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Afya Jumuishi : towards Interprofessional collaboration between traditional and modern medical practitioners in the Mara Region of Tanzania

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CHAPTER III RESEARCH METHODOLOGY AND ANALYTICAL MODEL

3.1 Research Methodological Approach

This chapter begins by explaining the basic concepts of the Leiden Ethnosystems Approach, which provides an interdisciplinary non-normative framework which allows for comparison and synthesis of different variables interacting in a particular setting of study. The three basic concepts underlying the Leiden Ethnosystems Approach include the *Participant's View* (PV), the *Field of Ethnological Study* (FES) and the *Historical Dimension* (HD), which are elaborated on in the context of interprofessional collaboration in health care between traditional and modern medical practitioners (*cf.* Slikkerveer 1995).

As an exploratory and explanatory study, it does not test a hypothesis. The major research questions under investigation are distinctly mentioned in this chapter. Moreover, the chapter explains the methodology and sources of data for analysis in this study, including the selection of the study sample, research planning and piloting, research design and the methodology employed.

The analytical model is operationalised into seven blocks of variables, adapter to analyse interprofessional collaborative patterns of behaviours of different medical practitioners. The independent variables are: *socio-demographic, psycho-social, enabling, trustworthiness, organisational* and *intervening variables*. Dependent variables are: *collaborative behavioural patterns of exchange of resources and of working jointly for clients*, as, reported by traditional and modern medical practitioners. Through a process of linking concepts into measurable phenomena, a structured questionnaire is formulated through a deduced process of steps from *concepts* to *variables* to *indicators* to *categories*, adapted from Kohn & White (1976) and Slikkerveer (1990).

Finally, the chapter highlights the selected stepwise statistical analyses performed in this study, including the bivariate analysis, the multivariate analysis (OVERALS) and the multiple regression analysis of data, leading up to the ultimate model presented in Chapter VII.

3.1.1 The Leiden Ethnosystems Approach

This scientific inquiry is carried out under the *Leiden Ethnosystems Approach*. This methodological approach is rooted in the classical school of ethnoscience as pioneered by Conklin (1957), Goodenough (1956), Garfinkel (1964), Cicourel (1967), and later, in the 1970s, adapted and refined to analyse and explain various complicated data of indigenous knowledge and practice by Slikkerveer (1982; 1990; 1999).

Since then, within the Leiden Ethnosystems and Development (LEAD) programme of Leiden University, this particular methodological approach has widely been employed throughout the world in policy-based research in numerous fields of Indigenous Knowledge Systems (IKS)-related studies, such as in health care utilisation, agriculture, wildlife management, bio-cultural diversity conservation, development economics, and integrated microfinance management. It has been used to document and analyse Indigenous Knowledge Systems (IKS) of local people as they interact with modern systems (*cf.* Leakey & Slikkerveer 1991b; Van den Breemer *et al.* 1991; Warren, Slikkerveer & Brokensha 1995; Adams & Slikkerveer 1996; Slikkerveer & Lionis 1996; Slikkerveer 1999; Agung 2005; Ibui 2007; Gheneti 2007; Djen Amar 2010; Leurs 2010; Ambaretnani 2012).

The main goal of the *Ethnosystems Approach* is to contribute to the establishment of common grounds for comparison and synthesis of analytical principles by providing an interdisciplinary non-normative framework of *emic*, regional comparative and (pre)historical analysis (cf. Slikkerveer & Dechering 1995). While the *emic* model views behaviour as cultural-specific, to be understood within the context of a particular culture, the *etic* model views behaviours as universal with other cultures (Headland, Pike & Harris 1990).

In this research, the *Ethnosystems Approach* takes the *emic* point of view, as it recognises that complex systems of beliefs, perceptions, knowledge and collaborative behaviours of medical practitioners in the study area are distinct and therefore need the adoption of insiders' views, as opposed to the potentially biased view of outsiders. The approach facilitates the exploration and explanation of the Indigenous Knowledge System (IKS) in relation to health care practices on the basis of anthropological and geo-historical basic concepts of the *Participant's View* (PV), the *Field of Ethnological Study* (FES) and the *Historical Dimension* (HD), as mentioned above. In combination, these concepts enable the analysis of local medical practitioners' view (both traditional and modern) including variables contributing to the way in which they collaborate while delivering their services to patients and clients. The three basic concepts of the *Ethnosystems Approach* are further discussed in relation to the particular research methods and techniques used in this study.

Participant's View (PV)

This is a wide notion as underscored by Slikkerveer (1999: 173): '*The assessment of symbolic representations, worldviews (cosmologies or cosmovisions), culture bound philosophies of nature and the environment, perceptions, attitudes, opinions, etc. as part of the underlying structure of values, norms and belief systems characterizes specific cultures*'.

The concept of *Participant's View* (PV) is used to obtain the medical practitioners' own perceptions, attitudes, beliefs, knowledge and behaviours of the collaboration or non-collaboration as they offer services to clients and patients in the society. Structured questionnaires and, in some cases, follow-up interviews are completed with the traditional and modern medical practitioners, who are the primary participants in this research, in order to assess their knowledge, beliefs, attitudes and interprofessional collaboration. More information on the same topics is obtained during organised workshops of the *Jadi and Utamaduni katika Afya* (JUA) Project, which simultaneously incorporates both traditional and modern medical practitioners from the Mara Region. The acronym, JUA, is an abbreviation of '*Jadi na Utamaduni katika Afya*' which implies (in Swahili) '*a call to realise and be in control of one's indigenous knowledge and culture for one's health improvement*'.

Other participants include health stakeholders, whose views are also invaluable for the understanding of complex local behavioural patterns, and the way in which medical practitioners collaborate in the Mara Region and in Tanzania as a whole. Some of these participants include the elderly ethno-cultural group leaders, the medical leaders of respective districts authorities of the Mara Region and workers from the Ministry of Health and Social Welfare (MoHSW). The participant observation by the researcher, who happens to live and work in the socio-cultural setting of the Mara Region, is another method used to collect relevant information about the livelihood and work-related relationships among traditional and modern medical practitioners. The *Participant's View* (PV) is most useful to obtain first-hand explanations as opposed to outsiders' views, which may lack the intrinsic socio-cultural institutions and traditions of local medical systems as well as the way in which these systems affect the interactions of the practitioners in the delivery of health care services.

