CHAPTER VIII CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

8.1 Overview

Following the objectives set for this research, as enumerated in 1.3, this chapter will consecutively address the outcomes of the qualitative and quantitative data collection and analysis. They are complemented by the insights drawn from the field of ethnographic study (FES), the historical dimension (HD) and the participants' view (PV), as integral components of the Leiden ethnoscience method. The eight objectives addressed in paragraph 8.2 are translated into practical recommendations for the organisation of local public health policies in par. 8.4.

The vulnerability of current public health policies has been elaborated in the historical analysis in Chapter I. Given the complexity of the themes covered by regional and national health policies, and the political and social pressure to address them simultaneously, increases the risk of overstretching available resources without precedent (*cf.* Luukkanen *et al.* 2004). The themes consist of communicable diseases monitoring and control (CDC), an increasing incidence of non-communicable diseases (NCD), maintaining preventive services and health promotion, reacting to environmental hazards, health manpower shortages, as well as special programmes such as maternal and child health (MCH), HIV/AIDS, or PMTCT. In particular where handling these multiple tasks is dependent of infrastructural assets, logistic capabilities, financial resources and health manpower, the management may come under strain in the region.

Additionally, the analysis looks at the extent to which these policies match the resources of the community and communicate with the socio-cultural context in which they are applied. Where many current concepts become dysfunctional, is when the availability of any of these resources, considered inherent to a modern encompassing public health system, are below the expected margins to contribute in a functional way (*cf.* Ambaretnani 2012). It is suggested that successful development of public health in rural Africa is dependent of the inclusion of as many indigenous, social and cultural aspects as possible (*cf.* Slikkerveer 1982; 1995; Hsu 2007; Prince 2014; Marsland 2014; Azevedo 2017a, b).

In the original concept of Primary Health Care (PHC), as one of the first universally adapted public health polices, the role of the community was really an integral part, but the implementation leaves a number of aspects to be reconsidered. Initiated among others to achieve decentralisation, in retrospect, the necessary resource allocation to district level and the commitment demanded on community level may have been underestimated. The effect of these aspects was a lower response to Primary Health Care (PHC) than anticipated, consequently amplified by factors such as economic decline and population growth over two consecutive decennia (*cf.* WHO 2008a). The role of a community member as a local health staff extension was never controversial in itself. The functioning of a community health committee to perform as a liaison for local authorities may have been subject to a lack of political will in the past, but in concept it is to be re-appreciated and revived (*cf.* Azevedo 2017b). It is in this re-orientation that the assessment made by Maurice King in his compilation after the Makerere Symposium becomes a point of focus again. He remarked that too much emphasis is placed on the three aspects of 'money, manpower and materials' and too little on the influence of culture: '*The almost inevitable human tendency is to accept the visible parts of a strange culture, and unconsciously graft unto them invisible elements from the observer's own culture, albeit in a very incomplete and haphazard way'* (King 1966: 4.1).

The essence of the discussion on the role of the community becomes twofold: on the one hand it is imperative that community involvement becomes anchored in a local public health structure. On the other hand the demands made on those who become involved on behalf of the community have also increased over time. That applies to the village health committees (VHC) as well as the community health workers (CHW). It means that selection and training of these individuals deserves renewed attention, as well as the allocation of funds to maintain them, not only on community level but also on district level. Additionally, their role could be extended by not only becoming a liaison for the modern medical system, but simultaneously for the traditional medical system. By embracing the local traditional practitioners they become an equivalent of the detection, early warning and monitoring of health hazards already in place (see 1.4 and 5.4). It could serve to reduce health manpower shortage, provided there is mutual trust, exchange of knowledge, and respect for local culture (*cf.* Chirangi 2013). The collaboration would stimulate the sharing of resources and create awareness of community rooted problems. Such an approach can be considered as operationalising '*community-based interventions at sub-district level'* as an integral part of the 'Reach Every District' (RED) goal of the Universal Health Coverage (UHC) policy by the WHO (2013). Moreover, it would imply structural recognition and integration of TM in a way envisaged by the WHO (2019). It could start with the networking of individual TBA's who recognise the importance of pregnancy related complications (PRC's). It could involve bone-setters and herbal practitioners who express great interest in sophisticating their therapies, and who in personal communications prove to be aware of working in the periphery of an invisible yet essential referral system, especially from a community point of view.

