

Quality of primary care from the patient perspective in South West Malawi

Development and application of the Malawian Primary Care Assessment Tool (Pcat-Mw)

Luckson Wandani Dullie

Thesis for the degree of Philosophiae Doctor (PhD)
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UNIVERSITY OF BERGEN



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SCIENTIFIC ENVIRONMENT

Quality of primary care from the patient perspective in South West Malawi:

Development and application of the Malawian Primary Care Assessment Tool
(Pcat-Mw)

Luckson Wandani Dullie

During the course of this thesis project, the candidate was enrolled in the doctoral education program at the Center for International Health of the Faculty of Medicine and Dentistry, University of Bergen, Norway. The scientific environment was the Health Services Research Group and the Research Group for General Practice at the Department of Global Public Health and Primary Care at the University of Bergen.

TABLE OF CONTENTS

SCIENTIFIC ENVIRONMENT	2
ACKNOWLEDGEMENTS	5
ABBREVIATIONS	7
ABSTRACT	8
LIST OF PUBLICATIONS	11
1. INTRODUCTION	12
1.1 Context.....	12
1.2 Organization of health services in Malawi	13
1.3 Providers of healthcare in Malawi	13
1.4 The role of primary care in health systems	14
1.5 The state of primary healthcare in Malawi	15
1.6 Current efforts to improve primary care in Malawi	17
1.7 Progress on health indicators	18
1.8 Persisting challenges for the Malawi health system	19
1.9 Study framework.....	19
1.10 Defining quality in healthcare.....	23
1.11 Measures of primary care quality.....	23
1.11.1 Structure measures of primary care quality	23
1.11.2 Process measures of primary care quality	24
1.11.3 Outcome measures of primary care quality	25
1.12 Conceptual and operational definitions.....	25
2. STUDY AIM AND OBJECTIVES	28
2.1 Study rationale	28
2.2 Study aim	28
2.3 Study objectives	28
3. METHODS	30
3.1 Study instrument: The Primary Care Assessment Tool	30
3.2 Cross cultural adaptation of the ZA-PCAT.....	32
3.2.1 Face and Content validity	32
3.2.2 Translation and cultural adaptation	35
3.2.3 Feasibility and understanding of the questionnaire- pilot testing	35
3.3 Study setting and facilities	35
3.4 Study population, participants and Sample size.....	36

3.5	Data collection	37
3.6	Study variables.....	38
3.7	Data management and Statistical analyses.....	39
3.8	Ethical approvals, consent and permissions.....	41
4	SUMMARY OF RESULTS.....	42
4.1	Paper I.....	42
4.2	Paper II.....	44
4.3	Paper III	46
5.	DISCUSSION	51
5.1	Methodological considerations	51
5.1.1	Study design.....	51
5.1.2	Use of Delphi and nominal group techniques in study I.....	51
5.1.3	Precision.....	52
5.1.4	Validity	52
5.1.5	Structural validity of the questionnaire	53
5.1.6	Confounding	53
5.1.7	Selection bias	53
5.1.8	Data collection	54
5.1.9	Information bias	54
5.1.10	Recall bias	55
5.1.11	Social desirability bias	55
5.1.12	Generalizability	55
5.1.13	Some analytical aspects	56
5.2.	DISCUSSION OF RESULTS.....	57
5.2.1	Filling a gap in patient experience measurement tools	57
5.2.2	Primary care performance in south west zone in Malawi	59
5.2.3	Factors associated with patients' experience of primary care.....	62
5.2.4	Priorities to improve primary care	68
6.	CONCLUSION.....	68
7.	IMPLICATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH	71
7.1	Health system implications	71
7.2	Future research questions.....	71
8.	REFERENCES:	73

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ABBREVIATIONS

AIDS	Acquired immuno-deficiency syndrome
ANC	Ante natal care
ANOVA	Analysis of variance
ARI	Acute respiratory infection
ART	Anti-retroviral therapy
CFA	Confirmatory factor analysis
CFI	Comparative fit index
CHAM	Christian health association of Malawi
CHW	Community health worker
EFA	Exploratory factor analysis
EHP	Essential Health package
GDP	Gross domestic product
GFI	Goodness fit index
HCW	Health care worker
HIV	Human immunodeficiency virus
HPV	Human papilloma virus
HSA	Health surveillance assistant
HSSP	Health sector strategic plan
HTS	HIV testing services
IMCI	Integrated management of childhood illnesses
IOM	Institute of Medicine
KMO	Kaiser-Meyer-Olkin
MDR	Multi-drug resistant (Tuberculosis)
MMR	Maternal mortality ratio
MOH	Ministry of Health
NCD	Non-communicable disease
NGO	Non-governmental organization
NHSRC	National Health Science Research Committee
NTD	Neglected tropical disease
PCAT	Primary care assessment tool
PCAT-Mw	Primary care assessment tool –Malawian version
PFP	Private for profit
PHC	Primary health care
PIH	Partners In Health
PNFP	Private not for profit
PREMS	Patient reported experience measures
QMD	Quality Management Directorate
RMNCH	Reproductive, maternal, neonatal and child health
RMSEA	Root mean square error of approximation
SEM	Structural equation model
TB	Tuberculosis
WHO	World Health Organization
VL	Viral load
ZA PCAT	Primary care assessment tool – South African version

ABSTRACT

Background

Primary care is considered as a vehicle for accelerating progress towards universal health coverage and for building efficient, effective, and integrated healthcare systems. Measuring patients' experience and satisfaction with healthcare services is among Malawi's health sector strategic goals to complement evaluation of clinical health outcomes. However, Malawi does not have validated tools for assessing primary care performance from patients' experience. The purpose of the study was therefore to develop a validated tool for the assessment primary care performance based on patients' experience of care in public health facilities in Malawi.

Study objectives:

1. To develop and validate a Malawian version of a primary care assessment tool (PCAT-Mw)
2. To assess the quality of primary care based on patients' experience in a rural district health system in Malawi.
3. To assess the association between quality of primary care and types of public health facilities in the South West health zone in Malawi.

Methods:

The South African version of the primary care assessment tool was assessed for face and content validity and then translated into Chichewa, a widely spoken local language. The tool was then used in a cross-sectional survey in Neno district, Malawi in August and September 2016. Data on patients' primary care experience and their sociodemographic, healthcare and health characteristics was collected.

Exploratory and confirmatory factor analysis was performed to evaluate internal consistency, reliability and construct validity of items and scales. Likert scale assumption testing and descriptive statistics were done on the final factor structure of the questionnaire. These results were reported in Paper I.

In Paper II, mean scores were derived for the following dimensions: first contact access, continuity of care, comprehensiveness, community orientation and total primary care. Linear regression models were used to assess association between primary care dimension scores and patients' characteristics.

A second survey was conducted in 12 public primary care facilities in Neno, Blantyre and Thyolo districts in July 2018. ANOVA at 0.05 significance level was performed to compare primary care dimension means and total primary care scores. Linear regression models at 95% CI were used to assess associations between primary care dimension scores, patients' characteristics and healthcare setting.

Results:

The validation process used responses of 631 patients representing 97.8% response rate. A tool was constructed comprising seven multi-item scales, representing five primary care dimensions (first contact, continuity, comprehensiveness, coordination and community orientation). All the seven scales achieved good internal consistency, item-total correlations and construct validity. Cronbach's alpha coefficients ranged from 0.66 to 0.91. A satisfactory goodness of fit model was achieved (GFI = 0.90, CFI = 0.91, RMSEA = 0.05, PCLOSE= 0.65).

In Neno, participants reported poor performance in first contact access, relational continuity and comprehensiveness of services available. Acceptable performance was reported in communication continuity, comprehensiveness of services provided and community orientation. Sex, geographical location, self-rated health status, duration of contact with facility and facility affiliation were associated with patients' experience with primary care

A total of 962 respondents represented 96.1% response rate in the second survey. Patients in Neno health centers scored higher than those in Thyolo and Blantyre health centers respectively in total primary care performance. Primary care performance in health centers and in hospital clinics was similar in Neno (20.9 vs 19.0, $p= 0.608$) while in Thyolo, it was higher at the hospital than at the health centers (19.9 vs 15.2, $p<0.001$). Urban and rural facilities showed a similar pattern of performance.

Conclusion:

The PCAT-Mw is a reliable and valid tool to assess core concepts of primary care as seen from patients' perspective in Malawi. PCAT-Mw has dimensions that reflect the attributes of the conventional definition of primary care.

This study reports poor quality of first contact access, comprehensiveness of the services available and relational continuity of care. Communication continuity of care was reported by patients to be acceptable across different settings of primary care.

Several factors were associated with patients' experience of primary care and they included sex, duration of affiliation with facility, reason for seeking care (acute or chronic) increasing self-rated health and the type of primary care facility.

These results showed considerable variation in experiences among primary care users in the public health facilities in Malawi. Factors such as funding, policy and clinic level interventions influence patients' reports of primary care performance. These factors should be further examined in longitudinal and experimental settings.

LIST OF PUBLICATIONS

This thesis is based on the following publications:

Paper I

Dullie L, Meland E, Hetlevik Ø, Mildestvedt T, Gjesdal S. Development and validation of a Malawian version of the primary care assessment tool. *BMC Family Practice*. 2018; 19:63. doi.org/10.1186/s12875-018-0763-0

Paper II

Dullie, L., Meland, E., Mildestvedt, T., Hetlevik, Ø, & Gjesdal, S. (2018). Quality of primary care from patients' perspective: a cross sectional study of outpatients' experience in public health facilities in rural Malawi. *BMC health services research*, 18(1), 872. doi:10.1186/s12913-018-3701-x

Paper III

Dullie L, Meland E, Hetlevik Ø, Mildestvedt T, Kasenda S, Kantema C, Gjesdal S. Performance of primary care in different healthcare facilities: a cross-sectional study of patients' experiences in Southern Malawi. *BMJ Open* 2019;9:e029579. doi: 10.1136/bmjopen-2019-029579

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1. INTRODUCTION

1.1 Context

Malawi is situated in the south east of Africa (Figure 1). The country has a total surface area of 118,484 square kilometers of which about 80% is land. Malawi's fast growing population is currently at 17.4 million people with an average annual growth rate of 2.7%.¹ About 84% of the population lives in the rural areas while 16% lives in urban centers.² Life expectancy was estimated at 63.9 years for both sexes in 2017.³ Malawi's per capita gross domestic product (GDP) in 2015 was approximated to be at USD381.40 with a growth rate of 2.9% in 2016.⁴ An estimated 28% of this GDP is largely based on agriculture, fishing and forestry.³



Figure 1: Map of Malawi showing regions and districts

Available from: https://www.researchgate.net/figure/Map-of-Malawi-showing-the-provinces-and-districts_fig1_241729515

1.2 Organization of health services in Malawi

Public sector provision of healthcare in Malawi is organized into four levels: community, primary, secondary and tertiary. Health surveillance assistants (HSAs), community midwives and community health volunteers provide community based health services at health posts, dispensaries, village clinics, and maternity clinics. These services are delivered through door-to-door visitations, village outreach clinics and mobile clinics.

Primary healthcare is delivered through health centers. Health centers offer outpatient and maternity services and are organized to serve an estimated population of 10,000 or a radius of about 8km. Typically, frontline healthcare providers at health centers include nurses/nurse midwives, medical assistants or clinical officers and HSAs.

District hospitals, community hospitals and hospitals of equivalent capacity belonging to the faith based Christian Health Association of Malawi (CHAM) provide secondary level services. These facilities provide outpatient primary care and inpatient care to their immediate surrounding populations as well as referral services to primary care facilities in their catchment areas. There are usually 1 – 3 non specialist physicians at the district hospitals working with 15 – 25 clinical officers and medical assistants, 40 – 60 nurses/nurse midwives and allied health professionals, such as physiotherapists and laboratory and radiology technicians.

Tertiary care is provided by four central hospitals that are located regionally in the north, center, east and south. They are ideally supposed to provide specialized care and referral services to secondary facilities within their region. However, due to poor coordination in the lower levels, 70% of their services would be more appropriately provided at primary and secondary levels.³

1.3 Providers of healthcare in Malawi

Health services in Malawi are provided by public, private for profit (PFP) and private not for profit (PNFP) sectors.³ The public sector includes health facilities under the Ministry of Health, the Ministry of Natural Resources, Energy and Mining, Ministry of Internal Affairs and Public Security (Police and Prisons) and Ministry of Defence,

and those under district, town and city councils.^{3,5} This sector provides approximately 60% of health services in Malawi which are free-of-charge at the point of delivery.⁶

Approximately 40% of services are delivered by private-not-for-profit (PNFP) and private for profit (PFP) providers. Most of these private providers charge user fees for their services. *The PNFP sector comprises of religious institutions, non-governmental organizations (NGOs), statutory corporations and companies. The major religious providers are organized under the Christian Health Association of Malawi which provides approximately 29% of all health services.*³ The PFP sector in Malawi is currently very small but includes commercial actors as well as the traditional healers and birth attendants.

1.4 The role of primary care in health systems

Primary care is defined as the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of the family and the community.⁷ It is the conventional primary medical care that strives to achieve the goals of primary health care (PHC)⁸ and is the back-bone of efficient, effective, and integrated healthcare systems.⁹ Strong evidence from studies done in both developed and developing countries suggests that effective primary care is associated with improved cost effectiveness, equity of and access to healthcare services, reduced hospitalizations, and better health outcomes.¹⁰⁻¹⁴ Primary care is also seen as a vehicle for accelerating progress towards universal health coverage.^{15,16}

Since the 1978 Alma Ata declaration that identified primary health care as the key to the attainment of the goal of health for all¹⁷, WHO has led calls to the return of the global commitment towards primary healthcare. Its 2008 report, *Primary care: Now more than ever*, the WHO envisions primary health care and health services that are high quality, safe, comprehensive, integrated, accessible, available and affordable for everyone everywhere.⁹

In most African countries, primary care is delivered through a district health system. At primary level facilities, health care workers (HCWs) and community health workers (CHWs) provide integrated preventive and curative services to a

geographically defined population under the supportive supervision of a district hospital and district health management team and with active participation of the community.¹⁸

1.5 The state of primary healthcare in Malawi

As a signatory to global declarations on primary health care such as the 2008 Ouagadougou Declaration¹⁹, Malawi has a health sector strategic plan “that is inspired by the primary health care approach”.³ Although there is no specific primary care policy that defines the gate-keeping role of primary care in Malawi, PHC is implemented through the Essential Health Package (EHP) program which began in 2004.²⁰ Patients are expected to enter the public health system through the primary care level before being referred to the higher levels of care. The EHP is designed to deliver cost-effective interventions targeting the diseases and conditions that make up the majority of the burden of disease in Malawi. These diseases and conditions are grouped into reproductive, maternal, neonatal and child health conditions; communicable diseases and non-communicable diseases and are outlined in the Table 1 below:

Table 1: Categories and intervention packages of the Malawi essential health package.

Category	Intervention package
Reproductive, Maternal, Neonatal and Child Health (RMNCH)	<ul style="list-style-type: none"> ➤ Antenatal care package (ANC) ➤ Modern Family Planning ➤ Safe delivery package
Vaccine Preventable diseases	<ul style="list-style-type: none"> ➤ Rotavirus vaccine ➤ Measles Rubella vaccine ➤ BCG vaccine ➤ Pneumococcal vaccine ➤ Pentavalent vaccine ➤ HPV vaccine
Malaria	<ul style="list-style-type: none"> ➤ Malaria diagnosis ➤ First Line uncomplicated Malaria treatment ➤ Complicated Malaria treatment
Integrated management of childhood illnesses (IMCI)	<ul style="list-style-type: none"> ➤ Diarrheal Disease ➤ Acute respiratory infections (ARI) ➤ Malnutrition ➤ Malaria diagnosis
Community Health Package	<ul style="list-style-type: none"> ➤ Growth Monitoring ➤ Vermin and Vector Control & Promotion ➤ Disease Surveillance ➤ Community Health Promotion & Engagement ➤ Village Inspections ➤ Promotion of hygiene (hand washing with soap) ➤ Promotion of Sanitation (latrine refuse, drop hole covers, solid waste disposal, hygienic disposal of children's stools) ➤ Occupational Health Promotion ➤ Household water quality testing and treatment ➤ Home-based care of chronically ill patients ➤ Child protection
Neglected Tropical Diseases (NTDs)	<ul style="list-style-type: none"> ➤ Case finding and treatment of Trypanosomiasis ➤ Schistosomiasis mass drug administration ➤ Trachoma mass drug administration
HIV/AIDS	<ul style="list-style-type: none"> ➤ Cotrimoxazole for children ➤ Prevention of mother to child transmission (PMTCT) ➤ HIV testing services (HTS) ➤ HIV treatment for all ages: antiretroviral therapy (ART) and Viral load (VL) testing

Nutrition	<ul style="list-style-type: none"> ➤ Vitamin A supplementation in pregnant women ➤ Management of moderate and severe malnutrition in children ➤ Deworming children ➤ Vitamin A supplementation in infants and children 6 – 59 months of age
Tuberculosis (TB)	<ul style="list-style-type: none"> ➤ TB testing ➤ Isoniazid Preventive Therapy for children in contact with TB patients ➤ First line treatment for new TB cases and treatment for retreatment cases for adults and children ➤ Case management of Multi drug resistant (MDR) cases
Oral Health	<ul style="list-style-type: none"> ➤ Management of severe tooth pain, tooth extraction ➤ Management of mild tooth pain, tooth filling
Non-communicable diseases (NCDs)	<ul style="list-style-type: none"> ➤ Treatment of Injuries ➤ Basic psychosocial support, advice, and follow up ➤ Anti-epileptic medication ➤ Treatment of depression (first line) ➤ Testing of pre-cancerous cells (Visual inspection of cervix with acetic acid) ➤ Diabetes Type I and II ➤ Hypertension

1.6 Current efforts to improve primary care in Malawi

There are several efforts that have been put in place by the authorities aimed at improving primary health care in Malawi. The expanded essential health care package now includes non-communicable diseases and continues to be free to all Malawians at the point of care within public sector and most facilities under the PNFP sector.³

Secondly, a decentralization policy program has been rolled out that puts local government authorities to oversee health service governance and the communities to own and participate in the effective delivery of the EHP.²¹ Another effort has been the establishment of the Quality Management Directorate (QMD) within the Ministry of Health (MoH) to lead, fast-track and coordinate quality improvement activities in the health sector. Additionally, *Malawi's medical school established a Family Medicine program to improve the quality of clinical governance, increase access to better*

*quality care, advocate for better allocation of resources for PHC, train and retain more skilled rural healthcare workers.*²² The MoH has also been working with different partners to support service delivery at the district level either as implementing partners or through the support they provide to the local councils. One such partnership is the collaboration between the MoH and the international non-governmental organization Partners In Health (PIH) to develop a model of district health services in Neno.²³ Under this partnership, Neno has the highest per capita health funding in Malawi at nearly 66 US\$²⁴ compared to the national average of 30 US\$³. The additional resources are used to hire extra healthcare workers including community health workers²⁵, to procure supplementary medical supplies and to implement innovative programs in maternal and child health²⁴, HIV care^{26,27}, non-communicable diseases^{28,29}, Kaposi sarcoma treatment and palliative care³⁰, and to ensure financial risk protection for vulnerable patients.³¹ The lessons learnt during implementation of these programs are used to inform national policy dialogues.