Participant's View (PV) focuses in particular on the people within their historical-geographical context (Slikkerveer 1990). This concept is further used in relation to the overall medical systems, as defined by Dunn (1976: 135): '*The patterns of social institutions and cultural traditions evolve from deliberate behaviours to enhance health, whether or not the outcome of particular items of behaviour is ill health*'.

Field of Ethnological Study (FES)

The second concept, *Field of Ethnological Study (FES)* emerged as the result of significant ethnological fieldwork by Leiden University researchers in Structural Anthropology. It has been observed that in different ethnic groups, certain sub-cultures within a larger culture are characterised by certain common cultural features, such as similar worldviews, values, beliefs, social organisations, languages, kinship, dietary habits, and clothing, as well as practices in medicine, agriculture and animal husbandry (cf. Van Wouden 1935; 1968; De Josselin de Jong 1984; Schefold 1988; Slikkerveer 1999). These are spread over a particular geographical region which has later been redefined as a *culture area* (cf. Hunter & Whitten 1975). This means that within a dynamic context of processes of development and change, the advantage of regional comparative studies of sub-cultures within a larger culture brings a more realistic evaluation of mutually comparable sub-cultures within the culture area. This research applies this concept by assessing the sub-cultures of each district of one larger culture area known as Mara and their contributions to the way in which the modern medical practitioners view the traditional medical practitioners as their counterparts and vice versa.

The Historical Dimension (HD)

The concept of the *Historical Dimension (HD)* refers to the (pre)historical analysis of both internal and external factors which have contributed to present complex situations in a specific socio-cultural setting. It has been proven in analytical research that strict contemporary-oriented approaches are unable to reveal the changes of developmental processes transforming the pre-contemporary ways into contemporary ways of complex configurations. It is manifest in various fields such as medicine, management, agriculture, religion and in many other disciplines (Ambaretnani 2012).

The *Ethnosystems Approach* documents the existing indigenous knowledge and helps to uncover the processes of societal change, as well as the ability to integrate the traditional values and ways into the modern systems. The analysis of historical changes of health services and indigenous practitioners in the respectively pre-colonial period of time during independence and in post-independent Tanzania reveals some reasons why people have different views on traditional medicine and practices. The mistreatment of traditional medical practitioners and the despise of African indigenous knowledge during the colonial period of time explain the present apathy and weak collaborative behaviours in medicine in Tanzania.

3.1.2 Major Research Questions

Based on qualitative findings from the researcher's personal experience in the field, results of the pilot study, workshop proceedings, group-focused discussions and literature content analysis, this research is undertaken on the hypothetical argument that variables such as *socio-demographic variables*, *psycho-social variables*, *enabling variables*, *trustworthiness variables* and *organisational variables* all correlate at different levels with *interprofessional collaborative behaviours* among traditional and modern medical practitioners. Therefore, the general research questions related to such understanding include the following:

- *At what level of correlation are independent and dependent variables of interprofessional collaborative behaviours between traditional and modern medical practitioners in the Mara Region of Tanzania?*
- *What are the general major challenges, for both the traditional and modern medical systems, towards a fully integrated medical system in Tanzania?*

In Tanzania, it is necessary to introduce some intervening strategies in order to improve the collaboration among medical practitioners of the two systems through the interaction of the above-mentioned variables.

3.2 Methodology and Sources of Data

3.2.1 Selection of the Study Sample

Getting a stratified sample with equal proportions of health workers both in Traditional Medicine (TM) and Modern Medicine (MM) with the same characteristics as those in the entire population of the Mara Region is not possible as the two medical systems involved in the study are not homogenous. Instead, multistage sampling is used as follows:

- four out of the five districts are represented: Bunda, Musoma (rural and urban combined), Serengeti and Tarime;
- *cluster sampling* is then used to obtain 50 practitioners (25 from each system) from each of the four districts;
- for Modern Medicine (MM), a random sampling method is used to choose three health facilities from every district; a health centre, a dispensary, a clinic, laboratory and a pharmaceutical shop. Additionally, each District Medical Office received four questionnaires. The District hospitals got five questionnaires due to their scope and high number of workers compared to other health facilities. A list of health facilities are found at the district Medical Officers office while the names of medical practitioners are found at their respective work stations;
- for Traditional Medicine (TM), cluster sampling is used. Questionnaires were given to workers in the following areas of expertise; traditional healers, circumcisers, traditional midwives, faith healers and fortune tellers. The individual respondents were picked from the list of traditional medical practitioners registered by their organisation, well known as *CHAWATIATA* leadership.

3.2.2 Planning and Research Piloting

The scope of this study is confined to Tanzania, although in the discussions examples from both developed and developing countries may be cited for comparison and for the clarification of concepts. The field of research encompasses the four administrative districts of the Mara Region of Tanzania, namely Musoma (rural and urban), Serengeti, Bunda, and Tarime.

As suggested by various researchers, adequate research depends on realistic planning, appropriate choice of research design and its subsequent effective execution (Bowling 1997; Peat 2001; Stangor 2006; Pallant 2007). Having fulfilled all the application procedures, a Research Permit No. 258-CC-2002-85 was granted by the Tanzanian Commission of Science and Technology with permission to undertake this study in the Mara Region of Tanzania. Furthermore, an introduction letter with reference number S.20/6/332 to the communities in the region from the Serengeti District Administrative Secretary has been also acquired in due course. These steps were necessary for clearance on ethical and legal grounds as per the law governing scientific research in Tanzania.

First, a pilot study was undertaken between August and September 2005 as a way to gather more general descriptive information and to test the questionnaire as the research instrument in Serengeti District. The necessary adjustments were applied to ensure the reliability and validity of data, including content, criterion and construct, as mentioned by Stangor (2005), DeVellis (2003), Siegel & Castellan (1998). This part of the research has been made possible through the financial support from the *Stichting Nederlandse Albert Schweitzer Fonds*. The Pilot study has also been beneficial for the training of less experienced research assistants who could work without fear of failing their assignment.

Effective communications with traditional medical practitioners were made possible after a rapport had been established with their organisation, known as *CHAWATIATA*, under the leadership of *Omufumu* Nyakiriga Nyakirang'ani as well as with their respective local community leaders. Throughout, the researcher and assistant researchers were sensitive to the culture of the respondents and stayed in regular contact with elderly authorities in the villages. The researcher and his assistants have shown due respect for the way of life of the villagers, and have paid allegiance to the prevailing rules of law, working together with credible people who are familiar with traditional medical knowledge and practice in the region.