8.2 Conclusions

The data from the household survey are processed in consecutive bivariate, mutual relations and multiple regression analyses, to provide insight into the strength of the relationships between the nine blocks of the conceptual model (Chapter III). The model is intended to disclose the nature of these relationships in the utilisation of the plural medical system, consisting of the traditional, transitional and modern medical system respectively, as described in 2.3. It shows these relationships as a point of reference for the local population, in terms of accessibility and cultural aspects. The blocks in the model consist of independent, intervening and dependent factors:

Table 44. Overview of the Sets of Variables Used in the Model.

Independent	pre-disposing variables	socio-demographic	block 1
	pre-disposing variables	psycho-social	block 2
	enabling variables	socio-economic status	block 3
	perceived morbidity	health status, illness, duration	block 4
	institutional variables	availability, quality, efficiency	block 5
Intervening	intervening variables	health education campaigns	block 6
Dependent	dependent variables	utilisation of traditional med. system	block 7
		utilisation of transitional med. system	block 8
		utilisation of modern med. system	block 9

N.B. see also 3.1.1. for the configuration of the conceptual model

The qualitative data were acquired by a set of open question sections in the household survey, complemented with in-depth interviews with selected key informants throughout the research area. They serve as a context for interpretation of the quantitative analysis, as well as identification of locally relevant themata. The eight research objectives are consecutively addressed as follows:

Objective 1: The qualitative analysis of the multidimensional model (Figure 1, table 44) of plural medical system utilisation provides the following results. In total 41.7% of the actors use TM, 21.5% use TR, and 36.8% use MM (N=715). The highest values among the independent variables are belief in traditional medicine, opinion on traditional medicine, and cost of traditional medicine, all scoring above 0,7. They are followed by availability of traditional medicine and cost of transport to traditional medicine, all above 0,6. The clustering in Figure 7 shows the coherence between the related aspects of TM utilisation. Apart from perceived morbidity, the highest values among the independent variables which receive sufficient values in both dimensions are: who was consulted for advice for treatment, who was the source of knowledge regarding illness, whether the treatment was socially acceptable, the cost and transport of traditional medicine, and whether the treatment is economically efficient. The clinical diagnosis only associates with MM. The source of knowledge with regard to illness and treatment is dominated by direct family members (46%). It appears to be gender biased as the majority is female among spouses, parents and grandparents. Especially with regard to the low impact of formal health education the VHW's role on community level remains essential. In the consultation for treatment both the VHW and the traditional healers (*waganga wa kienyeji*) prove substantial across the medical systems, as they are approached professionally and are not family related.

The dominant blocks in the model's relationships analysis presented in Figure 8, are block 2 psycho-social factors, block 3 enabling factors, block 4 perceived morbidity and block 5 institutional factors. The strongest relationship with the dependent variables is between block 4 perceived morbidity, and block 9 the use of Modern Medicine with 0,663. The second strongest relationship is found between block 4 perceived morbidity and block 7 the use of TM with 0,599. The highest correlation overall is between block 2 psycho-social factors and block 5 institutional factors in dimension one with 0,862, and in dimension two with 0,826. The intervening factors, block 6 in the model, which consist of the recollection of health education campaigns and their media of transmission, did not receive sufficient values in the bivariate analysis to substantiate their inclusion in the multiple regression analysis. Regarding the dependent variables the use of TM is dominant in the first dimension, while MM is dominant in the second dimension. From block 1 the social-demographic and economic factors, the only ones remaining significant in the analysis are land ownership in dimension 1, associated with TM, the number of modern media in household use, along with Social Economic Status (SES) in dimension 2, associated with MM.

The main cross-over in utilisation between medical systems appears to result from consecutive use of alternate treatments invoked by dissatisfaction with short term results. The movement can be multidirectional. A hospital treatment can be followed up by TM, and vice versa, but again, there is no correlation found with a specific morbidity, other than the ones mentioned in objective 2.

Other crossovers which are deviant from the expected process, are the options applied after official diagnosis by modern medicine (MM). There are the instances where instead of going to the hospital, a commercial laboratory downtown is consulted, which charges lesser fees, and is followed up by buying commercial medicine without a proper prescription. Equally unexpected is an official

diagnosis at a dispensary followed up by the same process, on account of non-available medicine. There is a subsequent non-adherence to the prescribed therapy as well because of cost level arguments. It is debatable whether these actions are purely a result of economic motives, or whether they can be attributed to scepticism or lack of knowledge. Non-compliance with therapy is a suspected cause for reoccurrence of symptoms. It is influential to the efficacy of selected prescribed medicines, possibly leading to insensitivity to certain therapies as feared by local clinicians.