With regard to access, more health facilities have been constructed across the country particularly to improve primary care provision. The proportion of the population living within 8km radius of health facility has improved from 81% in 2011 to 90% in 2016.³

1.7 Progress on health indicators

Malawi has recently made notable improvements in the provision of health services as reflected in a number of health outcome indicators. Notable progress was made through efforts that met the millennium development goals for literacy, childhood mortality, HIV and malaria.² Life expectancy at birth has increased from 44.6 and 48.5 years for males and females respectively in 1990³² to 61 and 67 years in 2016.³³ Infant mortality has decreased from 135 deaths per 1,000 live births in 1992 to 42 in 2015-16. During the same time period, under-5 mortality has markedly declined fourfold from 234 to 63 deaths per 1,000 live births.³⁴ Overall, 90% of births are assisted by a skilled provider, the majority by nurses/midwives. The maternal mortality ratio (MMR) for Malawi is 439 deaths per 100,000 live births³ down from

957 in 1990.³⁵ HIV prevalence has also steadily declined from 10.4% in 2010 to 8.8% in 2015.³

1.8 Persisting challenges for the Malawi health system

Despite the noted successes, a number of challenges continue to affect the Malawian health system. Access to health services, equity and financial risk protection are still major challenges.³⁶⁻³⁸ Malawi's health system is also faced with the most severe shortage of healthcare personnel in sub-Saharan Africa with only two (2) physicians and 34 nurse/midwives per 100,000 inhabitants³⁶ Thus mid-level health care providers such as clinical officers and medical assistants form the bulk of the work force as providers of primary care.³⁶ In a recent study in several African countries that included Malawi, staffing levels, staff experience, availability of equipment and facility management were some factors that accounted for the challenges in the quality of primary care.³⁹ There is also need for better coordination among stakeholders in the health sector.⁴⁰

In addition, the Quality Management Directorate (QMD) of the MoH identified the following factors among the main performance gaps that are negatively impacting the quality of healthcare in Malawi: insufficient people-centered care due to poor communication between providers and clients, inadequate client safety mechanisms and deficient research and monitoring/evaluation capacity. Additional challenges included weak leadership, governance and social accountability; inadequate human resource capacity; poor clinical practices and weak health systems.⁴¹

1.9 Study framework

The assessment of primary care performance in this study is based on the American Institute of Medicine (IOM) and the World Health Organization (WHO) conceptual definitions of primary care.^{7,9} Accessibility, continuity of care, coordination of care, comprehensiveness of services and community orientation are core dimensions of effective primary care in this definition. The study uses the Starfield primary care quality theoretical model⁴² as illustrated in Figure 2 which is in itself based on the Donabedian model (Figure 3) for quality of care consisting of structure, process, and outcome.⁴³ The structure of primary care describes its organization, available financial

and human resources, information systems and its governance. The process of primary care is determined by the primary care dimensions while the outcomes of primary care include improved health status, longevity, user evaluation, satisfaction with care, health behavior change, equity, efficiency and safety. The interplay between structural and process elements to bring about the desired outcomes is modified by environmental and patient characteristics. In this study, the core dimensions of primary care are used as the process indicators for quality of primary care. Patients' positive experience reflecting acceptable performance in the core dimensions of primary care is indicative of a high quality delivery system.

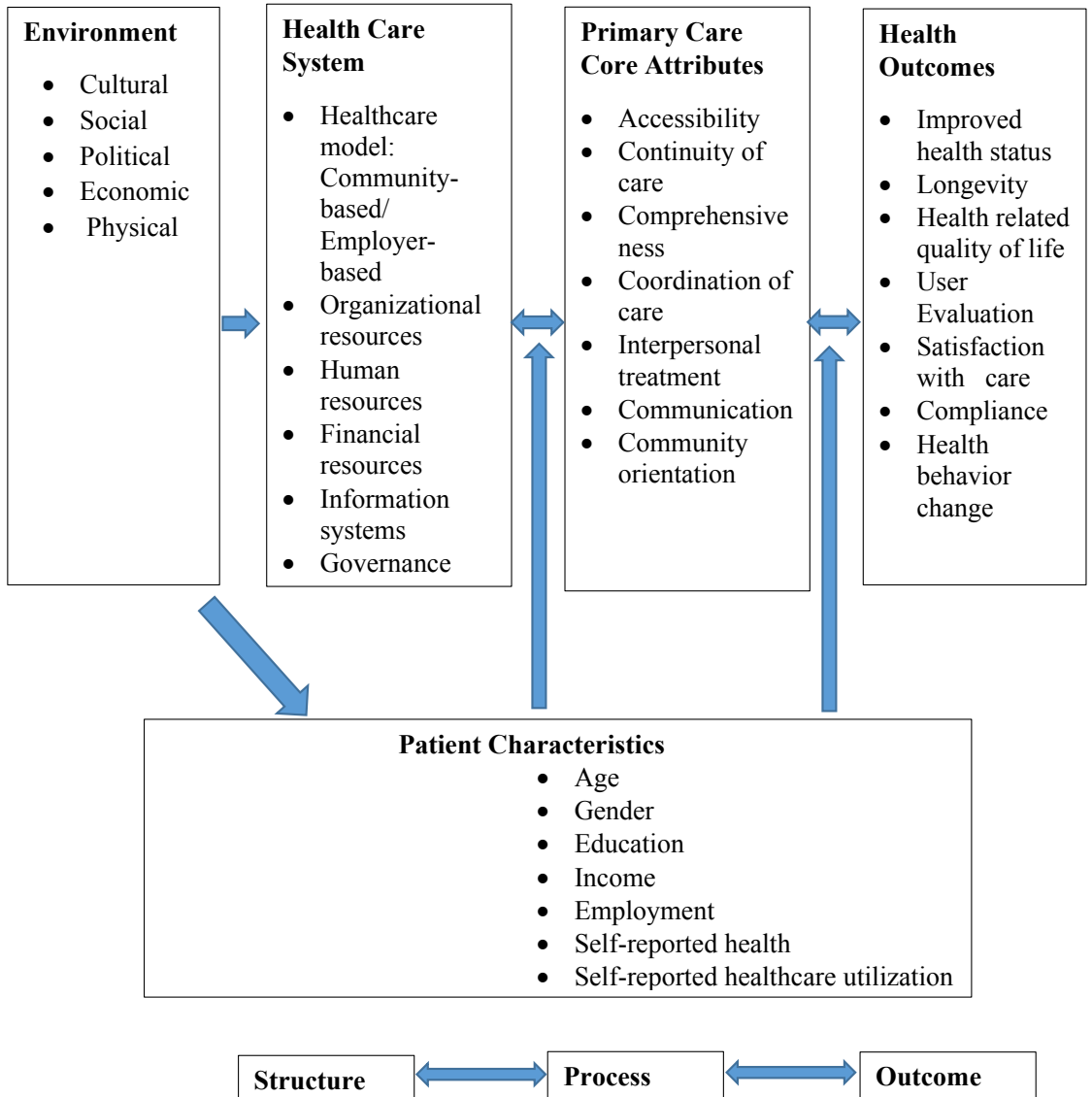
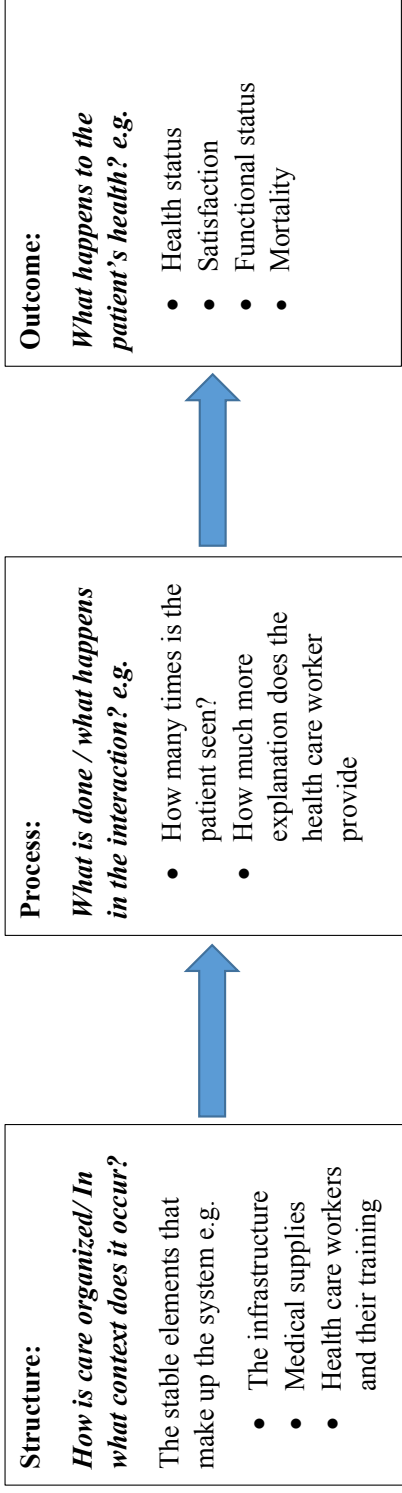


Figure 2: Starfield Primary Care Quality Model⁴²

Figure 3: The Donabedian structure – process – outcome model⁴³

1.10 Defining quality in healthcare

Quality in healthcare is a multi-dimensional concept. Its definition is based on different angles of focus⁴³⁻⁴⁷ the examples of which are:

- based on the scope of the definition of health itself (whether broad or narrow);
- the context in which healthcare is delivered such as hospital care, ambulatory care, community-based care;
- the focus of care whether clinical or interpersonal;
- the perspective that is being considered (whether patient, community, provider, government or payer).

The Institute of Medicine (IOM), defines quality in healthcare as the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.⁴⁸ According to the IOM and WHO core elements of high quality healthcare are safety, effectiveness, accessibility, efficiency, equity, and patient-centeredness.^{45, 49} Patient-centered care is respectful of and responsive to individual patient preferences, needs, and values, and ensuring that patient values guide all clinical decisions.⁴⁴

Many factors affect the quality of primary care within and between countries. Staffing levels, staff experience, availability of equipment and facility management were some factors that accounted for variation in the quality of primary care in several African countries that included Malawi.³⁹ In other studies, the type of health facility affected the quality of primary care received.^{50, 51}

1.11 Measures of primary care quality

Given the primary care quality model, the assessment of primary care quality can be approached from different levels which will be described next.

1.11.1 Structure measures of primary care quality

One approach to assess the quality of primary care is to evaluate the adequacy of its structure that is needed to carry its functions.⁴² This would include its healthcare model: community-based or employer-based, the adequacy of its organizational resources (human and financial), the availability of effective information systems and

the mechanisms of governance to ensure the availability and accessibility of primary care functions to meet population needs. However, the linkage between the structure and the outcomes of care is challenging because there is the need to account for the mediating function of the process of care. Some elements in the structure need to first affect changes in the process of care before influencing the outcomes.⁴²

In Malawi, there are several structural measures that have been put in place to strengthen primary care and support its functions. For example, primary care centers are organized in a way such that each center provides primary care to a defined population in a catchment area that spans 8km radius. The EHP forms the scope of services that are provided. Primary care providers include HSAs and community health volunteers. Additionally, each individual has a patient held medical record called the health passport. These measures aim to improve access, continuity and coordination of care as well as promote community-oriented health services to meet health needs of a defined population.

1.11.2 Process measures of primary care quality

A plan to measure patients' experience with healthcare should be part of the process of establishing and delivering primary care that users need.⁵² Patient reported experience measures (PREMS) facilitate understanding of gaps in the healthcare system.⁵³ PREMS also inform health authorities on trends of quality of care,⁵⁴ and ensure transparency and accountability.⁵⁵ Patient experience is also an important measure of healthcare quality^{56, 57} and positive experiences are associated with better health outcomes.⁵⁸

There has been some debate on the relative advantages of assessing processes versus assessing outcomes in healthcare quality assessment.^{42, 43, 59} Measuring the processes dimensions can provide actionable information about potential sources of deficiencies in care. This creates the opportunity for making timely and targeted interventions possible to improve quality of care in the most efficient and effective way. The process dimensions in primary care include accessibility, continuity of care, comprehensiveness of services, coordination of care, communication and community orientation.

1.11.3 Outcome measures of primary care quality

Outcome signifies the effect of care on the health of individuals, communities and populations. Primary care outcome indicators include improved health status, longevity, health related quality of life, user evaluation, satisfaction with care, compliance and health behavior change in Starfield's model.⁴² The WHO adds improved efficiency and social and financial risk protection to improved health and responsiveness as the overall goals of an effective health system.⁴⁹

Improved health status, longevity, health related quality of life and clinical measures are frequently used as an indicators of the quality of healthcare. The advantages of using outcomes as measures of quality of healthcare include the fact that the validity of outcome measures is often well accepted and that outcomes tend to be fairly distinct and relatively easier to measure precisely. A major limitation of outcome measures is that although they might indicate the combined effect of adequate or poor care, they do not provide any insight into the nature and location of the deficiencies or strengths to which the outcome might be attributed. This makes drawing up of interventions that would improve the situation difficult. There is also often potential for confounding factors that can affect the outcomes of healthcare. In addition, there may be significant lag time before certain outcomes manifest themselves making measurement difficult or limiting the usefulness of the measurement.

1.12 Conceptual and operational definitions

First contact access

First-contact accessibility in this study is defined as the ease with which a person is able to obtain the care (including advice and support) that she or he needs from the practitioner of choice within a time frame appropriate to the urgency of the problem.⁶⁰ In this study, first contact access is measured using items that ask about the ease of patients being attended during off hours and patients' ability to provide feedback regarding the services that they receive.

Continuity of care

Continuity of care here entails the existence of a regular source of care and the longitudinal relationship between primary care providers and patients, in terms of accommodation of patient's needs and preferences, such as communication and respect for patient.⁶¹ It encompasses a therapeutic relationship between a patient and one or more clinicians that spans various health care events and results in accumulated knowledge of the patient and care consistent with the patient's needs.⁶² Continuity of care also includes the ability of the clinician to elicit and understand patient concerns, explain health care issues, and engage in shared decision making, if desired.⁶⁰

This dimension was split into communication continuity and relational continuity of care. Communication continuity referred to the extent to which patient's felt that they were listened to and understood and that providers were friendly and approachable. Relational continuity on the other hand, referred to the extent to which the providers knew their patients as people including their complete medical history, family and social backgrounds entailing an ongoing consistent relationship and a sense of affiliation.

Coordination of care

Coordination of care in this study reflects the ability of primary care providers to facilitate and support patients to navigate use of other levels of health care when needed.⁶³ It includes the degree of direct access for patients to higher health care levels without a referral from a primary care provider and the degree of interest by primary care providers in the care that their referred patients receive. Coordination entails that primary care has a gate-keeping function.

Comprehensiveness of primary care services

Comprehensiveness of primary care services represents the range of services available in primary care to meet patients' health care needs.¹³ A distinction is made between services that are available and those that are actually provided.

Community orientation

Community orientation in this study is defined as the extent to which the primary care providers assess and respond to the health needs of the population in their catchment area.⁶⁰ It is also necessary to demonstrate how the community participates in that process of needs assessment, intervention planning and implementation.

2. STUDY AIM AND OBJECTIVES

2.1 Study rationale

In Malawi, national health policy emphasizes using primary healthcare system as a key strategy to achieve universal health coverage. This is also reflected in the essential health package and health sector strategic plans.

However, little is known about the extent to which the structural measures that have been put in place are impacting the process of primary care. Additionally, little is known about the quality of primary care in Malawi, particularly from the patients' perspective. Primary care is inherently patient-centered and therefore patient experience with care is a central component for evaluating healthcare quality. The available evidence from Malawi indicates problems of access and equity,^{36-38, 64} but no studies were found that measured patient experience with primary care using a multidimensional approach to evaluate primary care quality from the patient perspective. The current study is an attempt to fill this gap.

2.2 Study aim

The main aim of the study was to develop a validated tool which would be used to assess primary care performance based on patients' experience of care in public health facilities in Malawi.

2.3 Study objectives

The study had three objectives whose results were published in three papers.

Study I

To develop and validate a Malawian version of a primary care assessment tool (Paper I).

Study II

To assess the patient health care characteristics associated with the quality of primary care based on patients' experience in a rural district health system in Malawi (Paper II).

Study III

To assess the association between quality of primary care and types of public health facilities in the South West health zone in Malawi (Paper III).