3.2.3 Research Design and Methodology

The study in Mara Region is a descriptive and explanatory study, employing a randomised cross-sectional survey of a representative sample of both traditional and modern medical practitioners in the research area. The choice of the design is suitable for obtaining relevant data and performing adequate analyses to fulfil the general aim of the research and its specific objectives, as stated in Paragraph 1.4.2. The study has collected both qualitative and quantitative data through the use of different research instruments of data collection. The collection of primary data in the Mara administrative region both in the pilot study and later in the surveys has been completed by the researcher with the support of the following Research Assistants: Mr. T. Mukakaro, Dr. S. Keb MPH, Dr. B. Chirangi MPH, Mr. S. Karamba CLA and Mr. Baraka, M. DM.

A combination of different methods and research tools were used to gather both primary data well as secondary data as follows:

Structured Questionnaire

With help from the four previously mentioned research assistants, a structured questionnaire concerning the collaboration between the two categories of respondents has been administered to randomly selected traditional and modern medical practitioners in the four districts of the Mara Region of Tanzania at that time. While the names of modern medical practitioners were selected randomly from an official list of available health facilities, such as hospitals,

health centres, dispensaries, clinics, laboratories, pharmaceutical shops, in each district, the names of traditional medical practitioners were obtained from the headquarters of their Mara Regional Organisation (CHAWATIATA). Although not always possible, the gender balance has been included in the selection of respondents. Fifty questionnaires were administered in each district and collected between the period of April and May 2006. A total of 193 completed questionnaires with 57 questions each were collected from both traditional and modern medical practitioners combined. Unfortunately, five questionnaires were not completed, while two were discarded as they were too incomplete to secure a valuable representation of data.

The questionnaire was used to collect information about the respondents' general socio-demographic information, their beliefs, knowledge, and attitudes towards both medical systems, their level of trust, the perceived organisational support, and their actual interprofessional collaborative behaviours they experienced during the twelve months preceding the interviews.

For descriptive and exploratory purposes, the questionnaire also guided some open-ended questions about the respondent's ideas on the challenges facing each medical system and perceptions of the effective role of traditional medicine in the society. For the sake of controlling the quality of collected data, the questionnaires have been translated into Kiswahili, the national language in which all respondents are able to communicate fluently with the interviewer.

In cooperation with some employees of the *Jamii Imara* (Community Based Health Promotion Programme) based in Mugumu and the Serengeti District Medical Officer, all familiar with field work-based surveys, 50 draft questionnaires were tested for their viability before the incorporation into the final copy of questionnaire of some necessary changes, such as the replacement of appropriate, well-understood Swahili words and some clear introductory remarks and instructions for the interviewers.

Semi-Structured Interviews

Semi-structured interviews were conducted between April and June 2006 to key informants identified within both Traditional Medicine (TM) and Modern Medicine (MM) in order to obtain additional information on the study. The respondents included representatives or spokespersons from the following areas:

- the Tanzanian Ministry of Health and Social Welfare (MoHSW), from the directorate desk of both hospital services and traditional medicine;
- Muhimbili University College of Health Science & Institute of Traditional medicine district authorities and the Mara Regional health authorities;
- Mara Region leadership of CHAWATIATA district and village leaders;
- clients and/or relatives or guardians of those who have received health services in the Mara Region.

Workshop Summary of Proceedings

Eight different workshops following the *Participatory Learning Approach* were held between 2005 and 2007 in Serengeti (three), Musoma (three) and Shirati (two) under the *Jadi and Utamaduni katika Afya* (JUA) Project. These workshops, each entitled '*From Vision to Actions of Integrated Medical System*', were conducted for a minimum of three working days.

They were organised under the *Jadi and Utamaduni katika Afya* (JUA) Project, founded by the researcher and supported by the *Stichting de Doopsgezinde Zending*. The first three workshops were exploratory with health providers from both modern and traditional systems as participants. The next five workshops were dedicated to capacity building for professionals from Traditional Medicine (TM), including traditional birth attendants, traditional healers and circumcisers.

In line with the visions of the *Jamii Imara* Programme (Community Based Health Promotion) of the Mara Tanzania, the researcher established the *Jadi and Utamaduni katika Afya* (JUA) Project as an integrated health care initiative. The project's goal is to enhance the capacity for traditional health workers and other health stakeholders in the region to evaluate and address crucial questions related to integrated health policies and differential choice of service delivery in the context of the pluralistic medical configuration.

Apart from the focus on traditional medical practitioners, the *Jadi and Utamaduni katika Afya* (JUA) Project has been diversified, envisaging the provision of insight and facilitating community capacity building in general health matters, such as the treatment of malaria, anaemia, hygiene, HIV/AIDS, and to promote self-help initiatives. It has been created for improved health and livelihood of the underprivileged inhabitants of the Mara Region, including poor women and destitute children. To this end, the project, of which the logo depicts the *jua* (sun) shining on the call to realise, control and protect indigenous knowledge and culture, exists to fulfil the call for a holistic ministry, and as such identifying itself with the underprivileged people of Tanzania.

The *Jadi and Utamaduni katika Afya* (JUA) Project will continue in its second phase with follow-up workshops on strategic planning. Those workshops will bring together various actors in health services, including representatives from the Primary Health Care Committee, government district health authorities, trade union leaders, local authorities of the Social Services Committee, religious bodies, district hospitals, and nursing schools with the primary goal of developing a Memorandum of Understanding towards interprofessional collaboration between traditional and modern medical practitioners in order to improve the quality of the health services in the Mara Region. The results of this working workshop for future strategic planning, however, are beyond the scope of this study.

