate analysis also renders that *socio-economic status* (SES) of respondent households shows a strong correlation with *utilisation of traditional MCH* (ustra) and/or *utilisation of modern MCH* (usmod) during the process of pregnancy and delivery. While the category of intervening variables shows a strong correlation with *utilisation of modern MCH* (usmod), it is highly correlated with 'Safe Motherhood' programmes which have been implemented continuously within the Rancaekek community. Several 'Safe Motherhood' programmes (*e.g.* UNICEF and WHO-SEARO's 'Making Pregnancy Safer') have been set up for the entire community of Rancaekek, a sub-district of West Java Province, while other programmes, such as 'Mothers' Friendly Movement' (GSI: *Gerakan Sayang Ibu*), only focus on MCH care in remote and impoverished areas.

The variable *type of village* (typvil), categorised by the local government as to geography and socio-economic status, determines an individual's tendency to use traditional and modern MCH systems. Tegal Sumedang and Sangiang villages are geographically remote areas and labelled as less-developed (C), an exceptional condition which is included in the data for MCH utilisation in those two villages. Thus, 'Mother's Friendly Movement' (GSI: *Gerakan Sayang Ibu*) was set up as a government programme for rural areas with few MCH services. 'Safe Motherhood' programmes have been shown to enhance the use of MCH systems, making them more dynamic. Although on an individual level knowledge about the reproductive process has increased, it can be seen from the household survey that, based on opinions about *paraji* (TBA) and their skills, respondents continue to seek help from both MCH systems, depending on the woman's needs during different stages of pregnancy.

The overall pattern exposes a shift in influence between various categories of independent and intervening variables, from scores reported for traditional MCH services towards those reported for integrated traditional and modern MCH systems – characterised by a relatively equal coherence between MCH systems. Outcomes of the bivariate analysis were significantly re-inforced using multivariate analysis. Not only is the degree of coherence between independent and dependent variables numerically remarkable but advanced canonical correlation analysis using OVERALS has put further weight on coherence between variables. Additionally, the calculation of component loadings has expanded the under-reported interactive and predictive values of determinants for the utilisation of MCH systems in both dimensions. The subsequent projection of optimally scaled variables in canonical space also shows the direction in which the category quantifications of the variables increase. Projection of the results from canonical correlation analysis has shown a strong coherence between predisposing factors (socio-demographic. psycho-social. socio-economic. and institutional factors) and the two dependent variables for use of MCH systems.

Analysis has demonstrated that the sampled respondents themselves have integrated the use of traditional and modern MCH systems because practitioners in both systems have their own specialties (*cf.* Figures 6.3-6.11): *i.e.* the *paraji* (TBA) possesses expert indigenous knowledge about rituals, massage, and preparation of medicinal herbal concoctions from plants for pregnant, perinatal, and post-partum women, while the Community Midwife (*bidan*) is expert in the use of complete TT immunisations, in giving oxytocin injections, in repairing the perinea or vaginal tears, and in providing modern care during high-risk delivery. While the *bidan*'s level of education makes her more highly skilled and medically competent,

it is the *paraji*'s knowledge and understanding of traditions and of psychological and belief systems which make her a noteworthy support, both during and after pregnancy and childbirth.

Finally, results of multiple regression analysis strengthen the mutual coherence between respondents' scores in the use of both traditional and modern MCH systems during the trimesters of pregnancy, delivery, and post-partum period. The data help illustrate that the sample respondents have naturally integrated the use of traditional and modern MCH systems during the stages of pregnancy, childbirth and post-partum period.

Notes

1. Since 'original responses' refers to the categorization of responses in the data set after the third entry, *i.e*. including the adjustment, special emphasis is placed on the determination of single responses for multi-answer questions. This is accomplished by re-calculating the response categories in order to obtain comparable categories.
2. Determination of single responses has been carried out as follows. Based on the frequencies of the categories, a weight from 1 to 3 is given to each response category for some questions comprising the newly assigned categories. A category is given a weight of '1' if the frequency of the response categories for all questions is 'very low' and a weight of '3' if that frequency is 'very high'. Therefore, it was decided to weight all categories with regard to frequency and to recalculate according to the ratio described above. The new single categories of the multi-response questions are a representation of the degree of a characteristic, *i.e*. *knowledge about pregnancy* (knopre), of a single respondent in relation to other respondents in the sample. The range of scores found within the sample, in fact, determines the range of the weights given. For each question, the sum is calculated for the appointed weights of the categories. The sum totals are recalculated as a ratio: '*x*' is to '*y*' as '3' is to 'the actual highest sum score of a question' (Σ). The recalculations have been introduced into the following categories:
   1: 'little' (0–1);
   2: 'average' (1–2);
   3: 'much' (2–3).
3. In view of the fact that the use of Pearson's χ^2 and Cramer's *V* could result in a mere dichotomy of 'significant' *versus* 'non-significant' associations between variables, the implementation of a classification of values for the chance of deviation can sometimes reach a more dissimilar assessment of the correlation between variables. In such cases, the categories of values for the chance of deviation include: >0.15 for 'non-significant'; 0.15–0.10 for 'indication of significance'; 0.10–0.05 for 'weakly significant'; 0.05–0.01 for 'strongly significant'; 0.01–0.001 for 'very strongly significant'; and <0.001–0.000 for 'mostly strongly significant' (Agung 2005).