3. METHODS

3.1 Study design

In a cross-sectional study the investigator measures the independent and the dependent variables in the study participants at the same time. Study participants are selected based on the inclusion and exclusion criteria set for the study. Cross sectional studies are often used in surveys to measure the prevalence of a condition or dependent and to assess associations between independent and dependent variables.⁶⁵

This type of study has distinct advantages as well as limitations. Advantages of a cross-sectional study design are that they are relatively quick, cheap and less complex to conduct; data on all variables is only collected once; researchers are measure prevalence for all factors under investigation; multiple dependent and independent variables can be studied simultaneously and that they are good for descriptive analyses and for generating hypotheses.

Limitations of cross-sectional studies include: difficulty in determining whether the independent variable or dependent variable came first and thus the challenge of interpreting identified associations; not being suitable for studying rare diseases or diseases with a short duration; inability to measure incidence and susceptibility to biases such as responder bias, recall bias, interviewer bias and social acceptability bias.

This study design was the most suitable for this study as it allowed for psychometric evaluation through factor analysis of the data collected using a survey to ensure a rigorous validation of the tool. Additionally, multiple dependent variables (primary care dimensions) were assessed as were several health care and socio-demographic characteristics as independent variables.

The papers were based on cross sectional studies with two separate datasets collected at two different time points.

3.2 Study instrument: The Primary Care Assessment Tool

A literature review and metasynthesis of available evidence on primary health care assessment tools identified the primary care assessment set of tools (PCAT) among

the most widely used tools internationally.⁶⁶ The PCAT was originally developed by Starfield and colleagues⁶⁷ at the Johns Hopkins Populations Care Policy Center for the Underserved Populations in Baltimore, Maryland. The tool is based on a theoretical framework of primary care domains and characteristics. It measures the presence and extent of four cardinal dimensions and three related dimensions of primary care and user affiliation with the care source.⁶⁷ Subsequently, the tools have been widely adapted and used in patient surveys in many languages and countries,^{68–77} where their psychometric properties have consistently demonstrated good reliability and validity. The PCATs are useful for describing the adequacy of primary care as received by people (adults and children) and as delivered by practitioners, facilities, and systems.⁷⁸ Based on the 1994 American Institute of Medicine's definition of primary care, the PCATs aim at a global assessment of primary care organizations and their achievements around the core dimensions of accessibility, comprehensiveness, coordination and continuity, and accountability. In addition, the tools also assess derivative dimensions of family orientation, community orientation, and cultural competence. PCATs consist of four modules: Consumer-Client surveys, Facility surveys, Provider surveys, and Health System survey. For each module, there is an expanded version and a short version.

We used the South African version of the expanded adult consumer-client module (ZA-PCAT) for cross cultural adaptation and validation to develop the Malawian version of the PCAT. The ZA-PCAT was developed by a team from Cape Town University.⁷⁷ The South African version was chosen because it was adapted and validated in a health system setting closest and most similar to that of Malawi. The ZA-PCAT questionnaire is similar to the original American PCAT. It has 114 items and it measures the following primary care dimensions: first contact access, first contact utilization, continuity of care, coordination of patient, coordination of care focused on information systems, comprehensiveness of services available, comprehensiveness of services provided, family orientation, community orientation, cultural competence and primary care team. Each item is answered on a 4-point Likert scale where 1 is definitely not; 2 is probably not; 3 is probably; 4 is definitely and has an additional possibility to respond 'not sure'. The questionnaire includes 26

additional questions to determine the user's primary care facility/person and socio-demographic data.

For Papers II and III, we used the Malawian version of the PCAT (PCAT-Mw). The PCAT-Mw (Appendix 1) has 29 items and seven dimensions: first contact access (3 items), communication continuity of care (4 items), relational continuity of care (4 items), coordination (3 items), comprehensiveness of services available (6 items), comprehensiveness of services provided (6 items) and community orientation (3 items). The response structure was the same as in the original PCAT.

3.3 Cross cultural adaptation of the ZA-PCAT

3.3.1 Face and Content validity

The cross cultural validation from ZA-PCAT to PCAT-Mw is illustrated in Figure 4 below. We defined face validity as “the degree to which a measurement instrument looks as though it is an adequate reflection of the construct to be measured.”⁷⁹ Content validity was defined as “the adequacy with which the items of a measure constitute an adequate sample of the content domains that a test is claimed to cover”. Face and content validity of the questionnaire were therefore assessed through a modified Delphi⁸⁰ and nominal group technique process⁸¹ using a panel of 9 experts. The panel included 2 primary care academics from Malawi's sole medical school, 2 primary care policy makers from the Ministry of Health, 2 primary care managers based at the health zone and district respectively, 2 primary health care facility providers and 1 patient representative. The ZA-PCAT was sent to the 9 experts by e-mail. To assess face validity, each expert was asked to indicate whether or not the questionnaire was generally adequate to be used in the Malawian context. To assess content validity, each expert was asked to rate each dimension and item for relevance to the Malawi health system on Likert scale: 5 – highly relevant, 4 – relevant, 3 – not decided, 2 – not relevant, 1- highly irrelevant. Additionally, experts were asked if items were appropriately phrased and if there were additional dimensions or items to be added. Criteria for retention was at least 7 experts scoring 4 and above while exclusion was when at least 7 experts scored 2 or 1. Dimension and items with any other score results, additional new dimensions and items proposed and suggested rephrasing of

items were brought for the nominal group technique session using the same group of experts convened by three of the investigators. During this session, suggested new phrasing and items were discussed and experts were asked to reassess those items that had not achieved adequate consensus during the first round. Results were collated to form the questionnaire that was to be translated.

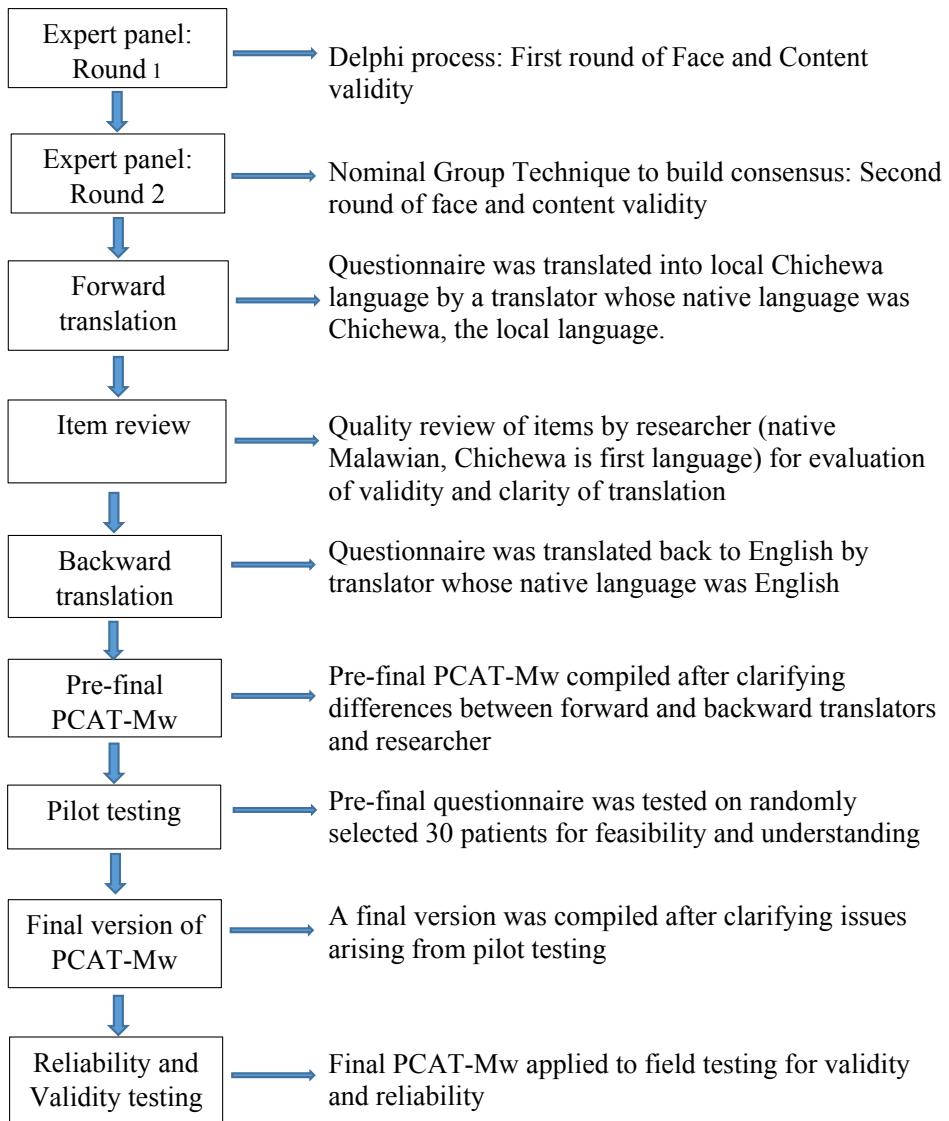


Figure 4: Steps for the cross cultural validation from ZA-PCAT to PCAT-Mw

3.3.2 Translation and cultural adaptation

The PCAT-Mw was going to be administered in Chichewa which is the most widely spoken local language in Malawi. It is used by about 65 % of the population.⁸²

Forward translation was first done by a translator whose native language was Chichewa. A review was then done for clarity of the translation by the principal investigator, a native Malawian with Chichewa as first language. A backward translation was then done by a translator whose native language was English but was fluent in Chichewa and understood the cultural context. Any differences were sorted out through a reconciliation discussion between the translators and the principal investigator.

3.3.3 Feasibility and understanding of the questionnaire- pilot testing

A pilot test involved administering the pre-final questionnaire to 30 randomly selected patients at Neno district hospital out-patient clinic through face-to-face interviews. In addition to responding to the individual item questions, patients were also asked to assess the comprehensibility of the questions, the overall relevance of the items to the Malawi setting and for suggestions of any changes to the wording that was necessary. The pilot study also estimated how long the questionnaire took to complete and the feasibility of carrying interviews in the out-patient clinic. From this phase a version was obtained which was used for the actual field survey.

3.4 Study setting and facilities

The studies were carried out in out-patient clinics of public primary care facilities in the South West health zone in Malawi. The South West health zone includes the districts of Nsanje, Chikhwawa, Mwanza, Neno, Blantyre, Thyolo and Chiradzulu in total serving a population of about 3 million. Two districts were purposefully selected: Neno because it receives the highest per capital funding in Malawi²⁴ due to additional resources from the NGO Partners In Health, and Blantyre was chosen because it has an urban population. The remaining five districts were assigned numbers 1 – 5 by using the alphabetical order of their first letters. The third participating district was selected by using a computer random number generator.

For Papers I and II, data was collected in out-patient clinics of two hospitals and eight health centers in Neno district. Facilities were selected purposefully to include all the public health facilities in the district. For Paper III, data was collected from all the three selected districts. The two hospitals in Neno and the district hospital in Thyolo were purposefully selected on the basis of being the only public hospitals offering primary care within the study area. This allowed for comparison between hospital and health center performance. All public health centers in each district were assigned numbers by using the alphabetical order of their first letters. Participating health centers were selected by using a computer random number generator. In order to ensure comparable numbers of study participants in all the three districts, 2 health centers were selected in Neno, 3 in Thyolo and 4 in Blantyre so that each district had 4 study health facilities.

3.5 Study population, participants and Sample size

The study population included adult patients attending outpatient care in public health centers and hospitals in the selected districts. The study sample was comprised of patients 18 years or older. Respondents must have used their health facility for at least six months and must have visited the facility for at least 3 times in 2 years. Acutely ill, frail looking or severe mental health patients were excluded in order to allow them to receive needed medical attention.

Sample size estimation was done by considering previous observational studies with comparative design.^{69-72,77} For Paper I, the aim was to achieve the minimum 5:1 subject to item ratio^{79, 83} in order to facilitate successful factor analysis for the validation process. As the questionnaire that was used for Papers I and II had 114 items, the target sample size was therefore 600.

For Paper III, the sample size was calculated using the formula:

$$N = \frac{4 (Z_{1-\alpha/2} + Z_{1-\beta})^2}{(\delta/\sigma)^2}$$

where $Z_{1-\alpha/2}$ is the value of the normal distribution corresponding to the probability of a type 1 error of 0.05; $Z_{1-\beta}$ is the value of the normal distribution corresponding to a probability of a type 2 error of 0.8; δ is the difference in the mean of the primary care

score between hospitals and health centers (estimated at 1.5 from previous studies); σ is the standard error of these means. To control for clustering by facility, we multiplied this formula by the design effect: $1 + p(m-1)$, where p is the intra-class correlation and m the number of observations per cluster. Estimated likely means, standard deviations and intra-class correlation were obtained from similar previous studies.⁷⁴ The final sample size target was 900 considering 2.5% incomplete or missing data.

3.6 Data collection

Data collection was done through face-to-face interviewer administered questionnaire from eligible patients in August – September, 2016 for Papers I and II and in July 2018 for Paper III. Six interviewers with prior experience were recruited to conduct the PCAT survey. The interviewers received a two-day training prior to each survey. During the training, pilot surveys provided indication of how long each interview was expected to take. Data collection was done from 7am to 5pm from Monday to Friday at each out-patient clinic supervised by a study coordinator and the principal investigator. The inclusion criteria were used to screen waiting patients for potential study participation. The recruitment of study participants and data collection were done using the following steps: Using the systematic random sampling method, potential subjects were identified through a pre-calculated interval which was based on the expected duration of each interview and the number of waiting patients at the beginning of each day. The interviewer approached the potential subject to introduce him/herself and to administer the screening questions. When the subject was eligible, the interviewer invited her/him to participate in the study and read out the information sheet to her/him including an explanation of the purpose of the study, potential benefits and risks, confidentiality and privacy assurance, voluntary participation and withdrawal notice and expected time to complete the survey. The explanation also included information that there were no costs or compensation for participating in the study. Consenting participants were then asked to sign or put a finger print on a written consent form. If the potential subject did not consent, the next potential subject was approached using the same procedure described above.

3.7 Study variables

The study variables that were used in the observational studies are illustrated in Figure 5 below.

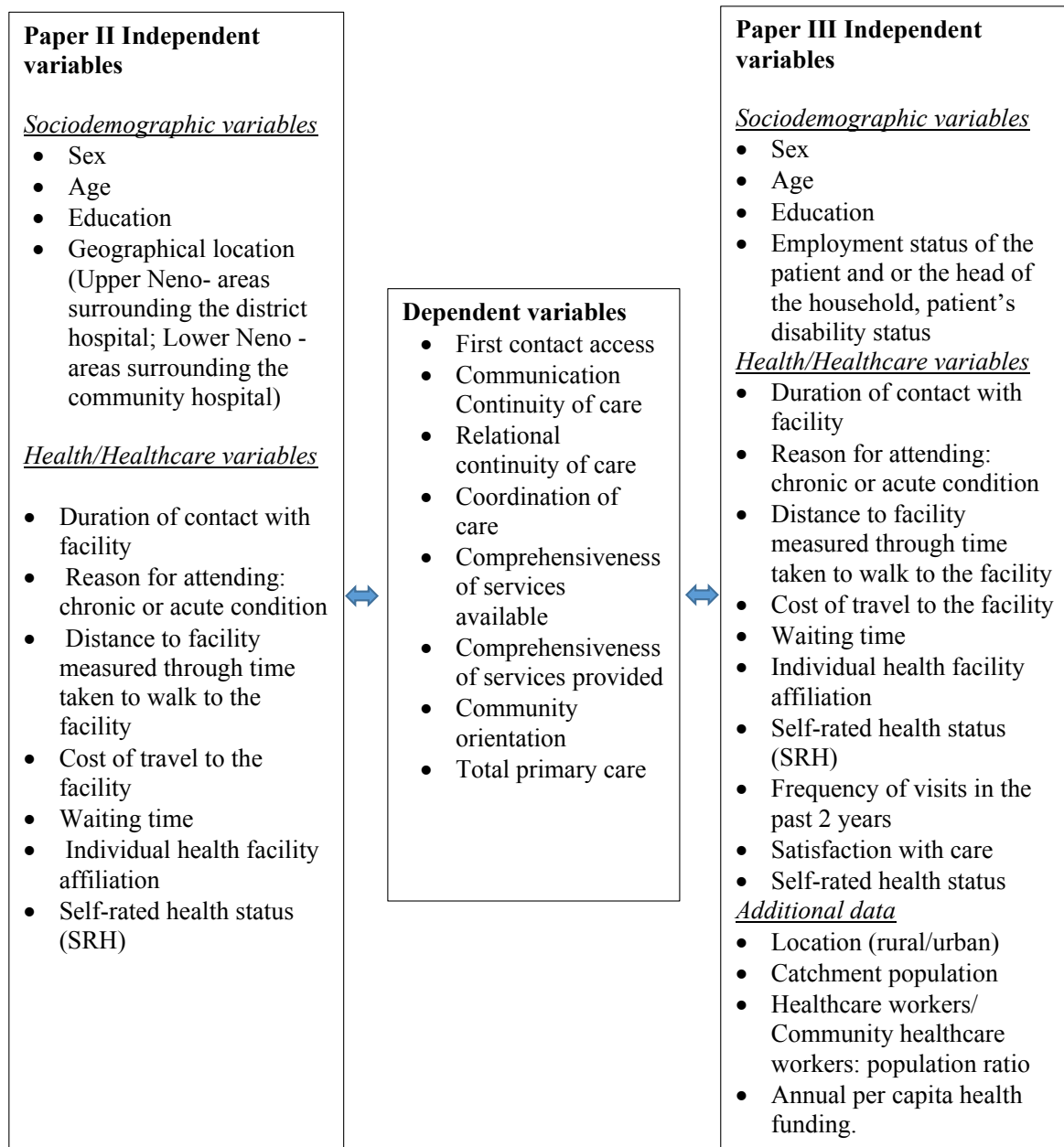


Figure 5: Independent and dependent variables used in the studies reported in Papers II and III.