Personal Observations

Additional knowledge and insights have been acquired from personal observations and encounters with traditional health issues based on more than ten years of the researcher's experience working in a district hospital. Specific roles for observation included the following:

- members of the district health management team entrusted with policy-making, implementation and management of the overall district health plan and strategies;
- members of the daily morning clinical conference for discussions on reports about patients, diseases and their management;
- management advisors (1996–1998) to the *Community Based Health Promotion Programme* (CBHPP), of which the areas of service include Serengeti in the Mara Region;
- coordinators of the *Community Based Health Promotion Programme* (CBHPP) (1997-1998) where the researcher participated in workshops and meetings with traditional elders from the Kuryan community on ways to control and prevent HIV/AIDS;

- researcher's life experience as an individual born and working in the Mara Region, one of the poor regions of Tanzania in terms of health status, but rich with indigenous medical knowledge and medicines in almost every village;
- visitor and observer of the comparative Dutch and Indonesian systems of Traditional Medicine (TM) and Complementary and Alternative Medicine (CAM) in Western Europe and South-East Asia.

Document Analysis

In order to collect secondary data, critical reading and analysis of various sources has been essential. The list includes the annual *Jamii Imara* (CBHPP) Mugumu Reports, available and accessible reports from the Tanzanian Ministry of Health and Social Welfare (MoHSW) desk in charge of Traditional Medicine (TM), health statistics abstracts from the Ministry of Health (1998-2011), MoHSW development report of 50 years of independence, annual district health reports (1998-2011), and Internet sites.

Literature on related topics has been consulted for theoretical framework and conceptual clarification, including traditional and alternative medicine, religion and traditional medicine, health, gender and traditional medicine, integration of modern and traditional medicine, etc. Additionally, SWOC analysis (which considers Strengths, Weaknesses Opportunities, and Challenges) has been employed for both national and international (macro) health policy and institutional support to Traditional Medicine (TM).

3.3 Operationalisation of the Analytical Model

3.3.1 Linking Concepts to Measurable Phenomenon

Different concepts key to particular scientific inquiries must be defined and translated into distinguishable empirical observations known as the *operationalisation* of concepts as coined by Bridgman (1882–1961), who wrote extensively on the scientific method and the philosophy of science. The process of operationalisation generally refers to the work of specifying the extension of a concept to the point of getting a measurable phenomenon from operational definitions. Those operational definitions contain implicit inductions and deductive consequences are part of the theoretical definition in use. Thus the process entails a translation from concept to variables to operation definition.

The measuring process is supported in the early work of Kohn and White (1976), as summarised in Figure 3.1, showing the conceptual, theoretical and analytical frameworks which were operationalised and linked to measurement of concepts in the research questionnaire. Relevant *concepts* from the theoretical orientation presented in Chapter II are related to interprofessional collaboration and transferred into *variables* in the analytical model which constitute certain blocks of factors which are translated into *indicators* showing operational definitions. Indicators are assigned with possible *categories* to enable them to be identified and/or measured. Questions are formulated at the *phenomenon* level to categories which can be chosen or completed by the respondent during the field survey.

3.3.2 Factors on Interprofessional Collaborative Behaviour

Within the selected multivariate analytical model mentioned in Chapter II, there are seven blocks of factors which are to be included as variables in the quantitative analysis, as shown in Figure 3.2.

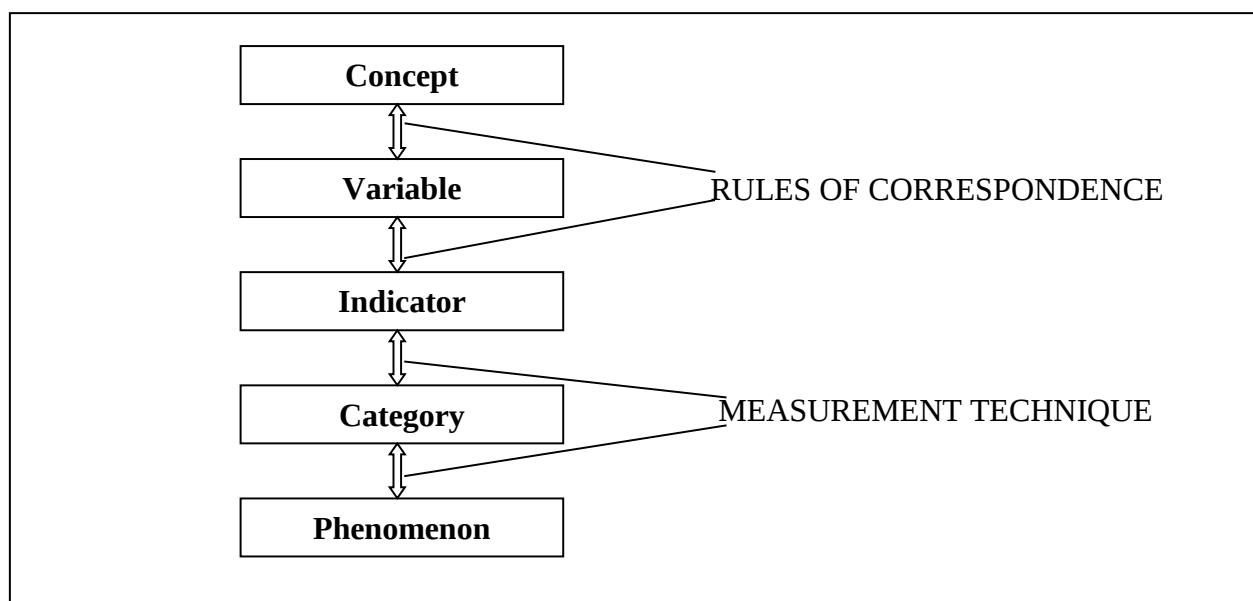


Figure 3.1 Links in the measurement process
Source: Kohn & White (1976)

The components of the analytical model encompass the independent, intervening and dependent variables, elaborated as follows:

Independent variables

Firstly, the independent variables include the *predisposing variables* such as *socio-demographic variables* and *psycho-social variables*. They are factors which exert their effects prior to a behavioural occurring (collaboration) by motivating or de-motivating a Practitioner toward or away from collaborative behaviour. Socio- demographic variables include both the ascribed and achieved individual characteristics of the respondents (medical practitioners) of sociography and a demographic profile nature. It should be noted before a behavioural action is done, generally although not always, much of these socio-demographic characteristics are rather static, is to say, they are not as easily changed as the others to be seen later.