Objective 2: Although there is an apparent classification of morbidities among respondents, as described in Chapter VI, par. 6.4, there is no single correlation with utilisation across systems, except for those associated with a mental illness, or the suspicion of a supernatural cause. They may occasionally be connected with symptoms resulting from stroke, partial paralysis, epilepsy or upper respiratory affections such as asthma. Another recorded distinction is the dichotomy between 'old' and 'new' diseases. That popular distinction stems from tradition and current experiences. Diseases such as cancer, diabetes, cardiovascular conditions, hypertension, obesity, HIV/AIDS and Ebola, are considered 'new', and therefore more difficult to treat with self-medication or TM. All other recorded diseases are treated with home remedies or by consulting a traditional healer.

Regarding the complementary outcomes of the quantitative and qualitative data concerning utilisation, there are two phenomena which stand out: the extent to which self-treatment is dominant within this sample by applying home remedies first. Secondly by the application of commercial medicine from the transitional system, notably when prior diagnosis by an external source is left out. These phenomena were observed with recurrent symptoms, but changed with increasing severity of specific symptoms over an extended period. In that case the next step was either to consult a specialised renowned traditional healer, involving extensive travelling, or proceeding to a hospital as the last option for treatment.

Objective 3: As described in both Chapter IV and VI consecutively, the sociographic background and the historical perspective show the strong adherence to traditions, especially the survival of normative behaviour over a prolonged period of time, to a large extent undented by modern societal developments. It is demonstrated by the awareness of the origin of migratory routes, customs and rituals, and explanations on the emergence of the combination of agricultural and pastoral practices.

With the Kurya people in particular, the role of transition rites and seasonal cultural festivals were indicated as essential, as well as the communal jurisdiction maintained and executed by both a council of elders and community members. This is emphasised by the widespread knowledge of oral history and the adherence of young people to the traditions, indicated by their collective participation. The remark made by the elders on the current situation is their recognition of an increasing urge to migrate to urban areas resulting from limited economic perspectives. Simultaneously however, people who have become successful in an urban setting create a 'pied a terre' in their hometown and spend their leisure time there, again showing identification with their original socio-cultural environment.

Objective 4: The qualitative research shows that general knowledge of traditional therapies is common, but specific knowledge pertaining to preparation of indigenous medicinal plants is more limited and transferred on personal relational level *i.c.* family members or acquaintances. There are indications of gender influence as most of the of the knowledge seems to reside with female

household members, as mentioned above (*cf.* Towns *et al.* 2014). Also, most TBA's combine their obstetric skills with herbalist practices, simultaneously complaining of a lack knowledge transfer to the next generation, as young people who show interest in the field are limited.

The intricate aspects of herbal medicine preparation are in the combination of species within certain concoctions, as well as their intended purpose. It may prove useful to investigate the varieties in the application of identified herbal treatments aimed at specific diseases across -sub- regional areas in the future (*cf.* Chirangi 2013), especially where they are consistent, and where they diverge, for example in malaria treatment. The household survey identified a number of specific TM treatment modes, which shows their current familiarity and confidence among the population, their effect on health care utilisation and impact on public health services. The type of morbidities to which they are applied, as described in Chapter VI, are mainly related to behaviour, hygiene, or nutrition, while indirectly indicating the limited impact of preventive health education.

The top frequencies in TM application are with urinary tract infection (UTI), amoeba, diarrhoea, abdominal pains, and jaundice. An exception is the role of malaria, where there are remarkable inconsistencies in health seeking behaviour, as well across the plural system utilisation as within one system. The lack of proper diagnosis and inconsistent treatment indicate the peril connected to the prevalence of this morbidity, it especially deserves attention when dealing with children. It is noted that convulsions (*degedege*) are usually self-treated, or by a traditional healer. Indirect effects resulting from malarial infections, *e.g.* anaemia, liver dysfunctions or cerebral injuries, are not widely recognised as possibly connected to the disease.

With regard to the maintenance of biodiversity, individual respondents knowledgeable on herbal treatment complained of decreasing availability of certain species. The species were identified through images by a number of professional botanists. There is an overlap with species identified in other area studies, although the combinations mentioned are yet to be matched with earlier recordings. There was no recording regarding the specific volume of the components mixed in concoctions, as the treatments were mentioned spontaneous during the household survey.