3.8 Data management and Statistical analyses

Statistical analyses were done using the IBM SPSS Statistics 24.0.0 (2016) package for Papers I and II and the IBM SPSS Statistics 25.0.0 (2017) package for Paper III. IBM Amos Graphics package 24.0.0 (2016) was used for confirmatory factor analysis in Paper I. To ensure consistency with methods used in previous PCAT studies, the “not sure” response was assigned a mid-scale value of 2.5 while the mean item score was used for missing data⁶⁷⁻⁷⁰

Standard descriptive statistical analysis was used for participant characteristics in all the studies and to examine assumptions required by inferential statistics.

Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were used in Paper I. The data was examined for factorability by running a correlation analysis run to ensure sufficient correlation between the items. The data was then split randomly into 50% subsets to allow for exploratory factor analysis with sample 1 and confirmatory factor analysis with sample 2. Adequacy of the sample for EFA was tested by Kaiser-Meyer-Olkin (KMO) statistic and Bartlett’s test for sphericity. The KMO statistic is a measure of the proportion of variance among variables that might be common variance. Scores are put on a range of 0 to 1 and the desirable result is closer to 1. The minimum acceptable value is 0.6.⁸⁴⁻⁸⁶

Bartlett’s test for sphericity compares the correlation matrix to the identity matrix. It is a chi squared test. A significant test confirms that linear combinations exist between the items and that the matrix is suitable for factor analysis.^{87, 88}

Principal axis factoring and varimax rotation were the methods used for factor extraction. Principal axis factoring enables one to explore underlying constructs which cannot be measured directly through items thought to be reflective measures of the construct especially where there are few items per component and low component loadings.⁸³ Item reduction was done by using the scree plot of Eigen values. Further, items were retained when they attained factor loadings of at least 0.32. Items in a construct shared the same underlying meaning and had inter-item correlation between 0.2 – 0.5. Cross loadings of similar significance were also avoided.

Next, Cronbach's alpha and item-total correlation were used to assess internal consistency. The minimum acceptable Chronbach's alpha value of 0.5 was considered adequate.⁸⁹ Within the scale, all the retained items were to exceed the minimum acceptable item-total correlation of 0.30.⁸⁴

Confirmatory factor analysis (CFA) was done using IBM Amos Graphics package 24.0.0 (2016) on sample 2 through structural equation modeling (SEM). This was done in order to confirm the structure of factors derived by the EFA. Maximum likelihood estimation was chosen with output of squared multiple correlations, maximization history, standardized estimates and index modification. The model's overall goodness of fit was assessed using a combination of indices: chi squared test, goodness of fit index (GFI), the root mean square error of approximation (RMSEA), and the comparative fit index (CFI). Some authors advocate for an insignificant chi squared test to show model fitness.⁹⁰ This is known to be unlikely possible especially when a large sample size is used.⁹¹ The GFI is an alternative to the Chi squared test and calculates the proportion of variance that is accounted for by the estimated population covariance. The statistic ranges from 0 to 1 and a minimum cut off of 0.9 is recommended.⁹² RMSEA estimates how well the model would fit the sample if optimal parameters were available and uses the chi squared statistics taking degrees of freedom into account. Values below 0.06 indicate a sufficient fit between the specified model and the data.⁹³ The CFI evaluates the difference between an independent model and a specified model without being affected by the sample size and values >0.9 are acceptable.⁹³

Dimension mean scores were derived by dividing the sum of the item means by the number of items in the dimension. A score ≥ 3 was considered 'acceptable to good performance' and < 3 as 'poor performance'.^{74,76} The sum of all the dimension mean scores provided the total primary care score. Means were compared by independent sample t-tests and ANOVA; proportions by Chi squared tests. Multivariable linear regression models were used to assess association between independent and dependent variables in Papers II and III. The association between type of facility and primary

care performance was carried out after controlling for respondents' sociodemographic and healthcare characteristics.

For all tests, confidence intervals of 95% and a p-value less than 0.05 were used as thresholds of statistical significance.

3.9 Ethical approvals, consent and permissions

Ethical approval for the studies was provided by the Malawi National Health Sciences Research Committee (NHSRC). For Papers I and II, the studies were part of the protocol "Evaluation of Clinical care in Neno" with approval number 1216. The protocol approval number for Paper III was 1993.

District Health Officers and heads of facilities in the respective districts and facilities also provided permission for the studies. Study participants provided written consent after receiving appropriate information on the details of the study. (Appendix 2 and 3)

3 SUMMARY OF RESULTS

3.1 Paper I

Face and content validity

The ZA PCAT was assessed to be generally relevant to the Malawi health system. The ‘primary care team’ dimension was however eliminated while the coordination – health information system dimension was changed to reflect the fact that primary care patients in Malawi use patient held health medical records. The scope of primary care services available and provided were also adapted to the Malawian context. No substantial changes were made after the pilot study except for improvements in translation for better comprehensibility of the questionnaire. The final questionnaire that was used for the field study contained 106 items.

Study participants

The exploratory and confirmatory factor analyses were based on 631 completed questionnaires. Of the total interviewees, 65.1% were female and 74.1% were between 18 - 40 years of age. We found that 75.6% had been in contact with their health center for at least 3 years and 65.9% had visited their health center at least 5 times within two years.

Exploratory factor analysis (EFA)

All the 106 items of the questionnaire showed correlation of at least 0.3 with at least one other item. The KMO measure of sampling adequacy was calculated to be 0.72 and Bartlett’s test of sphericity was significant ($\chi^2(4278) = 10951.7, p < .01$).

Sample 1 yielded 323 questionnaires after randomly splitting the data. Seven common factors were extracted based on principal axis factoring, varimax rotation and Kaiser normalization. These factors were named first contact - access, communication continuity of care, relational continuity of care, coordination, comprehensiveness of services available, comprehensiveness of services provided and community orientation. Table 2 shows dimension and item characteristics following item reduction based on the scree plot of Eigen values and factor loadings of at least 0.32. The distribution of the retained items was as follows: 3 of the 18 items in the first

contact - access dimension, 4 of the 7 items in the communication continuity of care dimension, 4 of the 9 items in relational continuity of care dimension, 3 of the 13 items in the coordination dimension, 6 of the 28 items in the comprehensiveness of services available dimension, 6 of the 19 items in the comprehensiveness of services provided dimension and 3 items from the community orientation dimension.

Table 2 Results of exploratory factor analysis and internal consistency (n =323) of PCAT-Mw

Scale	Number of retained items/ original items	Factor loadings on the scale	Item-total correlation range	Cronbach's alpha
First contact- access	3/18	0.34 – 0.59	0.31 – 0.62	0.66
Continuity of care - communication	4/7	0.36 – 0.62	0.39 – 0.56	0.73
Continuity of care- personal relationship	4/9	0.47 – 0.70	0.53 – 0.63	0.78
Coordination	3/13	0.81 – 0.89	0.78 – 0.87	0.91
Comprehensiveness - services available	6/28	0.34 – 0.52	0.42 – 0.46	0.71
Comprehensiveness - services provided	6/14	0.50 – 0.68	0.43 – 0.59	0.80
Community orientation	3/6	0.41 – 0.57	0.49 – 0.67	0.78
Total	29/95			0.82

Confirmatory factor analysis (CFA)

CFA was done on the remaining 328 questionnaires by performing structural equation modelling (SEM) to confirm the structure of factors derived by the EFA. Covariations were applied between some unique variables. The model produced a satisfactory goodness of fit. The chi squared test was 462.59, $df = 270$ CMIN/df = 1.71, $p =$

<0.001. The GFI was 0.90 and the CFI was 0.91. Finally, the RMSEA was 0.05, PCLOSE= 0.65.

3.2 Paper II

This paper presents results of secondary analysis of the same data used in Paper I. The coordination dimension was omitted in this report because only about 16% of the respondents reported ever being referred for higher level services and this was considered insufficient for analysis.

Primary care dimension scores

Primary care dimension scores are presented in Table 3. Respondents reported good performance in communication continuity of care (3.6), comprehensiveness of services provided (3.2) and community orientation (3.1). The lowest score was in relational continuity of care (2.3), followed by comprehensiveness of services available (2.4) and first contact access (2.8). Female patients scored lower than male patients in all dimensions and the difference was significant in total primary care score ($p = 0.01$), first contact access ($p = 0.021$), relational continuity ($p = 0.044$) and comprehensiveness of services available ($p = 0.017$).

Table 3: Primary care dimension mean scores among patients attending outpatient clinics in Neno district in August -September, 2016 compared between the total sample (N=631), male (n=221) and female patients (n=440).

Primary care dimension	Number of items	Mean scores (SEM)		
		Total	F	M
Sample size		631	410	221
First contact access	3	2.8 (0.03)	2.8 (0.04)	2.9 (0.05)*
Communication continuity	4	3.6 (0.02)	3.6 (0.03)	3.6 (0.04)
Relational continuity	4	2.3 (0.04)	2.2 (0.05)	2.4 (0.07)*
Comprehensiveness				
Services available	6	2.4 (0.03)	2.4 (0.04)	2.5(0.06)*
Services provided	6	3.2 (0.04)	3.1 (0.04)	3.2(0.06)
Community orientation	3	3.1 (0.04)	3.1 (0.05)	3.1(0.07)
Total primary care score	26	17.4 (0.12)	17.2 (0.15)	17.7 (0.21)*

Independent sample T-test p values: * < 0.05

Multivariate analyses of primary care dimensions

Linear regression models were used to assess the association between patient characteristics and total primary care scores. Male patients scored 0.7 points higher than females (95% CI = 0.2, 1.2; p = 0.01) in total primary care. After adjusting for sex and age, the following patient characteristics were found to be significantly associated with total primary care scores: duration of contact with facility of more than 4 years was associated with scores 1.1 points higher (95% CI = 0.4, 1.2; p = 0.003); increasing self-rated health status was associated 0.8 points higher scores at “good health status” (95% CI= 0.1, 1.5; p = 0.034) and 0.9 points for “very good to excellent health status” (95% CI = 0.3, 1.4; p = 0.002). SRH was assessed by the

question ‘would you say your health is?’ on a 5 point Likert scale from very poor to excellent. Acute presentation was associated with 0.6 points lower total score (95% CI = -1.0, -0.1; $p = 0.03$). Patients from the health centers scored significantly below the reference outpatient clinic at the district hospital by points ranging from 0.6 to 2.0. Level of education, distance to the facility, cost of travel to the facility and waiting time were not associated with total primary care scores.

With regard to total primary care scores, the investigated variables explained 10.9% of the noted variance. At the dimension level, the sociodemographic and health care characteristics explained 29.4% of variance in first contact access and 25.2% in comprehensiveness of services available. The explanation of variance was much lower for the other dimensions: 3% in comprehensiveness of services provided, 3.7% in community orientation, 4.4% in relational continuity of care and 5.2% in communication continuity.

3.3 Paper III

This paper presents results from 962 completed questionnaires: 302 in Neno, 301 in Blantyre and 328 in Thyolo districts.

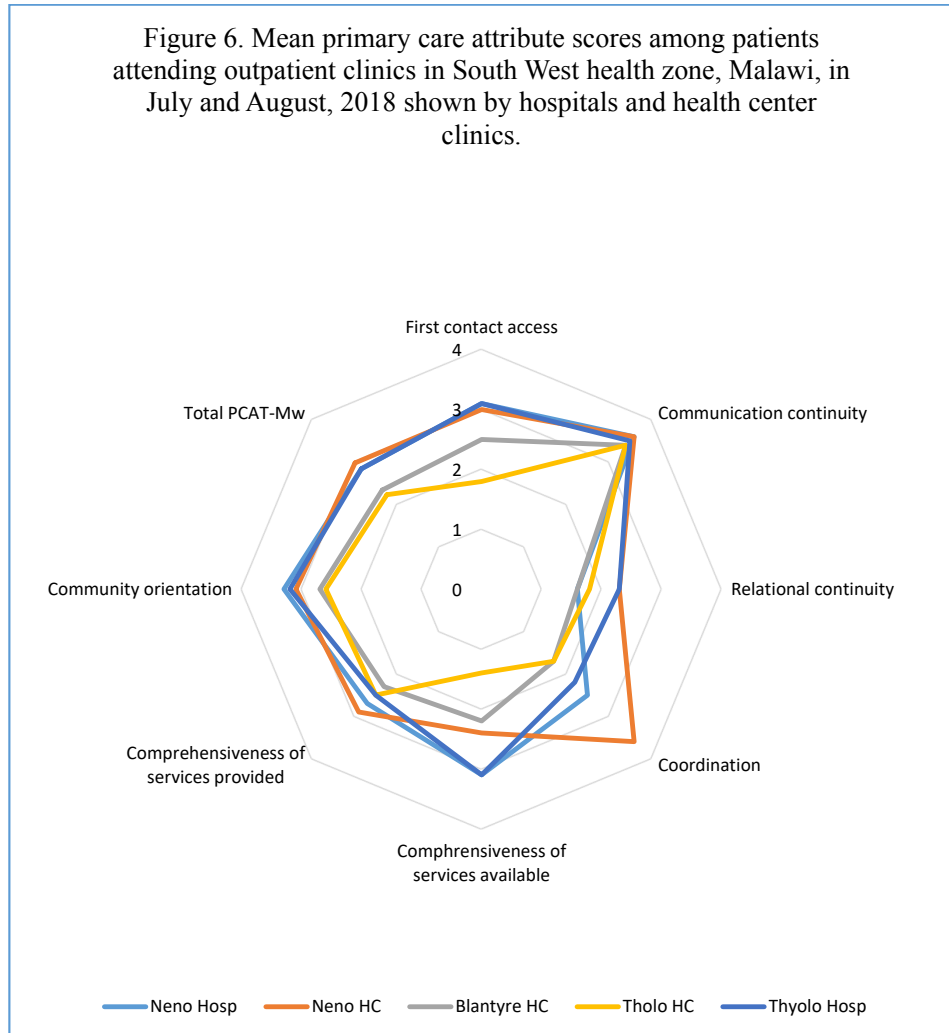
District characteristics

Average per capita healthcare funding during 2017 – 2018 financial year was 60 US\$ for Neno, 22 US\$ for Thyolo and 18 US\$ for Blantyre. Neno had an average of 0.4 facility based healthcare workers and 7.5 community healthcare workers per 1000 population respectively. Thyolo had 0.2 and 0.6 facility based healthcare workers and community healthcare workers per 1000 population respectively while Blantyre had 0.3 and 0.4 facility based healthcare workers and community healthcare workers per 1000 population respectively.

Study participants

Female patients made up 64.0 % of clinic attendees and 82.2% of all respondents were between 18 and 45 years of age. More rural respondents were affiliated to their primary care facilities for longer than 4 years when compared to those from urban facilities (81.1% vs 55.4%). A third of the respondents (32.6%) had five years or less

of education. About 60% of patients in Neno walked for more than 1 hour to their facility compared to 48% in Thyolo and 17% in Blantyre.



As shown in Figure 6, the study showed that performance was most variable between the different facilities in first contact access, coordination and comprehensiveness of services available. Neno health centers performed better than the other facilities in coordination. Performance in communication continuity was good and similar in all

the facilities. Comprehensiveness of services provided was poor in all facilities and ranged from 2.2 (Blantyre) to 2.9 (Neno health centers).

Primary care performance by district

Total primary care performance in Neno was 20.3 (n = 303, 95% CI 20.0, 20.6) compared to both Thyolo and Blantyre at 16.8 (n = 358, 95% CI 16.4, 17.2) and 16.4 (n = 301, 95% CI 16.1, 16.7) respectively (p = <0.01). Thyolo and Blantyre were similar with regard to total primary care performance. Poor performance was reported in all primary care dimensions in Thyolo and Blantyre except for communication continuity (3.4 in both districts). First contact access, communication continuity, coordination and community orientation were acceptable in Neno where poor performance was reported in relational continuity and comprehensiveness of services available and provided.

Primary care performance in rural and urban facilities

The comparison of primary care performance between rural and urban facilities was done by considering health centers in Thyolo and Blantyre. Health centers in both settings reported acceptable performance only in communication continuity (3.4). Both settings reported poor performance in the other dimensions and coordination was lowest (1.7). With regard to total primary care, the score for Blantyre was 16.4 (95% CI 16.1, 16.7) while for Thyolo it was 15.2 (95% CI 14.8, 15.6)

Primary care dimension scores in hospital and health center clinics

The comparison of primary care performance between hospital and health center clinics was done in Thyolo and Neno as Blantyre did not have a comparable public hospital.

Hospitals performed better than health centers in both districts in community orientation and comprehensiveness of services available. Thyolo hospital also performed better in first contact access, relational continuity, coordination and total PCAT-Mw scores than health centers. Coordination and relational continuity were reported better in health centers than hospitals in Neno. Health centers and hospitals

performed equally well in both districts in communication continuity and equally poor in comprehensiveness of services provided.

Association between primary care performance and type of facility

Table 7 shows the results of linear regression models assessing association between types of health facilities and primary care dimension mean scores after adjusting for sociodemographic, healthcare and health characteristics of patients. Patients in Neno hospitals had on average an estimated 3.77 points greater score than those in Thyolo health centers, and 2.87 greater score than those in Blantyre health centers with regard to total primary care. This pattern of performance is also reflected in the dimension mean scores albeit with lower margins, but it is pronounced in coordination of care, first contact access and comprehensiveness of services available. In these dimensions, the studied variables explained 22.4%, 37.7%, 54.4% of the variances observed.