While in the area of interprofessional collaborative behaviour, socio-demographics may consist of factors such as sex, marital status, education background, age, place of nativity (urban or rural), religious affiliation, ethnicity, the size of the organisation and profession (cadre) and hierarchical status in the organisation; psycho-social attributes (the ‘silent’ factors) may include the person’s beliefs, attitudes, perceptions, experience and knowledge on the practitioners, therapies, aetiology, perceived future impact, perceived mutuality (possibility to work with mutual understanding), perception on efficacy and safety, experience in intra-collaborative behaviour (within the same system), and awareness of successful interprofessional collaborative activities These factors cannot be recognised easily physically as they are strongly imbedded into one’s heart, mind and brain. They seem to be ‘silent’ but affect loudly people’s behaviour in different ways.

Secondly, they include *enabling variables* are factors such as individual socio-economic status, government and local authority efforts gearing towards collaboration, effectiveness of communication linkages all these either facilitate or triggers the practitioners or health facility towards a positive influence on the need to embark in interprofessional collaboration.

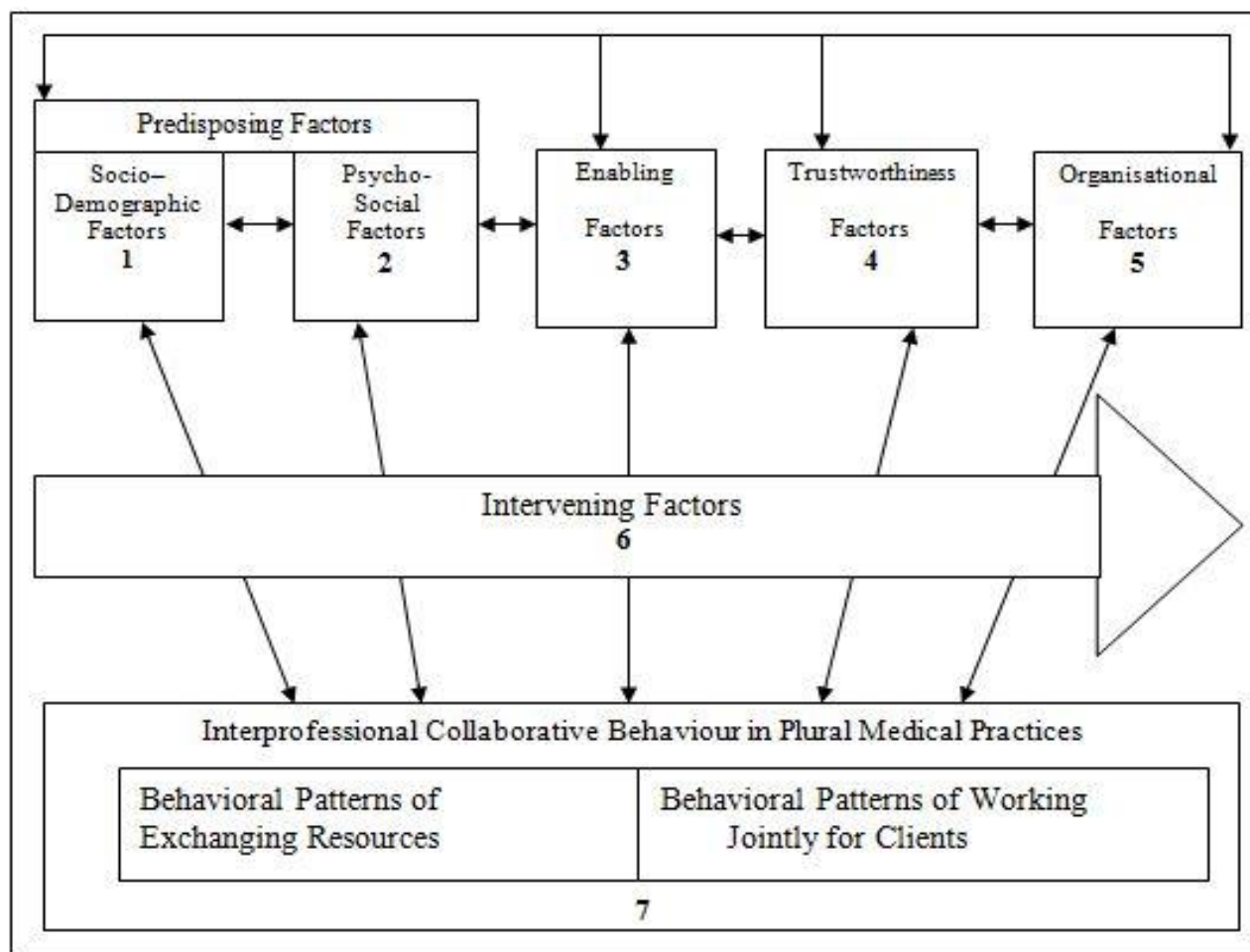


Figure 3.2 Analytical model of interprofessional collaboration between traditional and modern medical practitioners and its components.

Source: Adapted from Slikkerveer (1990; 1996).

Legend:	Block no. Variables
	Block 1 Predisposing Variables (Socio-demographic Variables)
	Block 2 Predisposing Variables (Psychosocial Variables)
	Block 3 Enabling Variables (Socio-Economic Status)
	Block 4 Trustworthiness Variables (Interprofessional Confidence in each other)
	Block 5 Organisational Variables (Organisational Culture, Resources Capability)
	Block 6 Intervening Variables (Government and International projects on collaboration)
	Block 7 Interprofessional Collaborative Behavioural Variables (exchange of resources) & Interprofessional Collaborative Behavioural Variables (working jointly).

Thirdly, they comprise *trustworthiness variables*. This is a long-term learned characteristic of practitioners deserving trust and confidence from the other medical system. In short, trustworthiness includes both the capability of being depended upon (being reliable and responsible) as well as being worthy of credibility or authoritative in the subject matter. From the researcher's perspective, based on life experience in health services in Tanzania, a number of modern medical practitioners find it difficult to accept that traditional and alternative medicine practitioners are also authoritative when it comes to speaking and dealing with

preventive, curative, and promotive health services to the public as compared to their counterparts from the modern system.

Thus, where there is no trustworthiness between the two systems, it is no surprise that a non-collaborative or rare collaboration prevails. Considering the system theory of organisations approach, the fourth variable encompasses *organisational variables* which include three main categories:

- i. the organisational inputs and processes capabilities, which measure the health facility's ability to have the required level of resources such as finances, medicines and equipment, and working space;
- ii. human resources and skills to correctly offer the anticipated health service to clients;
- iii. the organisational culture which describes the shared collective patterns of norms, attitudes, and organisational structures, dictated in a way in which practitioners interact within and with the outside world.