Objective 5: As described in Chapter VII the analysis of the data follows a specific sequence with the purpose of an overall data reduction in order to detect the underlying relationships between the dimensions of the conceptual model, as elaborated in *Objective 1*. The first step is the bivariate analysis which involves all variables in the model to be crossed with the system variable (SYSTEM) composed to represent the utilisation of the three designated medical systems in the area. The next step is to select the variables which attain a sufficient level of significance, and process these in a multiple regression method (OVERALS) to detect their mutual relations (table 43). The sets can consist of nominal as well as ordinal variables. The analysis is performed in two dimensions in a canonical space as presented in Figure 7. The multiple regression analysis of the variables identified in the bivariate session, shows that the highest 'fit', *i.e.* the proportion of variance accounted for, is found in the first dimension of the canonical space, with 52,4%. The outcome is consistent in as far as most discriminate bivariate variables also rank high in both dimensions in the multiple regression analysis. The final step in the process establishes the correlations between the sets of variables as indicators for the relationships among the separate blocks in the model as presented in Figure 8. They determine the level of influence of one specific block of independent variables on the dependent variables, *i.e.* the utilisation of a medical system.

Objective 6: The aspect of accessibility of health care services in a physical sense appears dependent of facility distribution. Whereas TM has been historically tied to the environment of the local population, and implicit in any social communal setting, the coverage of facility based curative and preventive services on A-level is stretched to its limits, given the current level of resources. Although this network is extended by the functioning of Community Health Workers, most of whom are operating without a fixed station, the distribution of facilities in rural areas will remain problematic in the middle long term, unless alternatives are found. One option would be to revive mobile services with outreach programmes [35] as were customary during the onset of Primary Health Care programmes in the early 1990's, or by upscaling the services on community level with local resources (*cf.* Azevedo 2017b).

The aspect of accessibility in socio-economic terms seems determined by complementary aspects. As most of the services are low key, while some are officially free of charge for the most vulnerable target groups, such as Maternal & Child Health (MCH), elderly care and HIV-suspects, there is competition for efficacy and cost level with alternate providers, whether transitional or traditional. One aspect which is explained by health workers is that the financial resources available on district level, cannot maintain the intended health care delivery, while preventive services do not generate the turnover to sustain themselves. Additionally, the present attraction of a Community Health Fund (CHF) or other types of collective insurance is not gathering enough momentum to function as a financial resource to sustain monitoring and preventive services, or their extension on community level. The strive by the government of Tanzania to become independent from NGO funding for the consolidation of health services demands a new approach towards identifying financial resources (*cf.* Health Sector Strategic Plan IV, 2015–2020). It may even prove to be more of social challenge than an economic one. To that extent several scenarios are reviewed in Chapter V, for example the integration with other professional organisations, such as having a farmers' union deduct reservations for health expenses from membership contributions, rescheduling local government subsidies, or allowing the spreading of payments for health services over extended periods. As noted from the references the major leverage mechanisms here are sensitisation and marketing campaigns, and, ultimately, the strength and trustworthiness of existing organisations (*cf.* Stoermer *et al.* 2012).

In line with earlier utilisation studies, *e.g.* Hausmann-Muela *et al.* 2000; Jangu 2012; Denisenko 2013; Stanifer *et al.* 2015, the qualitative research indicates that the confidence in the technical capabilities of Modern Medicine is high. It is expressed in the appreciation for aspects such as surgery, laboratory tests, X-rays, inoculations, infusions, blood transfusions, artificial respiration, resuscitation, and the compactness of modern medicine in mass produced tablets and sera.

However, as described in Chapter VI, the attitude of many modern health staff members is frequently criticised. There is a notion of insufficient feedback received during consultations, as the staff provide no explanations to the patient regarding the cause and effect of their morbidities or the proposed cure. Many respondents describe the attitude of staff towards patients as 'arrogant' or 'rude'. That being said, the underlying reasons, or even individual motivations as to where this behaviour stems from, are apparently a question mark to the patients. In as far as this may be affecting response to preventive services, it is an aspect for investigation at facility level. The same phenomenon was also reported by the TBA's from the feedback they in turn received from mothers returning from consultations, or delivery in hospitals and clinics. Additionally, the advertised free services, *i.e.* Maternal & Child Health (MCH), HIV/AIDS and elderly care, do not always prove

free. Many respondents remark that there is always some 'administrative' fee *e.g.* paying for registration cards, or extra payment for some medicine which is somehow not included in regular stock, which they believe ends up in the staff's pocket.