Table 7: Linear regression models assessing association between types of health facilities and primary care dimension mean scores with unstandardized beta values among 962 patients attending outpatient clinics in South West zone, Malawi in July – August, 2018 (adjusted for sociodemographic, healthcare and health characteristics of patients)

	Total Primary care		First contact		Communication continuity		Relational Continuity		Coordination		Services Available		Services Provided		Community Orientation	
	B (SE)	17.12(0.55)	B (SE)	3.10(0.14)	B (SE)	3.47(0.15)	B (SE)	1.77(0.16)	B (SE)	2.96(0.51)	B (SE)	3.05(0.11)	B (SE)	2.39(0.19)	B (SE)	3.37(0.17)
Reference																
Type of Health Facility(Ref: Neno hosp)																
Neno HCs	-0.11(0.33)		-0.07(0.08)		0.02(0.09)		0.66(0.10)**		1.03(0.35)**		-0.68(0.07)**		0.20(0.12)		-0.25(0.10)	
Thyolo HCs	-3.77(0.30)**		-1.35(0.07)**		-0.12(0.08)		0.22(0.09)*		-0.89(0.32)**		-1.64(0.06)**		-0.18(0.11)*		-0.70(0.09)**	
Thylo hospital	0.36(0.35)		-0.03(0.09)		-0.03(0.09)		0.68(0.10)**		-0.37(0.36)		0.04(0.07)		-0.18(0.12)		-0.11(0.11)**	
Blantyre HCs	-2.87(0.31)**		-0.69(0.08)**		-0.17(0.08)*		-0.04(0.09)		-1.10(0.31)**		-0.83(0.06)**		-0.45(0.11)**		-0.70(0.10)**	
R ²	30.0%		37.7%		9.0%		15.7%		22.4%		54.4%		5.7%		14.6%	

*p = <0.05

**p = < 0.01

5. DISCUSSION

5.1 Methodological considerations

This thesis is based on scientific adaptation and validation of a measurement tool and observational cross-sectional studies with two separate datasets collected at two different time points. In this section, methodological considerations relating to observational cross-sectional studies will be discussed first followed by a discussion of the analytical aspects.

5.1.1 Study design

Study I was a scientific adaptation and validation of a measurement tool. Study II and III were observational cross sectional studies. An observational study is a type of study in which individuals are observed or certain outcomes are measured. No attempt is made to affect the outcome.⁹⁴ A cross-sectional study is an observational study in which the independent and dependent variables are determined simultaneously for each subject. The primary limitation of the cross-sectional study design is that because the independent and dependent variables are assessed at the same time, a temporal relationship between the variables cannot be ascertained. That is, although the investigator may determine that there is an association between an independent and a dependent variable, a causal relationship cannot be deduced solely on the basis of the observed association.

5.1.2 Use of Delphi and nominal group techniques in study I

The Delphi technique is a method of congregating expert opinion through a series of iterative questionnaires with a goal of coming to a group consensus. In this study the technique was used to assess the face and content validity of the South African version of the PCAT questionnaire as part of the adaptation process to a Malawian version. There is debate about the reliability of this method. In addition, reaching consensus does not necessarily mean that the correct answer or judgement has been found as the results remain the opinion of that one group of participants or experts in relation to a particular topic at that material time. This process was thus supplemented by the nominal group technique to gain advantage from both techniques.

5.1.3 Precision

Precision refers to the extent to which similar information is elicited when the measurement is repeated.⁹⁴ In observational studies, random variation arises from the subjects in the study, the way in which subjects are sampled, and the way in which variables are measured.⁹⁴

To improve precision, our studies focused on public health facilities to ensure that study participants were as comparable as possible. In addition, data collection was done in similar settings in both studies and across all the facilities.

Further, research assistants underwent training in administering the questionnaire including operational definitions of terms and variables, description of methods and standard procedures. These research assistants were also supervised. Further, the tool that was used was appropriate for the studies. The tool contains sociodemographic and healthcare data as well as items to measure the key variables. The PCAT has been validated for use in many countries and contexts. Although the South African version of the PCAT did not go through rigorous psychometric analysis for validation, we chose to use it as the basis of the validation process because of the similarities in health systems between Malawi and South Africa. In the end, only few of the items from the ZA-PCAT (29 out of 114) proved reliable and valid for the Malawian context. Study II and III used the adapted and validated PCAT-Mw.

5.1.4 Validity

The validity of a research study includes two domains: internal and external validity.

Internal validity

Internal validity is defined as the extent to which the observed results represent the truth in the population one is studying and, thus, are not due to methodological errors.⁹⁵ The internal validity of a study can be affected by many factors, including errors in measurement or in the selection of participants in the study. The factors relevant to this study are discussed individually next.

Structural validity of the questionnaire

The structural validity of the PCAT-Mw was tested with good results by using EFA and CFA (discussed in more detail in a later section). The tool was also used for repeat measurement in one site and by using it again in a wider geographical area at multiple sites where it showed consistent results.

Confounding

Confounding occurs when the observed association can be explained by a third factor that is associated with the exposure and is a determinant of the outcome. The confounding factor exists external to the causal pathway between the exposure and the outcome. The factors identified in our studies only accounted for some explanation for the variances in the different primary care dimension scores. Potential unmeasured factors such as the health care workers' skills, attitude and behaviors were not assessed and might confound the results.

Selection bias

Selection bias in epidemiological studies occurs when there is a systematic difference between the characteristics of those selected for the study and those who are not.⁹⁵ There was potential for selection bias in this study in the way that respondents were selected. First, study I and II were based on data collected in one district. Secondly, because of the absence of a booking system and clinic held patient medical records, potential study participants could only be identified on the actual clinic day while they waited to be attended to. Under these circumstances, randomization was effected by dividing the number of the waiting patients by 15 which was the number of interviews to be completed per day by each research assistant. The result provided the 'nth' number by which respondents would be selected. The research assistants were supervised as much as possible but the potential for selection bias arises because we did not observe all randomization process as it had to be repeated every data collection day. Further selection

bias might have resulted from excluding those who were acutely ill, frail or had severe mental illness and interviewing only patients who attended clinics and might have had better experience than the patients excluded. While the first and second studies were carried out in one district, the subsequent study included more sites in a wider geographical area. Additionally, the response rate for all the studies was exceptionally high thereby minimizing the consequences of selection bias.

Data collection

The questionnaire was administered by research assistants who had prior experience in similar research studies. The research assistants underwent a two-day training in using the questionnaire before the actual interviews. This training included practice interviews with some patients.

The questionnaire was in Chichewa, a widely spoken local language. A pilot study ensured that comprehensibility issues were dealt with prior to the field study. Both research assistants and respondents were fluent in Chichewa and therefore there were no language barrier concerns. Being an interviewer administered questionnaire also allowed for clarification of questions whenever that was needed.

Respondents' participation was voluntary. Collected data did not include names or any identifying details. Only identifier numbers were used to maintain anonymity.

Information bias

This occurs when data is incorrectly recorded in a systematic manner during data collection.⁹⁷ When Likert scales are used, there is potential for central tendency bias, a particular type of information bias. Central tendency bias (sometimes called central tendency error) is a tendency for a rater to place most items in the middle of a rating scale. This was managed through clarifying the questions and their response options to the research assistants during the training. Additionally, the investigators closely supervised the data collection and data entry. Checking of entered data was also done systematically both manually and by using SPSS software.

Recall bias

Recall bias is a systematic error that occurs when participants do not remember previous events or experiences accurately or omit details.⁹⁸ The accuracy and volume of memories may be influenced by subsequent events and experiences. Recall bias is a problem in studies that have self-reporting. It is influenced by the time interval between the event and being asked about it. Other factors that affect recall include age, education, socioeconomic status and how important the experience was to the person.⁹⁹⁻¹⁰³ Recall bias was minimized in this study by emphasizing during the research assistants' training that each study participant was asked in the same way so as not to influence their responses. Additionally, the inclusion criterion that each study participant had a minimum of three visits to their primary care provider was to ensure that the participant had significant experience to report on.

Social desirability bias

Occurs when respondents answer the question in a way that they think the interviewer is expecting or will accept.¹⁰⁴ There was potential for this type of response bias because data collection was done during clinic visits and patients may have attempted to present themselves in the best possible light. Face-to-face interviews are generally prone to this form of bias but offer the advantage of increasing the potential for high participation rate, the possibility to clarify questions and completeness with the filling of the questionnaires. Efforts were also made to emphasize and demonstrate to the respondents that the information they were providing was not going to negatively affect their current or future care. The information remained anonymous and confidential for the clinical staff. The design of the questionnaire response options also presented a wide choice which the respondent would use to represent their true experience.

5.1.5 External validity

External validity deals with the question of external generalizability. External validity refers to the extent to which the results of a study can be applied to patients in daily

practice, especially for the population that the sample is thought to represent.¹⁰⁵ The main factors that affect external validity are representativeness of the study sample and the context in which the study took place. The study is generalizable to the Malawian population because the sample was representative of adult primary care attendees comprising different ages, sex, and other socioeconomic characteristics. There was also a high response rate that exceeded 96% overall. While the validation of the questionnaire was done in one district, generalizability of the questionnaire and the results was enhanced by applying the tool in more facilities in multiple districts in a wider context that included both rural and urban population where study facilities and study participants were identified through systematic random selection.

5.1.6 Some analytical aspects

Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were used for Paper I after dividing the data into sample 1 and 2 at approximately 50%.

EFA is a statistical technique that is used to reduce data to a smaller set of summary variables and to explore the underlying theoretical structure of the phenomena. The analysis started off without any a priori assumption of association between indicators and factors. We used the factor loadings to intuit the factor structure of the data.

CFA seeks to determine if the number of factors and the loadings of measured variables on them conform to what is expected on the basis of pre-established theory. The theory at this stage was the factor structure created by the EFA on sample 1. Sample 2 was subjected to factor analysis to see if the factors would load as predicted, on the expected number of factors. We found that there were too many missing data in the coordination dimension because only about 16% had been referred for higher levels of care. The coordination dimension was therefore omitted from the CFA and was subsequently only used based on the EFA results.

Study II was a secondary analysis using the validated items of PCAT-Mw on the data that was used for validation in Paper I. There is some debate on whether the data used for

validation can also be used simultaneously or in secondary analysis to measure performance.⁷⁹ In primary care measurement studies that have utilized the PCAT, the data that was used for validation of the respective PCAT versions has also been used to measure the primary care performance in those studies.^{70,74,106}

5.2. DISCUSSION OF RESULTS

The PCAT-Mw questionnaire is a tool that has been adapted and validated to assess adult patients' experience of primary care in Malawi. The tool has 29 items in seven scales. The items in the PCAT-Mw measure the four core dimensions of primary care: first contact access, continuity of care, coordination and comprehensiveness of services. It also includes the derivative dimension of community orientation.

Exploratory and confirmatory factor analyses showed that the PCAT Mw achieved acceptable psychometric properties for reliability and validity to assess core concepts of primary care as seen from patients' perspective in Malawi. In a subsequent application of the PCAT-Mw in the South west health zone, we found that the tool provided consistent results on repeated measurement of primary care after a two-year interval.

Overall, study respondents reported poor rating in first contact access, comprehensiveness of services available and provided and relational continuity of care. On the other hand, respondents across the south west zone in different types of health facilities reported good experience with regards to communication continuity of care. The experience of these primary care patients in the public health sector was associated with sex, reason for seeking care (whether acute or chronic), duration of affiliation with the primary care facility, self-rated health status and the type of the facility providing primary care.

5.2.1 Filling a gap in patient experience measurement tools

Patient experience, clinical effectiveness and patient safety are three key components of quality in healthcare.⁴² The Lancet Global Health commission on high quality health systems recently proposed that health systems be judged primarily on their impacts

including, among other things, equitable distribution and processes of care, consisting of competent care and positive user experience.¹⁰⁶ This perception is also shared in the Bellagio Declaration which was endorsed and adopted by several organizations and government ministries of health.¹⁰⁷

However, a recent large study of available primary care facility survey tools in several low and middle income countries that included Malawi, found gaps in the measurement of primary care quality. The authors suggested that new instruments that would integrate indicators of user experience and process measures be developed.¹⁰⁸

Applications of the PCAT-Mw

The PCAT-Mw therefore addresses the need in Malawi for a validated tool that would measure quality of primary care from patients' experience as it incorporates process indicators. The availability of the tool creates the opportunity for primary care implementers, policy makers and researchers to assess the content and organization of primary care in Malawi using reports of patients' experience.

The PCAT-Mw can also be used to set the standards of quality of primary care based on data on patients' experience of service delivery. In this regard, the PCAT-Mw can be used on its own as well as in combination with input based and outcome based measures. This would provide a more comprehensive assessment of the quality of primary care, evaluating its progress and impact of interventions. Similarly, as it was used in South Africa,¹⁰⁹ the tool can be used to bring together providers and users of primary care in identifying gaps and possible approaches to solutions. Additionally, it is possible to use the individual dimensions to assess specific aspects of primary care as was the case in the assessment of comprehensiveness in a Canadian study¹¹⁰ or continuity of care with general practitioners in New Zealand.¹¹¹

Comparing PCAT-Mw and other adapted versions

PCAT-Mw is different in the factor structure from the original PCAT adult expanded version and ZA-PCAT on which adaptation was based. While the original American

version has six scales that represent the four core and three derivative dimensions⁶⁷, the South African version added the derivative dimension of “the primary care team”.⁷⁶ This “primary care team” dimension was not retained at the Delphi consensus stage while “family orientation” and “cultural competence” dimensions did not satisfy metric analysis requirements for retention. Similar results were found in Spanish, Chinese and Korean studies.⁶⁹⁻⁷¹

The PCAT-Mw is significantly shorter than the version on which the cross cultural adaptation was based. The longer versions of the tool took up to 40 minutes to complete.⁶⁷ Adaptation and validation of the PCAT has resulted in shorter versions elsewhere too.^{70,72-74} It is noteworthy to mention that the initial cross cultural validation steps resulted in a questionnaire that had 106 items, closer to the 114 of the ZA PCAT. Most items were subsequently not retained during the item reduction process of EFA. This probably occurred not because the factors were not important to the respondents but rather that the eliminated factors had low discriminative power based on the distribution of the study sample over the response options.

The PCAT-Mw, as did the other shorter versions, still retained strong psychometric properties for reliability and validity, thus making it a more time efficient tool to use. Another advantage of the PCAT-Mw is that its dimensions generally reflect the core components of the definition of primary care as proposed by IOM and WHO.^{47,48} This allows for assessing primary care in its multi-dimensional nature that parallel its formal definition rather than relying on unidimensional proxies for primary care. This is important because a country’s primary care system is determined by the degree of development of a combination of core primary care dimensions in the context of its health care system.^{14, 112}

5.2.2 Primary care performance in south west zone in Malawi

In the first application of the PCAT-Mw in Neno district, our study found that acceptable performance was achieved in community orientation, comprehensiveness of services provided, and communication continuity of care. Poor performance was found in first

contact access, comprehensiveness of services available and relational continuity. In contrast, respondents in a South African study reported acceptable continuity of care and comprehensiveness of services available.¹⁰⁹ Poor performance was reported in first contact access, comprehensiveness of services provided and community orientation in the South African study.

First contact access

There is a perception that poor quality care is now a bigger barrier to reducing mortality than insufficient access to health services.¹⁰⁶ This perception has led to more efforts now focusing on the quality of healthcare services that are provided rather than continuing to improve access to care.

It is self-evident that access is a prerequisite for benefitting from healthcare. Access is fundamental to primary care and has been associated with lower hospitalization rates for ambulatory care sensitive conditions, positive general population health^{13, 113} and reduction in socio-economic and racial disparities in health.^{13, 114}

The results of our study in Malawi, as was the case in South Africa and Brazil, indicate that patients still regard access to primary care as being poor. The items in the first contact dimension sought to ascertain availability of services during the night and the week-ends. Although 90% of Malawians live within 8km of a health facility³, there are still other barriers to access to primary care services that people continue to face. Staff shortage, staff absence, lack of staff housing at the facilities, negative healthcare provider attitude and poor scheduling of available staff may be some of the factors contributing to unavailability of services during off hours.

Comprehensiveness of services available and provided

The study also showed poor performance in comprehensiveness of services available and provided. The EHP is intended to address this particular challenge. The poor performance in this aspect reflects the need to provide an enabling environment for the effective implementation of the EHP. In addition to the factors contributing to poor access,

inadequate staff training and lack of medical equipment and supplies especially at health centers are likely explanations for the deficiencies in providing the services that people need. Notably, these existing challenges point towards gaps in the structure component of the health system. Improving primary care in Malawi will therefore require continued efforts to improve geographical access as well as addressing barriers to availability of services. Adopting competency-based clinical education and providing better support to healthcare workers may also facilitate the delivery of quality health services.

Continuity of care of care

In our study, respondents reported poor experience in relational continuity of care. Continuity of care is a fundamental dimension of primary care¹³ which distinguishes it from specialist care. Continuity of care has been positively associated with coordination of care.¹¹⁵ It has also been consistently related to improved receipt of preventive services.^{116, 117} In addition, there is strong evidence for the relevance of continuity of care to assure high quality care, for example in terms of decreased hospitalizations and improved early diagnoses.^{13, 115}

Consistent presence of a primary care provider and frequent visits with the same primary care provider appear to be prerequisites to establishing an ongoing relationship characterized by mutual accumulated knowledge and personal trust.¹¹⁶ These factors need to be facilitated by positive provider attributes such as technical competence, effective patient-doctor communication and the provider's commitment to patient care.¹¹⁸ In addition, the size of the primary healthcare team in relation to the catchment area and the use of an appointment booking system are some of the health care system factors that have influence on the development of relational continuity.¹¹⁸

Public primary care facilities in Malawi serve a geographically defined catchment population. As a result, most patients had affiliation with their primary care facilities for longer than four years. This provides opportunity to foster relational continuity of care and population based primary care approaches. Population management and stable

patient-team partnership would facilitate continuity of care and set the foundational building blocks of effective primary care systems.¹¹⁹ However, inadequate staffing will probably continue to contribute to poor relational continuity in Malawi until more HCWs are recruited to improve the low patient-provider ratios currently seen in the primary healthcare system. This may be augmented by introducing relevant competencies in the training of primary care workers and providing on-going mentorship. Similar interventions could also be applied to address the short comings in the performance of coordination and community orientation dimensions.