Fifthly, the *Intervening factor* in this research is the level of one's involvement in national or international project or programmes supporting collaboration between the two medical systems in question such as the traditional birth attendants training programmes, etc.

In this study, 'the intervening factor represents an overriding situation which exerts a strong determining effect on the relationship of the independent and dependent variables with the time dimensional contribution during the interactions. Clarifying this in context, *ceteris paribus* it is hypothetically expected when a practitioner is already involved in a project which promotes integration between modern and traditional medicine nationally or internationally, there is a high probability of having a high level of interprofessional collaboration with a practitioner of the other system when compared to uninvolved practitioners.

Dependent variables:

Referring to Dotterich (2006), interprofessional collaboration is a stage which has already faced the turfs and sustained trust (see Figure 2.10) between the involved parties. Those in collaboration are networking, coordinating and cooperating to share patients' and health service information (of course without compromise of patient's confidentiality), exchanging services, sharing resources and cross training (sharing ideas and relevant knowledge) towards peoples health improvement.

Bearing in mind the definition from the Centre for Advancement of Collaborative Strategies in Health (2003), interprofessional collaboration as part of synergy formation has two components, a) sharing of resources and b) working jointly under unified management for a customer in need of health service. Therefore, talking of collaboration between medical practitioners of the two systems, it shall be inferred in their behavioural actions to exchange knowledge, skills and other material and financial resources as well as work together in giving health service to a customer(s) under some kind of a prearranged organised manner.

Thus, in completing an analytical model, these dependent variables (exchange of resources and working jointly) referred as interprofessional collaborative behaviour can be significantly affected by the alteration of independent variables such as *socio-demographic, psycho-social, enabling, trustworthiness* and *organisational* variables as shown in figure 3.2 with the variables which correlate with collaborative behavioural patterns between traditional and modern medical practitioners.

However, apart from establishing the significant correlation among the variables, it is beyond the scope of this study to discover the real causal-effect of the independent and dependent variables at play. Finally, the adapted multivariate analytical model from Slikkerveer (1990; 1996) shows the relationship between independent and dependent variables on the collaboration of modern and traditional medical practitioners. It contains seven blocks of operationalised variables, discussed in Paragraph 3.3.3, leading to the formation of the questionnaire's concepts, variables, indicators, and categories linking the measuring process.

3.3.3. Structuring of the Research Questionnaire

A questionnaire has been created, seeking responses on measurable, identified indicators to access the interactive processes of block variables concerning interprofessional collaborative behaviours between traditional and modern medical practitioners. All 57 questions were in line with the analytical model and the major research questions. The cover of the questionnaire provided the serial number and the relevant district name, along with a comprehensible set of instructions for the respondents. In addition, a statement explaining the reason for the survey and its benefit to the population. Respondents' anonymity and privacy were highly assured throughout this scientific inquiry.

In order to add up exploratory information for quantitative analysis, the questionnaire had three major sections, showing an independent block of variables, dependent block of variables and additional questions for qualitative analysis and as a complementary source of data related to the research. With regard to interprofessional collaboration (dependent variables) either by exchange of resources or by working jointly, traditional and modern practitioners were asked questions on specific variables relating to their frequency of engagement with the other medical system in the previous 24 months. There were five rating categories choices: none, once in two months' time, once in one months' time, once in two weeks' time, and more than once in two weeks' time. These were later recoded as: none, very low level, low level, average level, and high level.

The composition of those blocks of variables in the questionnaire adapts the same kind of flow deduced from *concept* to *variable* to *indicator* to *category* as shown in Table 3.1: the links in measurement processes later as adapted from Kohn & White (1976), Slikkerveer (1990), Agung (2005), Ibui (2007), Leurs (2010), and Djen Amar (2010), explicated below.

3.4 Types of Statistical Analysis

The dataset with 194 cases generated from the survey responses from both traditional and modern medical practitioners in the Mara Region of Tanzania is used in both qualitative and quantitative analyses. This dataset is *non-parametrical*, also referred to as *categorical data* (Van der Geer 1993). The *non-parametrical methods* of analyses are geared towards obtaining the resulting ultimate analytical model, with mathematical measures of the strengths of correlation between blocks of variables interacting in interprofessional collaborative behaviours between modern and traditional medical practitioners as stated in Chapter I of this study on objectives (1). The analyses involves a total of 27 variables, divided into 24 independent variables, one intervening variable and two dependent variables, shown as blocks in the analytical model presented in Chapter III, Figure 3.2: the analytical model of interprofessional collaboration between traditional and modern medical practitioners. By use of the Predictive Analytics Software (PASW) previously known as SPSS package of statistics version 20.0,

the following quantitative analyses as described in Paragraphs 3.4.1 to 3.4.3, are conducted and presented in this study.

Table 3.1 Socio-Demographic Factors: Concepts, Variables, Indicators and Categories

Concept	Variable	Indicator	Categories
Socio-Demographic Factors	Area	District	Musoma; Serengeti; Bunda; Tarime
	Gender	Sex	Male; Female
	Social Status	Status within the organisation	Owner; Top Leadership; Supervisor; Permanent Worker; Temporally / Under Probation Worker; Trainee / Apprentice
	Age	Number of years	Young Adult (20-39 years); Middle Adult (40-59 years); Elderly Adult (60-79 years)
	Formal Education	Highest level of schooling finished	Below Primary; Primary; Secondary; Tertiary; University
	Ethnicity	Ethnic group	WaKuria; WaZanaki; WaJita; Walkoma; Wajaluo; Others
	Religion	Religious affiliation	Non-Believer; Muslim; Christian; African Tradition Religion; Others
	Marital Status	Marriage	Unmarried; Divorced / Separated; Widow / Widower; Married
	System	Organisation type based on services	Modern Medicine; Modern Medicine Allied; Traditional Medicine; Traditional Medicine Allied
	Span of Relationship	Organisational size in terms of workers	Up to 10; 11 - 30; 31 – 60; 61 - 90; 91 & above (workers)
	Profession	Professional group	Doctor; Clinician; Nurse; Allied Health; Community Health Worker; Support Worker; Traditional Healer; Bonesetter; Traditional Birth Attendant; Male Circumciser; Faith Healer, Fortune Teller; Astrologer, Soothsayer; Traditional Medicine Vendor