There is an apparent lack of top of mind awareness with preventive measures as established by the values for block 6 'intervening variables' (*cf.* Table 44). The popularity of preventive services is disputable, and while the awareness of health education campaigns is measurable (Chapter VII), the impact is low, as the correlations with system utilisation were below threshold level in the quantitative analysis. As respondents in the qualitative data expressed (Chapter VI), there is the option to improve the integration with regular primary and secondary education curricula. They have high expectations that children might prove the best medium to create awareness, while simultaneously reaching parents indirectly. The revival of staging public role plays on community level addressing the recognition of potential hazards is subscribed by several key informants. The impact is considered higher than campaigns based on mobile Public Address Systems or incidental informative invents with on-site bannering. The role of mobile communications is not yet investigated, but the proliferation of the digital communication is almost complete, as many inhabitants have more than one device because of the differences in cost level as well as quality in coverage range between local providers. Text messaging to herald health education campaigns, or to provide specific emergency information to a broader audience may prove promising, possibly involving social media.

As extensively described in Chapter I and V, the health manpower situation is urgent, clearly expressed in the number of staff shortage documented in the Serengeti district profile (see 4.1) (*cf.* Kwesigabo, *et al.* 2012). Against the background of health manpower problems in a broader sense, this shortage is twofold, as it not only concerns physicians, who might play a secondary role in consolidating preventive services, but paramedic staff on community level as well. The options discussed range from setting up PPP's in the formal training institutions, to incorporating local level traditional practitioners into the elementary preventive or curative services. As found during the qualitative research, the option of tackling a human resources challenge with local practitioners is still a feasible one, irrespective of to the renewed emphasis on increasing the role of a Community Health Worker (CHW). Notwithstanding the argument of certain individual practitioners not meeting qualifications to engage in formal training, as incidentally expressed by local staff members, there is also an opportunity in having them become instrumental as an early detection and referral system. Their position close to the community and their confidential relationship with individual patients, as demonstrated in the daily practice of TBA's, makes them a valuable resource. Moreover, as expressed by the traditional practitioners themselves, there is an eagerness to co-operate and exchange knowledge (*cf.* Marsland 2007). Individual TBA's have already shown to take responsibility, by referring delicate cases to the hospital, sometimes even accompanying them to make sure they went (Chapter VI). The very mechanism should preferably become reciprocal, by training traditional practitioners in return how to maintain quality control in the consistency and conservation of their traditional products, as that is exactly what they express to expect from their interaction with the modern system (Chapter V).

While the emphasis at this point is focused on a human resources alternative, the larger picture of co-operation with TM is somehow pushed to the background. As is shown from both the qualitative and quantitative data, the first line of care with specific morbidities is through self-treatment with home remedies. The majority of diseases which carry either mental or spiritual connotations are

directed towards TM, although sometimes erroneously [36]. The potential of this phenomenon should be recognised and used for improving health policies, rather than being dismissed as inferior, inappropriate or unmanageable (*cf.* King 1966).

There is a need to extend institutionalised interaction with what the WHO calls "*the social determinants of health*" (WHO 2018). The event which triggered this insight was the reaction of the people to the emergence of Ebola in West-Africa 2014-2016. The inhabitants could hardly be convinced of the risk involved in the transmission, because there was no opportunity for them to maintain contact with the patients or escort their deceased family members into their afterlife. In that example there was an analogy with the risk impact following HIV/AIDS when not discovered timely or intentionally ignored, an important aspect of the PMTCT [37] projects.

In a wider implication, this demands a change in the mind frame of many health workers. Their awareness of the impact of certain health measures on the daily routines of the local population, where they might conflict with traditional values, should accompany any operationalisation of local health policies. It is the point where the social sciences and the bio-medical dimension converge, which can prove their added value when they are combined. The fieldwork discovered the role of the community where dedicated volunteer members of religious affiliations took it upon themselves to guide HIV-patients. They encourage them to adhere to monitoring, and prevent them from becoming socially isolated, thereby indirectly contributing to the containment of a potential health hazard. The analogy with other indigenous institutions is not hard to envisage. There are expectations from an renewed Community Health Worker (CHW) in the future, who, as the eyes and ears on community level, could be the core of social communications. By anticipating health hazards, identifying potential pitfalls, co-operating with traditional practitioners, and using locally recognisable definitions, they serve the community as a whole. The conditions under which they will be identified, trained and maintained in the community will have to be reviewed however. Especially in retrospect of the experiences under the original Primary Health Care (PHC) set up, and analogous to the Johns Hopkins (JPHIEGO) project which is aimed at the improvement of Maternal and Child Health (MCH) and TBA training.