Overall performance

The overall assessment from this study shows acceptable communication continuity of care and poor quality in first contact access, comprehensiveness of services available and provided and relational continuity of care across the three study districts. Poor coordination and community orientation were reported in Thyolo and Blantyre. The dimensions that performed well provide a positive platform from which quality improvement interventions could build on. It is encouraging that despite the challenges the health system is facing, there are some aspects of the primary care services that are working relatively better. The implementation of the Ministry of Health's community health strategy¹²⁰ and the healthcare quality improvement manual⁴¹ which were launched in 2017 and 2018 respectively may contribute to some added progress if well supported with resources.

5.2.3 Factors associated with patients' experience of primary care

Several factors were associated with patients' experience of primary care in our study. These were sex, reason for seeking care (whether acute or chronic), duration of affiliation with facility of greater than four years, self-rated health status and the type of health facility offering primary care.

Sex and primary care experience

Primary care attendees in this study were mostly female and tended to have lower education level. The 2018 Malawi population and housing census report indicates that 51% of the 17.5 million Malawians are female.¹²¹ Literature review of health-seeking behavior studies shows that women consult more frequently than men.¹²² This may explain the larger proportion of female patients observed in this study.

Female patients in this study rated their total primary care experience lower than male patients. A recent study in India found that men and women utilize formal and informal care with different motives and expectations, leading to contrasting health-seeking outcomes.¹²³ Since the women in this study were younger, reproductive health reasons might at least partially explain the gender difference. However, it would be interesting to study if different motives and expectations would also explain the difference in experience between male and female patients in the Malawian context.

Reason for seeking care and primary care experience

Most patients' reason for their primary care visit in this study was seeking care for acute conditions. However, it was care for chronic conditions that was associated with better overall experience. Patients with chronic conditions had regular appointment scheduled visits in organized clinics which were run by regular staff and supported by community health workers.²⁹ Thus the health system attributes comprising consistency of primary care provider and frequent visits with the same primary care provider are likely to have fostered a positive relational continuity which is known to be associated with better patient experience.¹³ It would be interesting to explore if these structural in-puts present in the chronic care clinics really explain the difference in experience of care among patients presenting with acute and chronic conditions. Further, to explore if the primary care experience of patients presenting with acute conditions would improve when offered the same management.

Self-rated health status and primary care experience

Self-rated health status was also associated with patients' experience of primary care in this study. SRH is a widely-used health indicator which has been shown to predict mortality even after adjusting for variables such as age, socio-economic status, as well as other medical, psychological, and behavioral elements.¹²⁴ Mildestvedt et al recently found that modifiable factors amenable to primary care interventions were associated with poor SRH.¹²⁵ Users who rated their health status as 'good' or 'very good' also rated primary care experience better than those who rated their health as 'poor'. Similar findings have been reported in the Korean⁷¹ and South African¹⁰⁹ PCAT studies. Although it is possible that those who rated their health as good or very good had actually benefited from the care itself, the direction of the association cannot be ascertained through the current studies only.

Healthcare inputs and patients' primary care experience

Patients' experience of primary care also varied between different types of health facilities. In this regard, patients' experience was compared between three districts, among rural and urban facilities and between health center and hospital clinics.

There was a significant difference in per capita funding and healthcare workers' density among the three study districts. Thyolo and Blantyre both had per capita funding and healthcare workers' density that were similar to the national averages. Neno had about twice as many core primary healthcare workers, three times the funding and nearly seven times the number of community healthcare workers. Evidence has shown that increase in public healthcare spending has a long-lasting impact in low-resource communities¹²⁶ and is associated with better health outcomes.¹²⁷ In this study, the reported experience of respondents in Thyolo and Blantyre was similar both being lower than the experience of respondents from Neno in overall primary care.

More dimensions were reported to be acceptable in Neno than the other two districts where communication continuity of care was the only dimension that achieved acceptable performance. Neno has also been shown to have better outcomes when compared to other districts in program performance outcomes in maternal and child health²⁴ and HIV care indicators²⁷ in previous studies. The relatively better structural in-puts in Neno have possibly influenced some process indicators resulting in the observed differences in primary care quality. There is however, need to study the situation and outcomes in Neno to better understand the impact of the better funding on population health in general and primary care in particular.

Primary care experience of rural and urban patients

The comparison of quality of care between rural and urban facilities was done by contrasting results from health centers in the three districts. Respondents from Neno health centers reported higher total primary care and acceptable performance in more dimensions compared to respondents from Thyolo and Blantyre health centers. The probable explanation for this difference is likely to be the same factors as noted above.

The rural to urban comparison is therefore clearer when applied to Thyolo's health centers that were rural and Blantyre's urban health centers. The healthcare system was similar as was the pattern of primary care performance. Health centers from both Thyolo and Blantyre performed well in communication continuity of care. Respondents reported poor performance in all the other dimensions. Results from a South African study on organization and performance of primary care also did not show a significant difference in experiences of patients from rural and urban settings.¹⁰⁸ In addition to the similar health system in-puts, the use of standardized protocols and clinical guidelines used by the HCWs who provide primary care may be another reason for the similarity. This shows that it is possible to provide equitable healthcare to both rural and urban communities by ensuring equity in the way resources are distributed.

Hospitals vs health centers and primary care experience

The gate-keeping function in the Malawian health system is performed by health centers as the main providers of primary care. District and community hospitals also provide primary care to the communities within their immediate catchment areas. We therefore used facilities in Neno and Thyolo to compare performance of primary care between hospital and health center clinics. The facilities within the two districts were compared separately to highlight unique performance features between them.

As noted above, funding and human resources distribution in Thyolo is similar to national averages. Respondents from Thyolo district hospital clinic reported higher overall primary care than those from the health centers. The hospital clinic had acceptable performance in first contact access, communication continuity of care, community orientation and comprehensiveness of services available compared to acceptable performance only in communication continuity of care at the health centers.

In most districts in Malawi, the peripheral facilities face more acute challenges than the district hospital. This was highlighted by findings in a qualitative assessment of PHC that found that peripheral facilities experienced inadequate supplies, shortage of personnel, poor quality infrastructure and a lack of transport and communication equipment.⁴⁰ In this study we also found that health centers in Thyolo had fewer healthcare workers than the district hospital. As noted elsewhere, higher public healthcare spending is associated with positive long-lasting impact in low-resource communities¹²⁶ and is associated with better health outcomes.¹²⁷ The distribution of resources is a probable explanation for the difference in primary care performance noted in this context.

The performance of primary care in Neno was comparable between the hospital and health center clinics. The total primary care experience was similar in both settings. Acceptable performance was reported in both settings with regard to the dimensions of first contact access, communication continuity of care and community orientation. Further, comprehensiveness of services available was acceptable at the hospital clinics

while coordination was acceptable at the health centers. Both settings showed poor performance in comprehensiveness of services provided and relational continuity although the latter was significantly higher at health centers than the hospital clinics. Hospital clinics are supported by availability of more senior clinical officers, laboratory and radiology services and thus have wider scope of services available. Smaller facilities tend to favor relational continuity and coordination of care¹²⁸ hence the better performance in health centers in these dimensions.

While primary care performance was comparable at the hospital clinics in both Neno and Thyolo, there was significant variation between the performance of health centers in the two districts. As health centers provide primary care to more people than the hospital clinics, the benefits of effective primary care such as equity, access to healthcare services, reduced hospitalizations, better cost effectiveness and better health outcomes¹⁰⁻¹⁴ are likely to be realized when efforts are made to improve the primary care that health centers provide. The contributing factors for the difference in quality of care between the two districts need to be studied in order to learn from the positive lessons.

Factors not associated with primary care experience

In our study, age, education, cost of travel to the healthcare facility and distance to the healthcare facility were not associated with patients' overall experience of primary care. The differences in primary performance reported by patients from different types of health facilities held true after adjusting for patients' socio-demographic and healthcare characteristics. Studies in Korea, Brazil and South Africa also reported similar lack of association between socio-demographic factors and patients' experience of primary care.^{70, 73,109} This might be attributed to the strength of the questionnaire to accurately measure users' primary care experience independent of such sociodemographic differences among the patients.

5.2.4 Priorities to improve primary care

There is a suggestion of some hierarchical order among the dimensions of primary care as shown by the results of this study. The factors that were assessed explained 54.4% and 37.7% of the variances in comprehensiveness of services available and first contact access respectively. The explained variances were 22.4% for coordination, 15.7% for relational continuity of care and 14.6% for community orientation. In its report on universal health coverage, WHO states that the first objective is that everybody should be able to access a full-range of quality health services.¹²⁹ Kringos et al conclude in a systematic review of the literature on the dimensions of primary care that a hierarchy of importance could be observed consisting of access to primary care services, the comprehensiveness of services available and provided, continuity, and coordination of care.¹⁴

The hierarchical order among the dimensions of primary care as shown by the results of this study are also consistent with the quality of primary care model. Access and comprehensiveness of services largely depend on structural in-puts such as the facility infrastructure, availability of medical supplies, and adequate supply of appropriately trained primary health care workers including community health workers. On the other hand, continuity of care, coordination and community orientation are processes of care.¹³⁰ Improving the quality of primary care in Malawi still needs to focus on improving basic access to services while integrating measures to enhance the quality of the services provided. To achieve this, it will require policy level interventions to address challenges on the primary health care structure side such as the training and deployment of primary care HCW. Process gaps can be addressed through clinic level interventions such as structured and continuous mentorship of primary care providers.

6. CONCLUSION

Existing facility survey tools in low and middle income countries in general and Malawi in particular are inadequate. There is need for new instruments that would integrate indicators of user experience and process measures. The present thesis adapted and

validated a primary care assessment tool in order to more adequately measure quality of primary care through reported patients' experiences. The tool was used for the first time in Malawi and showed that:

The PCAT-Mw is a reliable and a valid tool to assess core concepts of primary care as seen from patients' perspective in Malawi. PCAT-Mw has dimensions that reflect the attributes of the conventional definition of primary care. The tool is simple to use and takes approximately fifteen minutes to complete. It can be used to establish primary care baseline performance and to evaluate performance from patients' perspectives over time or to measure impact after interventions.

Patients in Malawi report facing challenges as they seek primary care especially with regard to first contact access, comprehensiveness of the services available and relational continuity of care. Communication continuity of care was reported by patients to be acceptable across different settings of primary care.

Several factors were associated with patients' experience of primary care and they included sex, duration of affiliation with facility, reason for seeking care (acute or chronic) increasing self-rated health and the type of primary care facility. A probable reason for the performance differences between primary HC facilities is different levels of funding and support leading to varied distribution of HCWs, availability of medical supplies and functional systems.

This study measured the quality of primary care by assessing process indicators. Since there is evidence that improving these indicators is associated with positive health outcomes⁵⁸, targeted interventions aimed at improving patients experience with care is likely to improve overall quality of primary care outcomes. Some process indicators are affected by structural inputs.⁴³ Measures of improving primary care in Malawi will thus need to target both the structure and process levels. Structure level interventions may include:

- a clear policy to reinforce the gate-keeping function of primary care

- deploying clinical officers to replace medical assistants at health centers in order to improve the scope services that can be delivered;
- improved supply of pharmaceutical and medical equipment for primary care services;
- increased funding to support primary care delivery

The above interventions may be augmented by on-going mentorship of primary care providers to reorganize the actual delivery of services, build support systems and improve utilization of data for continuous quality improvement to address the process indicator gaps.

7. IMPLICATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

7.1 Health system implications

There is now a reliable and valid tool that can be used to assess the quality of primary care from patients' perspectives in Malawi. This tool can facilitate quality improvement efforts in the delivery of primary care in several ways. The PCAT-Mw augments existing facility survey tools by adding patient experience indicators. The combination of such comprehensive instruments with health outcome measures would provide a wider scope of primary care assessment. It is also possible to use individual dimension items to evaluate specific elements of primary care. The tool will be useful for measuring baseline primary care performance, identifying existing gaps and evaluating progress and impact of interventions.

Fundamentally, the mere availability of measurement instruments cannot in and out of itself lead to improvement in primary care. There is need to develop and use monitoring and evaluation systems to maximize the potential of the current healthcare improvement efforts.

7.2 Future research questions

This study raised several issues that future research could focus on. Some of those areas are listed below:

- Longitudinal and intervention studies in patients' experience of primary care
- Assessment of primary care performance using the PCAT-Mw on a national scale.
- To investigate the correlation between patient experiences and primary care health outcomes in Malawi
- What are the process of care differences between patients seeking care for acute and chronic conditions and establish if the primary care experience of patients presenting with acute conditions would improve when offered the same management that chronic care patients receive?

- What are the factors contributing to poor performance in first contact access, comprehensiveness of services and relational continuity in primary care in Malawi? What are the best interventions to effect improvement in these dimensions?
- What factors contribute to the difference in primary care experience between male and female patients?
- What factors influence different levels of primary care performance in different districts in Malawi? What is the impact of funding?

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Appendix 1**PRIMARY CARE ASSESSMENT TOOL
MALAWI ADULT VERSION (PCAT-Mw)****English version**

	Name	Signature	Date
Quality check (Interviewer)			
Quality check (Supervisor)			

ADMINISTRATIVE INFORMATION

Interviewer's name: Date.....

Time interview beganTime interview finished

INTRODUCTION/SCREENING QUESTIONS _____ RECRUITING & PURPOSE OF THE SURVEY. Interviewer: Hello, my name is _____ I'm working with other colleagues fromconducting a survey asking patients what they think about the health care they receive. All the information given is private and confidential and will remain anonymous. We are not recording your name and address on the survey form. We only require your name and signature on the consent form to show the (IRB) that we have asked for your permission and you have agreed to be part of the study. Would you be willing to answer a few questions about your experience of health care while you are waiting?

- Yes If Yes, in which language would you prefer to speak? (Go to separate consent form)
- No If No, terminate interview by saying: Thank you for your time. I apologize for any inconvenience.

AFTER CONSENT COMPLETED:

Thank you for agreeing to answer a few questions on your experience of health care. First, I would like to ask you a few general questions before asking about your experience.

A. Extent of your affiliation (relationship) with a primary care place or person (hc/ clinic / hospital / general practice / doctor / nurse)

A1. Where do you usually go when you are ill or need to talk to someone about your health? Please give the name of the place or person:

A2. Is there another place / person you sometimes go for health care?

Yes, Please give the name of the place or person.....

No

A3. Which place / person knows you best regarding your health care? Ring A1 or A2

For the interviewer: 'YOU HAVE BEEN TO THIS HC 3 TIMES OR MORE. ALL THE QUESTIONS ARE ABOUT YOUR EXPERIENCE OF PRIMARY CARE AT THIS HC.'

A4 Which of these can be seen at this HC?

1 Adults only

2 Both children and adults

3 Only certain kinds of problems

4 Most kinds of problems

9 Not sure/don't remember

A5 About how many times in the last 2 years have you been to this HC? Times

A6 How long have you been coming to this HC?

1 Less than 6 months

2 Between 6 months and one year

3 1 - 2 years

4 3 - 4 years

5 5 or more years

6 Not sure/don't remember

A7 Did you choose this HC yourself?

Yes. No Other Not sure/don't remember

A8 Do you come to this HC mainly because of a special medical problem? E.g. Hypertension; Diabetes etc.

Yes. No Other Not sure/don't remember

B. FIRST CONTACT – ACCESS

<i>Please choose the ONE best answer</i>		Definitely	Probably	Probably not	Definitely not	Not sure/Don't remember
B1	When this HC is closed on Saturday and Sunday and you get sick, would someone from here see you the same day?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
B2	When the HC is closed and you get sick during the night, would someone from here see you that night?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
B3	Is there a complaints / suggestion box at this HC?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9

C. COMMUNICATION CONTINUITY OF CARE

<i>Please choose the ONE best answer</i>		Definitely	Probably	Probably not	Definitely not	Not sure/Don't remember
C1	Is the staff friendly and approachable?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
C2	Do you think the staff at this HC understands what you say or ask?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
C3	Are your questions answered in a way that you understand?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
C4	Does this HC give you enough time to talk about your problems or worries?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9

D. RELATIONAL CONTINUITY OF CARE

<i>Please choose the ONE best answer</i>		Definitely	Probably	Probably not	Definitely not	Not sure/Don't remember
D1	Does this HC know you very well as a person, rather than as someone with a medical problem?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
D2	Does this HC know who lives with you?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
D3	Does this HC know your complete medical history?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
D4	Does this HC know about your work or employment?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9

E. COORDINATION OF CARE

E1 Have you ever been referred to a specialist or hospital service? (E.g. Lung or heart specialist doctor)

1 Yes If Yes, what specialist or hospital was it? (Last visit if more than one)

2 No (Skip to question F1)

3 Not sure/don't remember (skip to question F1)

E2 When was the last time you had a visit to a specialist or hospital? Month -----Year -----

E3 Was this specialist visit for a condition that doesn't go away or lasts longer than a year?

1 Yes 2 No

E4 Have you ever visited that specialist or special service before this last visit?