Source: Adapted from Links in the measurement (Kohn & White, 1976; Slikkerveer 1990)

Table 3.2 Psycho-social Factors: Concepts, Variables, Indicators and Categories

Concept	Variable	Indicator	Categories
Psycho-Social Factors	Belief on future mutuality	Level of belief on future possibility of good work relationship	Unknown; None; Little; Average; Greater; (Possibilities)
	Knowledge of impact of collaboration	Level of perception on the general positive impact of collaboration	Unknown; None; Minor; Average; Major; (Positive Impact)
	Belief on illnesses/health problem system specificity	Level of belief that illnesses and other health problems are system-specific	Unknown; Strongly disagree; Disagree; Agree; Strongly disagree (On illness/system specificity)
	Knowledge about Traditional Medical practitioners	Level of knowledge about Traditional Medical practitioners	(1 – 5 points) Very low; Low; Average; High; Very high (Knowledge)
	Knowledge about Modern Medical practitioners	Level of knowledge about Modern Medical practitioners	(1 – 5 points) Very low; Low; Average; High; Very high (Knowledge)
	Knowledge about Traditional Health Therapies	Level of knowledge about Traditional Health therapies	(1 – 5 points) Very low; Low; Average; High; Very high (Knowledge)
	Knowledge about Modern Health Therapies	Level of knowledge about Modern Health therapies	(1 – 5 points) Very low; Low; Average; High; Very high (Knowledge)
	Knowledge of Collaboration	Awareness of successful Collaboration	No; Yes
	Knowledge (experience) on intra-professional Collaboration	General frequency of collaboration with other professionals in the same system (Modern or Traditional)	None; Low; Average; High; (Frequency of Collaboration)
	Belief on efficacy level of goods and services from Traditional Medicine (TM)	One's experience level of outcome of received goods and services from Traditional Medicine (TM)	Unknown; Poor; Average; High (Appropriate Effects)
	Belief on efficacy level of goods and services from Modern Medicine (MM)	One's experience level of outcome of received goods and services from Modern Medicine (MM)	Unknown; Poor; Average; High (Appropriate Effects)

Source: Adapted from Links in the measurement (Kohn & White, 1976; Slikkerveer 1990)

Table 3.3 Enabling Factors: Concepts, Variables, Indicators and Categories

Concept	Variable	Indicator	Categories
Enabling Factors	Socio-economic Status	One's average monthly income	Tshs. <40,000; Tshs. 40,000 – 100,000; Tshs. >100,000 – 300,000; Tshs. >300,000 – 500,000; Tshs. >500,000
	Socio-economic Status	Value of one's type of property and material ownership	Income; Type of housing building material; Roofing; Size of land ownership; Type of transportation means; Value of domesticated animals; (poor; average; rich)
	Community Support	Level of Local Government and Community efforts on collaboration	Unknown; None; Minimal; Some; A lot
	Infrastructural Capability	Level of quality of communication linkage (roads, communication media) with other places	Unknown; Poor; Fair; Good

Source: Adapted from Links in the measurement (Kohn & White, 1976; Slikkerveer 1990)

Table 3.4 Trustworthiness Factors: Concepts, Variables, Indicators and Categories

Concept	Variable	Indicator	Categories
Trustworthiness Factors	Trusting other medical practitioners	One's general level of trusting of other practitioners of Modern Medicine (MM) in their practice	Low; Average; High
		One's general level of trusting of other Practitioners of Traditional Medicine (TM) in their practice	Low; Average; High

Source: Adapted from Links in the measurement (Kohn & White, 1976; Slikkerveer 1990)

Table 3.5 Organisational Factors: Concepts, Variables, Indicators and Categories

Concept	Variable	Indicator	Category
Organizational Variables	Organisational Input Capability	Level of Organisational Inputs in terms of the required number of Human Resources; Data/Information; Expertise/Skills, Working tools and Materials; Work space	None; Almost none; Some; Most; All (of the required resources)
	Organisational Culture fostering Collaboration	The level of one's organisational cultural attributes rating information dissemination, motivation and cooperation with others in the opposite Medical system.	Unknown; Poor; Fair; Good; Excellent
	Organisational anti-Group think	The level of one's organization efforts in fostering open discussion, tolerance and respect to the opposite Medical system.	Unknown; Low; Average; High

Source: Adapted from Links in the measurement (Kohn & White, 1976; Slikkerveer 1990)

Table 3.6 Intervening Factors: Concepts, Variables, Indicators and Categories

Concept	Variable	Indicator	Categories
Intervening Factors	National and International Programmes on Collaboration	The level of one's involvement if any in a National or International Programme which fosters collaboration between Traditional and Modern Medical systems	None; Rare; Some; Often

Source: Adapted from Links in the measurement (Kohn & White, 1976; Slikkerveer 1990)

Table 3.7 Dependent Factors: Concepts, Variables, Indicators and Categories

Concept	Variable	Indicator	Categories
Dependent Factors:	Behavioural patterns of exchanging resources for health service delivery with a practitioner from the other medical system	Frequency of exchange of ideas; Giving out material resources; receiving material resources from any practitioner of the other medical system in the past 24 months.	none; once in 2 months; once in 1 month; once in 2 weeks; more than once in 2 weeks.
Interprofessional collaboration between Practitioners of Modern and Traditional Healthcare Systems.	Behavioural patterns of working jointly for a client with health-related problem with a practitioner of the other medical system	Frequency of referring out customers; receiving customers; receiving services, conducting meetings or workshops together, offering health services jointly to customers with any practitioner from the other medical system in the past 24 months.	none; once in 2 months; once in 1 month; once in 2 weeks; more than once in 2 weeks

Source: Adapted from Links in the measurement (Kohn & White, 1976; Slikkerveer 1990)