There is an opportunity to apply a health information system to enable digitalised early warning and detection of hazards on district level. During the qualitative research, the visits to the dispensaries on site proved the dedication with local health staff to collect and record relevant health statistics (see 4.2.4). Even as the facilities are equipped with desktop computers, they are not capable of using these assets to their advantage as there is no internet connection to process the data timely. Sharing them with the public health department's back office would be instrumental to managing monitoring and control. Yet the cost involved in setting up these connections are disproportionately low put against logistics and manpower involved in physical movement and alternative communications over large distances and unpaved roads. The interviews with staff members indicated that they would be eager to not only process the data digitally, but also analyse them on site and give feedback to the public health department in Mugumu [38].

With regard to a local population of which the majority operates two mobile phones and extensively uses digitally transferred money (M-Pesa) it is not an advanced prospect. It would imply that any health hazard data requiring short term response, would automatically be detected by a public health back office. The information could be analysed in a cloud, and shared simultaneously with their satellites in the district, the health centres and dispensaries. Objectives 7,8 and 9 are addressed separately in the next three paragraphs, *i.c.* 8.3.1 until 8.3.3.

8.3 Theoretical, Methodological and Practical Implications

8.3.1 Theoretical Implications

One contribution to the theoretical realm lies in the extent to which medical pluralism (*cf.* Slikkerveer 1982) has manifested itself in the research findings. As concluded in 8.1, the variation in steps and utilisation is multidirectional and moves across the defined medical systems regardless of their historical relationships. Although psycho-social and cultural aspects appear ultimately dominant, there are indications where perceived morbidity is linked to pragmatism with chronic or recurrent symptoms. Unsuccessful treatment or dissatisfaction with the explanations may lead the way to alternative treatment, even if that transcends the medical system a specific morbidity is associated with. Self-medication with commercial medicine because of economic motives, either or not officially prescribed, is sandwiched with clinical visits or indigenous medicine. Through all varieties there are however consistencies with regard to the classification of specific diseases as either naturally caused or suspected of a supernatural cause. In the qualitative data there are indications of TM becoming commercialised on the supply side, displaying tokens of modernity in the process, which can be seen as an example of the adaptive capabilities of an otherwise tradition oriented society (*cf.* Millar 2004; Marsland 2007; Chirangi 2013; Appiah 2018).

Under the influence of global changes, Tanzania is confronted with a range of feasible options which apparently do not contradict essential local values, as described in the T&CM proliferation by the WHO (2019). In that sense these adaptations are indicative of a true enculturation of T&CM, as they are instigated by local people, not by virtue of a remote influence. These trends are visible in modern (ex-) health staff putting up commercial services privately, traditional healers producing their medication in quantity introducing smart packaging with advertisement. A spiritual healer with a website scaling up his clientele on account of one outstanding specialty, or a commercial laboratory downtown offering tests at half the price and twice the speed of a hospital, but omitting official prescriptions. On an individual level, these varieties are so wide in range that the suggestion of an expanding continuum, constantly being reshaped by emerging opportunities, blurring the division of co-existing medical systems, becomes a plausible point of interest *(cf.* Hsu 2007; Marsland 2007; Chirangi 2013; Hörbst 2017; Olsen & Sargent 2017).

As the WHO has declared, the attention to the '*social determinants of health*' is crucial in the success of an encompassing public health system, leaving indigenous cultural values intact (WHO/AFRO 2018). The desired interaction with the community should be articulated in the proposed integration of social sciences with epidemiological and public health training curricula, thereby recognising the role of indigenous culture in rural development.

8.3.2 Methodological Implications

The application of the combined types of research as promoted by the Leiden school of ethno-science (Chapter III) provides outcomes which have to be viewed in their complementarity. The model (*cf.* Slikkerveer 1989) used in the analysis of the utilisation of plural medical systems enables combining multiple dimensions and delivers results with predictive capabilities. The contributions of qualitative fieldwork and the historical perspective are considered essential for the interpretation of quantitative data. The combined consecutive analyses show that a number of sets of variables are

strongly related, in particular the psycho-social and institutional factors, followed by enabling factors. The method is capable of identifying the combination of variables within the respective dimensions that support the dominant role of indigenous knowledge in the motives of the respondents. The clustering of belief, opinion, cost and availability of TM shows their coherence. The source of health knowledge is closely related to who is consulted for advice for treatment, as well as social acceptability, social economic status, and perceived morbidity. These connections show that communal and cultural aspects are ultimately dominant over practical and economic considerations in the short term and become complementary in the long term. In that way the ethnoscience method and its model can deliver contributions to policy planning and sustainable community development (*cf.* Agung 2005; Ibui 2007; Djen Amar 2010; Leurs 2011; Ambaretnani 2012; Chirangi 2013; Aiglsperger 2014; Erwina 2019; Saefullah 2019).