1 Yes 2 No

The following questions E5 – E7 to the specialist or services referred to in E1 above (i.e. answered Yes)

<i>Please choose the ONE best answer</i>		Definitely	Probably	Probably not	Definitely not	Not sure/Don't remember
E5	Does this HC know what the results of the visit were?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
E6	After you went to the specialist or hospital, did this HC talk with you about what happened at that visit?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
E7	Does this HC seem interested in the quality of care that you get from that specialist or hospital?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9

F. COMPREHENSIVENESS OF SERVICES AVAILABLE

Following is a list of services that you or your family might need at some time. For each one, please indicate whether it is available at this HC

<i>Please choose the ONE best answer</i>		Definitely	Probably	Probably not	Definitely not	Not sure/Don't remember
F1	Checking hearing	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
F2	Dental check-up – checking and cleaning your teeth	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
F3	Treatment by dental therapist eg extraction of bad teeth	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
F4	Counseling for mental health problems	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
F5	Plastering of fractures	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
F6	Treatment of ingrown toe nails or removing part of a nail	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9

G. COMPREHENSIVENESS OF SERVICES PROVIDED

The next questions deal with different types of health care services that you sometimes get at this HC

<i>Please choose the ONE best answer</i>		Definitely	Probably	Probably not	Definitely not	Not sure/Don't remember
G1	Advice on wearing reflectors when walking on the road at night	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
G2	How to prevent hot burns	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
G3	Advice about appropriate exercise for you	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
G4	Advice on how to prevent accidental falls	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
G5	Ways to handle family conflict; arguments; disagreements (that may arise from time to time)	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
G6	Possible exposure to harmful substances in your home, at work or in your area e.g. paraffin; pesticides?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9

H. COMMUNITY ORIENTATION

<i>Please choose the ONE best answer</i>		Definitely	Probably	Probably not	Definitely not	Not sure/Don't remember
H1	Do you think this HC knows about the important health problems of your area?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
H2	Does this HC get opinions and ideas from people or organizations with knowledge to help provide better health care? E.g. the local health committee, churches, other organizations?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9
H3	Does this HC do surveys of patients to see if services are meeting the needs of the people?	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 9

I. HEALTH ASSESSMENT

Please check the **one** best answer

I1. Would you say your health is:

- 1 Excellent 2 Very good 3 Good 4 Fair 5 Poor

I2. Do you have any physical, mental, or emotional problem that has lasted or is likely to last longer than one year?

- 1 Yes 2 No 9 Don't know

J. DEMOGRAPHIC & SOCIOECONOMIC CHARACTERISTICS

These are several questions about you and your family.

J1 Sex: 1 Male 2 Female (Tick)

J2 How old are you? _____ Years

J3 What is your home language?

1. Chichewa
2. Chisena
3. Chiyawo
4. Chitmbuka
5. Other
6. Refuse to Answer

J4 Which of the following best describes your work situation now?

1. Employed full-time
2. Employed part-time
3. Self-employed (informal sector)
4. Self-employed (formal sector)
5. Student
6. Homemaker
7. Retired / pensioner
8. Disabled
9. Unemployed
10. Refuse to Answer

J5. What is the highest grade that you finished at school?

1. Did not attend school
1. Std 5 or less
2. Std 6 to 8 (completed primary school with/without certificate)
3. Secondary school with/without school certificate of secondary education
4. Completed technical training
5. Have some college/university education, without completing a degree/diploma
6. Completed a degree or diploma
7. Refuse to Answer

J6. Do you have piped water in your house?

- 1 Yes **If yes, go to J9**
- 2 No
- 3 Refuse to Answer

J7 Do you have piped or protected well water in your yard?

1. Yes **If yes, go to J9**
2. No
- 3 Refuse to Answer

J8 Do you have piped or protected well water nearby?

1. Yes
2. No
- 3 Refuse to Answer

J9 Do you have electricity in your home?

1. Yes
- 2 No
- 3 Refuse to Answer

J10 Which of the following best describes your dwelling?

- 1 Traditional dwelling with grass thatch
- 2 Brick house or house with iron sheets
- 3 Other _____
- 4 Refuse to Answer

J11 Is the head of your household employed?

1. Yes
2. No
- 3 Refuse to Answer

THANK YOU VERY MUCH FOR ANSWERING THESE QUESTIONS TO HELP IMPROVE HEALTH SERVICES

Appendix 2

Information letter (English version)

Adaptation and cross-cultural validation of the Primary Care Assessment Tool – adult expanded version for use in Malawi.

Good Day

My name is.....I would like to invite your participation in a Research Project that seeks to explore your views in relation to various aspects of care that you receive in the primary care facilities in public health facilities.

RECRUITING & PURPOSE OF THE SURVEY.

I'm working with other colleagues conducting a survey asking patients what they think about the health care they receive. All the information given is private and confidential and will remain anonymous. We are not recording your name and address on the survey form. We only require your name and signature on the consent form to show the NHSRC that we have asked for your permission and you have agreed to be part of the study.

Would you be willing to answer a few questions about your experience of health care while you are waiting?

1 Yes

2 No If No, terminate interview by saying: Thank you for your time. I apologize for any inconvenience.

Why are we doing this?

It is important that we seek your perceptions in relation to the care that patients like yourself receive in the primary care facilities. There are a number of efforts underway to improve primary care in Malawi and in order for authorities to know their impact, they need to understand how you feel about the current care you receive as well as the impact of those changes from your perspective. We will use the information that you provide to adapt a tool that will be used to measure the quality of care that patients receive.

Participant selection

We are choosing all those that use these primary care facilities and are willing to take part in the research.

What is expected of the participant?

You will be asked questions which you will respond to. Your responses will be recorded on the questionnaire. It is expected that the interview will last about 45 minutes. The results will inform authorities on the performance of primary care and they will also be published in a peer reviewed medical journal.

May I withdraw from the study?

Your participation is entirely voluntary. You are free to decide whether or not you wish to join the Interview. There will be no consequences to you whether you participate or not. You may withdraw at any time. You will not be victimized in any way.

What are the benefits of participating? Any risks?

Participants will be helping to improve the quality of care they receive from primary care facilities. There are no risks associated with participation in this study.

What about confidentiality?

Please note that your name will not be used in any reports even if demographic details are recorded. We will maintain the confidentiality of the information we collect. Every effort will be made to keep personal information confidential, but absolute confidentiality cannot be guaranteed.

Permission?

Official permission to conduct this research has been granted by the National Health Sciences Research Commission (NHSRC) and from the local authorities. Should you require any information regarding your rights as a research respondent, or have any complaints regarding this study, you may contact the NHSRC Chairperson, on 01789 400 or Dr Luckson Dullie on 088 402 47 49

If you are willing to participate, we request you to sign the formal consent form. A copy of this will be provided to you.

Thank you

CONSENT FORM (ENGLISH VERSION)

Concerning participation in the Research Project:

Adaptation and cross-cultural validation of the Primary Care Assessment Tool – adult expanded version for use in Malawi.

Researchers: Luckson Dullie, Eivind Meland, Øystein Hetlevik, Thomas Mildestvedt, Sturla Gjesdal.

I understand that I have been invited to participate in an interview.

I have heard the aims and objectives of the Research Project that is proposed. I was given opportunity to ask questions and was also given enough time to think about this Research Project. I have not been forced or pushed in any way to take part. I feel clear about the aim of the Research Project.

I understand that taking part in this Research Project is completely voluntary i.e. of my own choice. I know that I may withdraw from it at any time without giving any reasons.

I understand that the researchers will make every effort to keep personal information confidential, but absolute confidentiality cannot be guaranteed.

I know that the results of this Research will be used for scientific and educational purposes, and that may include it being published. I agree to this, provided my privacy is guaranteed.

I hereby agree to participate in this Research Project as per the Information Letter.

.....
Name of participant

.....
Signature of participant

.....
Place

.....
Date

Statement by the interviewer:

I have given written and oral information regarding this Research Project to the participant.

I agree to answer any future questions concerning the Project as best as I am able.

I will adhere to the protocol as it has been approved.

.....
Name of interviewer

.....
Signature

.....
Date

.....
Place

Appendix 3

Information letter (English)

Types of health care facilities and the quality of primary care: a study of experiences of Malawian patients in South West health zone, Malawi.

Good Day

My name is.....I would like to invite your participation in a Research Project that seeks to explore your views in relation to various aspects of care that you receive in the primary care facilities in public health facilities.

RECRUITING & PURPOSE OF THE SURVEY.

I'm working with other colleagues conducting a survey asking patients what they think about the health care they receive. All the information given is private and confidential and will remain anonymous. We are not recording your name and address on the survey form. We only require your name and signature on the consent form to show the NHSRC that we have asked for your permission and you have agreed to be part of the study.

Would you be willing to answer a few questions about your experience of health care while you are waiting?

Yes

No If No, terminate interview by saying: Thank you for your time. I apologize for any inconvenience.

Why are we doing this?

It is important that we seek your perceptions in relation to the care that patients like yourself receive in the primary care facilities. There are a number of efforts underway to improve primary care in Malawi and in order for authorities to know their impact, they need to understand how you feel about the current care you receive as well as the impact of those changes from your perspective.

Participant selection

We are choosing all those that use these primary care facilities and are willing to take part in the research.

What is expected of the participant?

You will be asked questions which you will respond to. Your responses will be recorded on the questionnaire. It is expected that the interview will last about 25 minutes. The results will inform authorities on the performance of primary care and they will also be published in a peer reviewed medical journal.

May I withdraw from the study?

Your participation is entirely voluntary. You are free to decide whether or not you wish to join the Interview. There will be no consequences to you whether you participate or not. You may withdraw at any time. You will not be victimized in any way.

What are the benefits of participating? Any risks?

Participants will be helping to improve the quality of care they receive from primary care facilities. There are no risks associated with participation in this study.

What about confidentiality?

Please note that your name will not be used in any reports even if demographic details are recorded. We will maintain the confidentiality of the information we collect. Every effort will be made to keep personal information confidential, but absolute confidentiality cannot be guaranteed.

Permission?

Official permission to conduct this research has been granted by the National Health Sciences Research Commission (NHSRC) and from the local authorities. Should you require any information regarding your rights as a research respondent, or have any complaints regarding this study, you may contact the NHSRC Chairperson, on 01789 400 or Dr Luckson Dullie on 088 402 47 49

If you are willing to participate, we request you to sign the formal consent form. A copy of this will be provided to you.

Thank you**CONSENT FORM (ENGLISH)**

Concerning participation in the Research Project:

Types of health care facilities and the quality of primary care: a study of experiences of Malawian patients in South West health zone, Malawi.

Researchers: Luckson Dullie, Eivind Meland, Øystein Hetlevik, Thomas Mildestvedt, Stephen Kasenda, Constance Kantema, Sturla Gjesdal.

I understand that I have been invited to participate in an interview.

I have heard the aims and objectives of the Research Project that is proposed. I was given opportunity to ask questions and was also given enough time to think about this Research Project. I have not been forced or pushed in any way to take part. I feel clear about the aim of the Research Project.

I understand that taking part in this Research Project is completely voluntary i.e. of my own choice. I know that I may withdraw from it at any time without giving any reasons.

I understand that the researchers will make every effort to keep personal information confidential, but absolute confidentiality cannot be guaranteed.

I know that the results of this Research will be used for scientific and educational purposes, and that may include it being published. I agree to this, provided my privacy is guaranteed.

I hereby agree to participate in this Research Project as per the Information Letter.

..... Name of participant
Signature of participant

.....
Place Date

Statement by the interviewer:

I have given written and oral information regarding this Research Project to the participant.

I agree to answer any future questions concerning the Project as best as I am able.

I will adhere to the protocol as it has been approved.

.....
Name of interviewer Signature Date Place

Paper I

I

RESEARCH ARTICLE

Open Access

Development and validation of a Malawian version of the primary care assessment tool



Luckson Dullie^{1,2,3*}, Eivind Meland¹, Øystein Hetlevik¹, Thomas Mildestvedt¹ and Sturla Gjesdal¹

Abstract

Background: Malawi does not have validated tools for assessing primary care performance from patients' experience. The aim of this study was to develop a Malawian version of Primary Care Assessment Tool (PCAT-Mw) and to evaluate its reliability and validity in the assessment of the core primary care dimensions from adult patients' perspective in Malawi.

Methods: A team of experts assessed the South African version of the primary care assessment tool (ZA-PCAT) for face and content validity. The adapted questionnaire underwent forward and backward translation and a pilot study. The tool was then used in an interviewer administered cross-sectional survey in Neno district, Malawi, to test validity and reliability. Exploratory factor analysis was performed on a random half of the sample to evaluate internal consistency, reliability and construct validity of items and scales. The identified constructs were then tested with confirmatory factor analysis. Likert scale assumption testing and descriptive statistics were done on the final factor structure. The PCAT-Mw was further tested for intra-rater and inter-rater reliability.

Results: From the responses of 631 patients, a 29-item PCAT-Mw was constructed comprising seven multi-item scales, representing five primary care dimensions (first contact, continuity, comprehensiveness, coordination and community orientation). All the seven scales achieved good internal consistency, item-total correlations and construct validity. Cronbach's alpha coefficient ranged from 0.66 to 0.91. A satisfactory goodness of fit model was achieved (GFI = 0.90, CFI = 0.91, RMSEA = 0.05, PCLOSE = 0.65). The full range of possible scores was observed for all scales. Scaling assumptions tests were achieved for all except the two comprehensiveness scales. Intra-class correlation coefficient (ICC) was 0.90 ($n = 44$, 95% CI 0.81–0.94, $p < 0.001$) for intra-rater reliability and 0.84 ($n = 42$, 95% CI 0.71–0.96, $p < 0.001$) for inter-rater reliability.

Conclusions: Comprehensive metric analyses supported the reliability and validity of PCAT-Mw in assessing the core concepts of primary care from adult patients' experience. This tool could be used for health service research in primary care in Malawi.

Keywords: Primary care, Primary care assessment tool, Patient centeredness, Patient experience, Primary care quality measurement

Background

Evidence from both developed and developing countries indicates that well established primary care is the backbone of effective, efficient and equitable health care delivery systems [1–7]. Investing more in primary health care interventions is likely to accelerate progress towards achieving the sustainable development goal of universal

health coverage [8]. A growing focus is also emerging to investigate primary care performance and organization in different settings using data from patients' assessment of service delivery [9–12].

Malawi is a signatory to global declarations on primary health care and has a health sector strategic plan "that is inspired by the primary health care approach" [13]. Malawi's health system is faced with the most severe shortage of healthcare personnel in sub-Saharan Africa with only two (2) physicians and 34 nurse/midwives per 100,000 inhabitants [14]. Mid-level health care workers

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such as clinical officers and medical assistants form the bulk of the work force as providers of primary care [15]. Most health indicators, while slowly improving, remain poor. Access, equity and financial risk protection are still major challenges [14–16].

There are three levels of health care in Malawi. Primary care consists of dispensaries and health centers which target a coverage radius of 8 km. Secondary level care is provided in district hospitals while tertiary care is delivered in three regional and two mental hospitals. There is an essential health package of services since 2004 that is offered in all public facilities as well as those belonging to the faith based organizations. Patients enter the system at first level and are referred higher up depending on the need [13].

To augment this primary health care structure, Malawi's sole medical school has since 2015 started a specialist family medicine training program to train family physicians who will lead district health systems towards primary health care implementation. This approach is already showing evidence of positive impact on health systems elsewhere in sub-Saharan Africa [17, 18]. Earlier similar findings have come from developed and mid-level emerging countries like China and Brazil [19].

The Ministry of Health in Malawi has established a memorandum of understanding with the non-governmental organization Partners In Health to use the rural district of Neno in the South-west part of the country as a model of primary care delivery. As a result, novel models of primary care interventions are being implemented in the district to reflect program integration of programmatic interventions, [20] community orientation [21] and financial risk protection [22].

As an integral part of these primary care reforms, there is need for assessment of primary care performance in order to describe, compare and follow-up services from patients' perspectives. Several instruments have been developed in order to make this assessment structured and standardized way in different settings [23–27]. Some instruments assess many aspects of primary care services (or key dimensions) whereas others only target specific dimensions, like accessibility or continuity of care [28].

Within primary health care research, the US Primary Care Assessment Tool (PCAT) has been widely adapted and used in patient surveys in many countries including South Africa [29–34]. Based on the 1994 American Institute of Medicine's definition of primary care [35], the PCAT aims at a global assessment of primary care organizations and their achievements around the core dimensions of accessibility, comprehensiveness, coordination and continuity, and accountability. In addition, it also assesses derivative dimensions of family orientation, community orientation, and cultural competence.

The aim of this study was therefore to develop a reliable and valid instrument that could be used to assess primary

care performance from adult patients' perspective of the Malawian health system in order to facilitate future evaluation of health care services and to compare performance and development over time. The Specific objectives were to adapt the South African PCAT (ZA-PCAT) to the Malawian health system and culture, and to analyze its feasibility, reliability and validity.