3.4.1 Bivariate Analysis

Cross tabulation and bivariate analysis bring both descriptive statistics showing frequencies and percentages of variables as well as inferential statistics showing relationships using coefficients which can be used for preliminary evaluating predictions by comparison of the analytical model to the expected outcome. Cross tabulation of pair-analyses among all 27 variables has been done and non-parametric tests results which were observed include *the Pearson's Chi-square* (χ^2), *Cramer's V*, and *Kendall's tau b*, *Gamma* and the *Spearman Correlation*. Based on the nature of the obtained data, all these tests avoid the assumption of bivariate normality; correlations are therefore unduly influenced by outliers, unequal variances, non-normality, and nonlinearity. The *Pearson's Chi-square* shows a sign of association, while the other aforementioned tests disclose the strength of correlation (association), if any, among variables in interplay. The *Pearson's Chi-square* confidence level is set at 95%, and the significance is measured as *strongly significant* if the value is between .05 and .01; *very strongly significant* if the value is between .01 and .001, and has *the strongest significance* if the value is less than .001 (Pallant 2007). Three conditions are to be fulfilled for *Pearson's Chi-square* to be significant; firstly, each respondent can score only once in one cell of the cross tabulation; secondly; no expected frequencies can fall below 1.00; and lastly, no more than 20% of the expected frequencies can fall below 5.00 (Field 2005).

As a correlational study, the tests examine the possible existence of correlations among pair-variables with a caution of not jumping into causality conclusion that one variable causes something to happen to another variable. The caution of causality is due to two reasons, elaborated by Field (2005), as follows:

- The third variable problem: This is also known as the *tertium quid*. It infers causality cannot be concluded because there may be other unidentified or unmeasured variables affecting the outcome;
- Direction of causality: The resulting correlation coefficients do not show clearly that one variable causes the other. Despite the limitation of the third variable problem and the intuition to see that variable one causes variable two, there is no statistical reason why variable two cannot cause variable one.

3.4.2 Multivariate Analysis (OVERALS)

Because bivariate analysis does not take into consideration mutual interactions between variables, a multivariate analysis of all independent variables, intervening variables and dependent variables through Dimension Reduction – Optimal scaling for categorical data method has been completed. Optimal scaling is a general method to treat multivariate data. This method advances the standard analysis through two important advantages:

- i. OVERALS (Non-linear Canonical Correlation Analysis) allows a more than two sets of variables as (Cicourel 1967; Siegel, & Castellan (1998) explain. (2);
- ii. Different variables which are nominal, ordinal or numerical can be accommodated and their relationships can be established.

Rather than maximising correlations among variables, different sets are compared to an alternative set defined by the object scores. The results of this analysis include frequencies, centroids, and object scores as outputs. Additional outputs, presented in Chapter VII, are component loading and their component-loading plot. The 1988 SPSS Inc. *White Paper*, which approves the principal of optimal scaling as part of the Gifi system (Gifi 1990) has increasingly appeared in the mainstream statistical literature focusing on the multivariate analysis of qualitative and categorical data.

The Gifi system has been deliberated among the traditional statistical techniques in Krzanowski & Marriott (1994), and has now graduated into the *Data Theory Scaling System* (DTSS) to meet typical concerns from both substantive and technical points of view to deal with discrete multivariate data, nominal and ordinal data, incomplete data, non-linear relationships between pairs of variables, non-normal distributions, scaling of response patterns, social network data and other proximity correlational data (3).

3.4.3 Multiple Regression Analysis

The last statistical analysis to be carried out in this study is *multiple regression* (a term first used by Karl Pearson in 1908), which focuses on the relationship among variables. Explicitly, regression analysis can be used to understand how independent variables are related to the dependent variable, and for exploring the forms of the discovered relationships. In other words,

regression analysis helps one understand how the typical value of the dependent variable changes when any one of the independent variables is altered, while the other independent variables are held fixed. The general purpose of multiple regressions is to learn more about the relationship between several independent (predictor) variables and dependent (criterion) variables. Since the regression analysis methods depend on the kind of data, in this study (with non-parametric data), methods such as linear regression and ordinary least squares regression cannot be used where the regression function is defined in terms of a definite number of unknown parameters estimated from the data. Instead a non-parametric technique allows the regression function to lie in a specified set of functions used. In this study individual OVERALS analyses and resulting *eigenvalues* (Ed) (Van der Burg 1983) between each block of variables and all other blocks of variables from the analytical model have been chosen as the preferred method as previously done in correlational research (Agung 2005; Ibui 2007; Djen Amar 2010; Leurs 2010; Ambaretnani 2012). The formula to calculate the multiple correlation coefficients (ρ_d) of block of variables as functions of *eigenvalues* is given by:

$$\rho_d = (2 \times Ed) - 1$$

Therefore, with this analysis, some predictions of the influence level of independent variables (psychosocial, socio-demographic, socio-economic status, organisational, trustworthiness and intervening variables) to the dependent variable, which is interprofessional collaboration between traditional and modern medical practitioners, can be construed. Through this kind of analysis and study, researchers and health policy makers may come to realise which of the multiple independent variables best predict whether or not practitioners of the two medical systems (traditional and modern) will collaborate, and thus, advance an appropriate policy intervention towards the most predictors in interprofessional collaboration.

Sample size and number of variables

Field (2005:173) explains the importance of collecting enough cases (N) of data for obtaining a reliable regression analysis. It is recommended that for testing predictors (independent variables), the minimum sample size is obtained by the formula; $N = 104 + k$, where k is the number of predictors. Therefore by selecting to use 25 variables (as used in this study), $N = 104 + 25 = 129$. This result (129) of minimum cases needed substantiates that the 193 cases, which represents the actual number of the sample size of this research, suffices the condition and is therefore accepted.

Notes

1. Non-parametric methods do not depend on any assumptions about the parameters of the parent population and they are generally assuming data which are only measured at the nominal or ordinal level.
2. Official explanation of *Nonlinear Canonical Correlation Analysis (OVERALS)* presented by IBM-SPSS Statistics (2011), available at:
http://publib.boulder.ibm.com/infocenter/spssstat/v20r0m0/index.jsp?topic=%2Fcom.ibm.spss.statistics.help%2Fidh_over.htm
3. The white paper entitled *Optimal scaling methods for multivariate categorical data analysis*, written by J.J. Meulman from the Data Theory Group, Faculty of Social and Behavioural Sciences of Leiden University. Recently this method, taken as part of the *Data Theory Scaling System*, has been widely utilised in multivariate analysis in policy-oriented research in different disciplines, including Ibui (2007), Leurs (2010), Djen Amar (2010), and Ambaretnani (2012).