The application of the ethnoscience method is encouraged to contribute to what Nachega *et al*. (2012) identify as the need to extend national training curricula in the African region with as many epidemiology and public health aspects as possible (WHO/AFRO 2012). Their meta-analysis also indicates that historically there was a pre-occupation with communicable diseases (CDC), but this should be extended. It should include NCD's, incorporate MCH as well as climate change and environmental impact respectively, as they are notably on the rise in the region.

The main motive for applying comprehensive research tools lies in the identification of predictive indicators, as they state; '*the next decade must see increases in regional epidemiological expertise to identify and elucidate causes of illness rather than just control communicable disease and outbreaks'* (Nachega e*t al.* 2012: p.1841). It should involve promoting the collaboration with programmes outside the region, and the application of distant learning modules into existing curricula. There is an explicit reference to the demand for master courses in public health supported by internet-based resources to compensate for insufficient local infrastructural capacity.

8.3.3 Practical Implications

A tangible contribution can be found in the potential role of indigenous knowledge and practices in respect of the organisation of public health on a communal level. The prominence of the role of indigenous knowledge and practices leads to a reassessment of how to mobilise communities towards health-related topics. By recognising indigenous beliefs and motives underlying local behaviour, it is possible to exchange knowledge without loss of semantics and influence unhealthy lifestyle attitudes, which may contribute more than conventional health education campaigns.

It also enables newly trained health staff members to become fully integrated because of their acquired capability of communicating on par with community members. Especially when topics are regarded as controversial, *e.g.* the social isolation of HIV-positive individuals, or diseases attributed to witchcraft. The impact of institutionalised health care at local level is fragmented and not consolidated through preventive health education. The perception of quality is dependent of the perceived receptive attitude of health staff, identification with the patient, and to a lesser extent of the type of service or the available medicine. Despite the commitment of individual health workers, the first line of consultation by patients is with immediate acquaintances, traditional healers or midwives.

There is a substantial degree of self-medication, without professional diagnosis or prescribed treatment, which is perceived as accessible, economically efficient and socially acceptable (see 8.1).

It applies to both herbal treatment as well as mass produced commercial medication. Additionally, there are disease classifications which determine the type of health service which will be applied. That choice is subject to success, as dissatisfaction with the result of a cure will lead to seeking alternative treatment, irrespective of the source. In order to anticipate and monitor health hazards on a collective scale, these are all aspects which need to be addressed through increased co-ordination between the decentralised district level institutions and local community level.

The qualitative botanical data contribute to the indigenous classification of MAC plants in the utilisation of the traditional medical system. They intend to promote the pharmacological research into local plant medicine, and contribute to the cultural and intellectual property of indigenous peoples (*cf.* regulation 31, UNICEF 2014, WIPO).

Finally, the results of this study will be used as input for the development of a health manpower training scheme in the Serengeti, which is aimed at the full integration of the medical social sciences into a curriculum for medical professionals at bachelor level. It is called the Transcultural Public Health Management (TPHM) programme and is a joint venture of Tanzanian and European counterparts, implemented through the mediation of the Mennonite Church (KMT) health facilities in Mara Region, in particular the Kisare College of Health Sciences.

8.4 Recommendations

In order to arrive at tangible contributions to health care management on district and communal level, there are a number of feasible options which can be applied consecutively. They can be executed without ample resources as they are borne in the existing social and cultural structures and can be built upon existing infrastructure and the plural medical system.

1) There is the possibility to revive community-based institutions which improve the prerequisites for sustainable health conditions on local level. They entail the revitalisation of community health committees, community health workers, and the structural co-operation with traditional practitioners in the range in which they are available (*cf.* Ambaretnani 2012, Chirangi 2013). It could perform as an alternate health manpower resources pool, provided there is willingness on district level to co-operate. The mobile outreach routine of the early days of Primary Health Care could be reinstalled to perform as a liaison and training facility, complementary to its original function as monitoring and control of MCH activities.

2) There is a request for an enhanced curriculum (see 8.3.3) to train staff in applying indigenous knowledge in their daily activities. Integration of social sciences in public health management curricula will improve the communications on community level, instigate a change in attitude and better reflection on the motives of the local population. It will enable health staff at different levels to identify with the health utilisation behaviour of their target group, and improve both preventive and curative services. The relationship between the two proves to be dependent on the perception of quality and accessibility of service. It could lead to a structural co-operation with TM practitioners, resulting in mutual respect, exchange of knowledge, and a reduction of health hazards.

3) There is underestimated potential in the revitalisation of the Community Health Fund (CHF), by considering alternative ways of organising it. Integration with existing indigenous institutions on

communal level, *i.e.* farmers' co-operatives, religious affiliations, or voluntary associations involved in any other economic activity related to reciprocal credit, are eligible ways to consolidate a health insurance. Additionally, there could be proper re-evaluation as to which type of service should be covered, with consensus of all party's involved, and with long term commitment to build confidence. Finally, there are a large number of alternatives with regard to the payment of fees which have not been explored yet. The spreading in instalments, cost sharing, collective saving schemes, rechannelling through local associations, or digitalising via mobile communications, could all prevent potential patients from avoiding consultation because of the financial impact.

4) There is a desire to start a digitalised health information system between the referral stations in terms of exchanging and analysing morbidity rates, drug supplies, health hazard early warning, monitoring and control, by applying technology which is already available, but has until now not been operationalised. There is commitment at A-level to establish such form of communications, and they could be established at a fraction of the cost of traditional logistics and physical movement. The hardware and software is available, internet providers are available, electricity is available, and the knowledge is available.

5) There is an option to enhance the impact of health education campaigns by extending the sourcing in primary and secondary education, while increasing the frequency of role plays to appeal to the tradition of oral transmission in the transfer of indigenous knowledge. Additionally, because of the changing modalities of communications with mobile telecom, it is imperative to investigate the use of existing networks to introduce health hazard messaging on mobile devices. The next generation in particular will prove susceptible to these channels and they could create a platform for proliferation, possibly through eligible social media.

6) There is the possibility a to re-animate the research into the applications of indigenous traditional medicine. A number of traditional practitioners indicated they would be eager to have their material examined. They propose that the scientific analysis of the components would have a twofold effect. First of all, it would take away the stigma of not having any recorded qualifications, secondly it would enable them to further develop their medicine in terms of conservation or reproduction and receive recognition. The main objective, in their words, is to finally receive feedback on the offer which they have consistently made. It is simultaneously a solid basis for future co-operation, and the intended integration between medical systems. It should receive the deserved attention, more so because the same practitioners foresee a lack of interest by the younger generation to engage in the laborious task of collecting and preparing the needed species. They fear that the knowledge will not be maintained or transferred, while they simultaneously experience a diminished availability of some species, endangering their preservation (Chapter VI).

Notes chapter VIII

35. Mobile outreach clinics were a core activity of PHC in covering large rural areas with limited infrastructure. The activities combined ante-natal monitoring, detecting sources of communicable diseases, individual general counselling, dispensing elementary drugs and birth registration, making it a versatile exercise, but it involved a multidisciplinary crew and transportation on a regular basis. It requires extra input but may prove a feasible alternative to extending facility based preventive services in the short term (*cf.* Azevedo 2017b).
36. Various utilisation studies (*cf.* Marsland 2007; Jangu 2010; Towns 2014; Stanifer 2015;) have shown that the interpretation of recurring symptoms, on account of chronic diseases, or the display of convulsions with young children as a result of malaria related fever, may lead to a delayed or insufficient treatment, which may prove risk full. In the co-operation with TM professionals these delicate differences must remain on the agenda.
37. Prevention of Mother to Child Transmission (PMTCT) aims at making women aware of the impact of an HIV-infection in case of pregnancy, both as a health information campaign as well as leading them to subsequent participation in testing and counselling (*cf.* WHO 2015)
38. The dispensary at Natta is equipped with desktop computers in a separate room with elementary software and capable of processing and analysing health statistics. Yet the recording and reporting was done with pen and paper and kept on carbon copies. If there would be an internet connection the digitalised data could be sent to the Public Health Department in Mugumu directly and answered with relevant advice or directives via E-mail instantaneously.