Methods

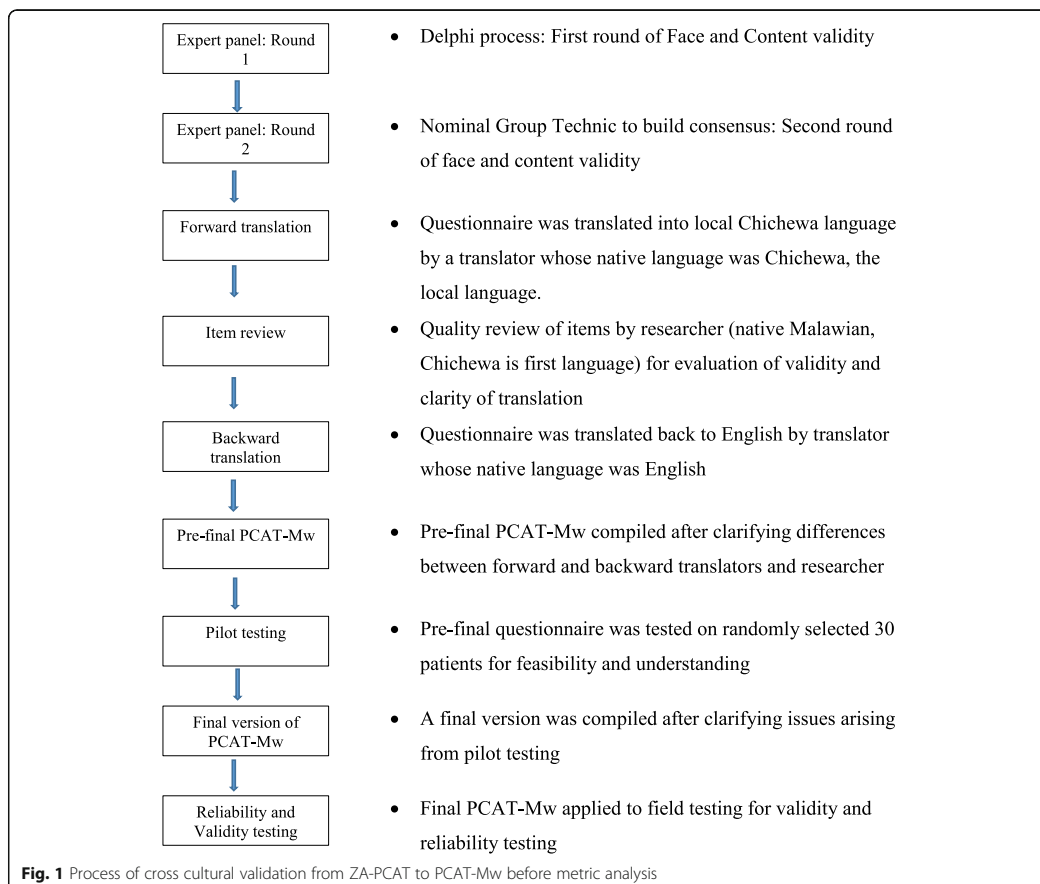
Instrument

The ZA-PCAT questionnaire is similar to the original American PCAT. Through 114 items, it measures eight domains of primary care: first contact (access and utilization), on-going care, coordination (patient care and information systems), comprehensiveness (services available and services provided), family orientation, community orientation, cultural competence and primary care team. Each item is answered on a 4-point Likert-type scale (1 = definitely not; 2 = probably not; 3 = probably; 4 = definitely) with an additional possibility to respond "not sure". The questionnaire includes 26 additional questions to determine the user's primary care facility/person and socio-demographic data. The ZA-PCAT was chosen for the study because of proximity and similarity of health systems to the study setting. Adapted versions of the PCAT have been used to measure primary care organization and performance, and to assess performance of primary care in different settings [9–11].

Face and content validity

The cross cultural validation from ZA-PCAT to PCAT-Mw is illustrated in Fig. 1.

Face and content validity of the questionnaire were assessed through a modified Delphi [36] and nominal group technique process [37] using a panel of 9 experts that included 2 primary care providers, 2 primary care managers, 2 primary care policy makers, 2 Family Medicine academics and 1 patient representative. The ZA-PCAT was sent to the 9 experts by e-mail. To assess content validity, each expert was asked to rate each dimension and item for relevance to the Malawi health system on Likert scale: 5 – highly relevant, 4 – relevant, 3 – not decided, 2 – not relevant, 1- highly irrelevant. Additionally, experts were asked if items were appropriately phrased and if there were additional dimensions or items to be added. Criteria for retention was at least 7 experts scoring 4 and above while exclusion was when at least 7 experts scored 2 or 1. Dimension and items with any other score results, additional dimensions and items proposed and suggested rephrasing of items were brought for the nominal group technique session using the same group of experts convened by three of the investigators. During this session, suggested new phrasing and items were discussed and experts were asked to reassess those items that had not



achieved adequate consensus during the first round. Criteria for inclusion or exclusion were as described above.

For face validity, we used the definition “the degree to which a measurement instrument looks as though it is an adequate reflection of the construct to be measured” [38] and thus asked each expert to indicate whether or not the questionnaire was generally adequate to be used in the Malawian context. Results were collated to form the questionnaire that was to be translated.

Translation and cultural adaptation

Forward translation was done by a translator whose native language was Chichewa, the most widely spoken national language (used by about 65% of the population) which was to be used in the study. A review was done by the principal investigator, a native Malawian with Chichewa as first language for clarity of the translation. A backward

translation was then done by a translator whose native language was English. Any differences were sorted out through a reconciliation discussion between the translators and the principal investigator.

Feasibility and understanding of the questionnaire- pilot testing

Six interviewers with prior experience in patient interviews were trained in the PCAT interviews. The interviewers administered the questionnaire to 30 randomly selected patients at Neno district hospital out-patient clinic. In addition to responding to the items, patients were also asked for comprehensibility of the questions, the overall relevance of the items to the Malawi setting and for suggestions for any changes to the wording. The pilot study also assessed how long the questionnaire took to complete and the feasibility of carrying interviews in the out-patient

clinic. From this phase a version was obtained which was used for the survey.

Data collection, setting and study population

A cross sectional study was carried out in August – September, 2016 in Neno, a rural district in South-West of Malawi with a population of 150,000 people, two hospitals and 11 health centers. Out-patient clinics in the two hospitals and 8 health centers were selected based on high patient volumes. Study participants were at least 18 years of age, must have been using the facility for at least six months and must have visited the facility for at least 3 times. Patients that were acutely ill, frail looking or with severe mental health disorders were excluded in order to allow for the immediate medical attention that they needed. Sample size was calculated based on similar studies using at least 5:1 subject to item ratio [30–34]. Sample size of 600 was targeted. From this it was calculated that each interviewer needed to administer seven questionnaires per day. The sampling frame was the 40–50 patients waiting to be seen on each working day. These patients were asked for permission to participate in the interview with a full explanation of the research purpose and were told that the survey would not influence their consultation. The sampling interval was calculated by dividing the number of available waiting patients by seven. The random starting point was identified using a smart phone random number generator.

Statistical analysis

Data were entered into and analyzed using the IBM SPSS Statistics 24.0.0 (2016) package. For consistency with methods used in PCAT studies in other countries, a mid-scale value of 2.5 was assigned to “not sure” answers while the mean item score was used for missing data [26, 29–31].

First, each item responses were inspected for floor or ceiling effect and a correlation analysis was run to ensure sufficient correlation between the items.

Secondly, the data file was split randomly into 50% subsets to allow for exploratory factor analysis with sample 1 and confirmatory factor analysis with sample 2.

Prior to exploratory factor analysis of sample 1, the overall Kaiser-Meyer-Olkin (KMO) statistic and Bartlett's test for sphericity were calculated to evaluate whether the sample was large enough to perform a satisfactory factor analysis. The KMO statistic is a measure of the shared variance in the items to justify factor analysis. On a range of 0 to 1, the desirable result is closer to 1 and the minimum recommended value is 0.6 [39]. Bartlett's test is a chi squared test whose null hypothesis states that there are no relationships between the items. A significant test confirms that linear combinations exist between the items and that the matrix is suitable for factor analysis [40].

Factor extraction was done through principal axis factoring and varimax rotation. Principal axis factoring was chosen because it allows for the exploration of underlying constructs, which cannot be measured directly, through items thought to be reflective measures of the construct especially where there are few items per component and low component loadings [41]. Theoretically, oblique rotation should be used in the case where factors were assumed to possess underlying correlations [41]. However, the varimax rotation rendered the matrix more reproducible and easier to interpret.

Determining scale structure and item reduction was based on multiple steps. First the scree plot, which is a graphical representation of the factors and their corresponding eigenvalues, was used. Factors above the bend or elbow cut-off point were retained. Additionally, items were retained when they attained factor loadings of at least 0.32, without cross loadings of the same significance and shared the same underlying meaning of construct and had inter-item correlation between 0.2 and 0.5.

Next, internal consistency was assessed by Cronbach's alpha and item-total correlation. For a scale to be considered sufficiently reliable, minimum Chronbach's alpha value of 0.5 is accepted as adequate. Within the scale, all the retained items were to exceed the minimum acceptable item-total correlation of 0.30 [39].

Likert scaling assumptions were tested by assessment of equal item convergence through the range of item-total correlation; domain score reliability through Cronbach's alpha; item-convergent validity through item-scale correlations (minimum 0.3); and item-discriminant validity using scaling success rate (correlation of each item with other items within the same scale being greater than with items from different scales).

Construct validity was analyzed throughout the measures of convergent validity and discriminant validity explained above. Further construct cross-validation was done through confirmatory factor analysis (CFA) using IBM Amos Graphics package 24.0.0 (2016) on sample 2 which was subjected to structural equation modeling. Maximum likelihood estimation was chosen with output of squared multiple correlations, maximization history, standardized estimates and index modification. The model's overall goodness of fit was assessed using a combination of indices: chi squared test, goodness of fit index (GFI), the root mean square error of approximation (RMSEA), and an incremental fit index, the comparative fit index (CFI). Some authors advocate for an insignificant chi squared test to show model fitness [42]. This is known to be unlikely possible especially when a large sample size is used [43]. The GFI was created as an alternative to the Chi squared test and calculates the proportion of variance that is accounted for by the estimated population covariance. The statistic ranges from 0 to 1 and a minimum cut off of 0.9 is

recommended [44]. RMSEA estimates how well the model would fit the sample if optimal parameters were available and uses the chi squared statistics taking degrees of freedom into account. Most authors will accept values below 0.08 but recommend those under 0.06 to indicate a sufficient fit between the specified model and the data [45]. The CFI evaluates the difference between an independent model and a specified model without being affected by the sample size and values > 0.9 are acceptable [45].

Lastly, descriptive statistics were performed for the revised PCAT domains, including the mean, standard deviation, range, skewness and kurtosis. The results of the study were planned for both local and international dissemination through meetings with local authorities, scientific conference presentations and publication in an appropriate journal.

Further reliability tests

A subset of patients had second interviews after 4 weeks to assess consistency of the item scores through intra-rater and inter-rater reliability analysis. To do this 2 of the 10 facilities where data was collected were selected randomly. One was assigned for test –retest intra-rater reliability and patients from this facility were asked to return for a second interview by the same interviewer after 4 weeks. At the inter-rater facility, patients were asked to return after 4 weeks and were interviewed by a different interviewer from the one who did the first. Intra-class correlation coefficient (ICC) was calculated for the sum scores of the domain means of the responses of the participants with the two rounds of interviews to measure intra-rater and inter-rater reliability.

Results

Face and content validity

The ZA PCAT was rated to be generally relevant to the Malawi health system. Table 1 compares the item and domain structures of the ZA PCAT and the initial version of the PCAT-Mw. The general structure and content was largely similar. The modified Delphi and nominal group technique process eliminated the domain “primary care team” and modified “coordination – Health information” because patients in Malawi use patient held health passports for their medical records. There was also substitution of services available and provided to fit context in Malawi.

Pilot study

During the pilot study, it was found that the questionnaire took approximately 45 min to complete. There were no substantial changes suggested by patients to the content of dimensions or items. All items and dimensions were thought to be relevant to the Malawi setting. Suggestions were however made to the local language translation to

Table 1 Comparison of number of items and structure of ZA-PCAT and PCAT-Mw

Parts of the Questionnaire	ZA-PCAT	PCAT-Mw before metric analysis	Final PCAT-Mw
Core domains			
B - First contact: utilization	3	3	
C - First contact: access	19	18	3
D - Continuity of care	15	16 (plus 2 open question)	8
E - Coordination	10	9 (plus 7 open questions)	3
F - Coordination – Health information	3	4	
G - Comprehensiveness			
Services available	28	28	6
H - Comprehensiveness			
Services provided	15	14	6
Ancillary domains:			
I - Family orientation	3	3	
J - Community orientation	6	6	3
K - Cultural competence	5	5	
P - Primary care team	7		
About PC provider information	8	8	8
Socio-demographic data	18	18	18
Core domains (B-H)	93	92	26
All domains (B-P)	114	106	29
Total:	140	132 (plus 9 open questions)	47

improve comprehensibility of items in the continuity dimension. A further suggestion concerned timing of interviews to fit better into normal flow of services as patients were waiting to be attended to.

Study participants

Out of 649 patients approached, 18 (2.8%) declined to participate in the study. These results are based on 631 completed questionnaires. Missing data accounted for approximately 1.9% of all data. Table 2 shows the socio-demographic characteristics of the 631 study participants of which 65.1% were female, 74.1% were under the age of 40 years and 2.7% were above 65 years. Education was generally low with 80.9% having only attended 8 years of primary school or less. We found that 41.7% of the patients were unemployed themselves while 52.5% came from homes where the household head was unemployed. Access to safe water and electricity were major challenges as only 21.9% of households had access to safe water while access to electricity was at 6.3%.

Of the total interviewees, 75.6% had been in contact with their health center for at least 3 years and 65.9%

Table 2 Sociodemographic characteristics of total study subjects (N = 631) and comparison of Sample 1 and 2

	Total sample (N = 631)	Sample 1 (n = 323)	Sample 2 (n = 308)	p value
Gender				
Male	220 (34.9)	110 (34.4)	110 (35.7)	0.37
Female	411 (65.1)	213 (65.6)	198 (64.3)	
Age (years)				
Up to 40	467 (74.1)	242 (74.9)	225 (73.4)	0.33
41–65	146 (23.2)	75 (23.2)	71 (22.9)	
> 65	18 (2.7)	6 (1.9)	12 (3.7)	
Education				
< 5 years of primary school	271 (43.0)	132 (40.9)	139 (45.1)	0.14
6–8 years of primary school	239 (37.9)	128 (39.6)	111 (36.4)	
Attended secondary school	113 (17.9)	60 (18.6)	53 (17.2)	
Post-secondary education	8 (1.3)	3 (0.9)	5 (1.2)	
Employment				
Full time	54 (8.6)	31 (9.6)	23 (7.5)	0.17
Part time	103 (16.3)	52 (16.1)	51 (16.6)	
Self-employed	211 (33.4)	101 (31.3)	110 (35.7)	
Unemployed	263 (41.7)	139 (43.0)	124 (40.2)	
Piped water/protected well nearby within compound or nearby				
Yes	138 (21.9)	69 (21.1)	69 (22.4)	0.35
No	493 (78.1)	254 (78.9)	239 (77.6)	
Electricity in the home				
Yes	41 (6.3)	23 (7.1)	18 (5.8)	0.25
No	590 (93.7)	300 (92.9)	290 (94.2)	
Head of house employment status				
Employed	301 (47.5)	158 (48.9)	143 (46.4)	0.27
Unemployed	330 (52.5)	165 (51.1)	165 (53.6)	
Health status				
Good to Excellent	418 (66.2)	208 (64.4)	210 (68.2)	0.16
Poor to Fair	213 (33.8)	115 (35.6)	98 (31.8)	
Years in contact with HC				
Up to 2 years	154 (24.4)	82 (25.4)	72 (23.4)	0.28
3–4 years	69 (10.9)	30 (9.3)	39 (12.6)	
> 4 years	408 (64.7)	211 (65.3)	197 (64.0)	
Contact times with HC in past 2 years				
0–4 times	215 (34.1)	107 (33.1)	108 (35.1)	0.30
5–9 times	171 (27.1)	81 (25.1)	90 (29.2)	
> 10 times	245 (38.8)	135 (41.8)	110 (35.7)	
Chronic condition				
Yes	254 (39.6)	139 (43.0)	115 (36.7)	0.06
No	377 (60.4)	184 (57.0)	193 (63.3)	

had visited their health center at least 5 times within two years. 39.6% reported having a chronic condition and 33.8% indicated poor to fair health.

Table 2 also shows that the socio-demographic characteristics of sample 1 and 2 had no statistical difference across all parameters.

Exploratory factor analysis (EFA)

Initially, the factorability of the 106 items was examined on the one half of the data set. Firstly, it was observed that all the items correlated at least 0.3 with at least one other item. Secondly, the Kaiser-Meyer-Olkin measure of sampling adequacy was calculated to be 0.72, above the commonly recommended value of 0.6 and Bartlett's test of sphericity was significant (χ^2 (4278) = 10,951.7, $p < .01$). Finally, the communalities were above 0.3 for 101 items, further confirming that most items shared some common variance with others. Given these overall indicators, factor analysis was deemed to be suitable with all 106 items.

Construct validity

Results of the rotated matrix after principal axis factoring, varimax rotation and Kaiser normalization are found in Additional file 1. Seven common factors were extracted based on the initial exploratory factor analysis and were named first contact - access, continuity of care (communication), continuity of care (personal relationship), coordination, comprehensiveness (services available), comprehensiveness (services provided) and community orientation. Initial item reduction was based on the scree test and then retaining items with factor loadings of at least 0.32, items sharing the same underlying meaning of construct without cross loadings of the same significance and inter-item correlation between 0.2 and 0.5. As a result, from the preliminary number of items those retained were as follows: 3 of the 18 items in the first contact - access domain, 4 of the 7 items in the continuity of care (communication) domain, 4 of the 9 items in continuity of care (personal relationship) domain, 3 of the 13 items in the coordination domain, 6 of the 28 items in the comprehensiveness (services available) domain, 6 of the 19 items in the comprehensiveness (services provided) domain and 3 items from the community orientation domain.

As shown in Table 3, factor loadings ranged from 0.34 to 0.89. The coordination domains were analyzed separately to include only those patients that had experienced referral.

Internal consistency

The Cronbach's alpha coefficient results ranged from 0.66 (first contact) to 0.91 (coordination) for all revised multi-item scales. The item-total correlations ranged from 0.31 to 0.87, meeting the acceptable standard of > 0.30 (Table 3).

Likert scale assumptions

Tables 3 and 4 show the results of Likert scaling assumptions using the seven revised multi-item scales. All item-scale correlations were above the accepted minimum (0.30) with the majority being greater than 0.50. All scales demonstrated a relatively narrow range of item-scale correlations. Five of the seven scales showed 100% discriminant validity. The two comprehensiveness available and comprehensiveness provided had items that correlated higher in other scales but were retained because of other favorable metric properties.

Confirmatory factor analysis (CFA)

The structural equation model (SEM) for sample 2 is illustrated in Fig. 2. After allowing for some covariations between unique variables, this model produced a satisfactory goodness of fit to the model: chi squared test = 462.59, $df = 270$, $CMIN/df = 1.71$, $p = < 0.001$, $GFI = 0.90$, $CFI = 0.91$, $RMSEA = 0.05$, $PCLOSE = 0.65$.

Descriptive features of PCAT-mw

Table 5 presents estimates of central tendency, dispersion, and other features of the seven revised scales representing four core primary care principles and one derivative domain. The full range of possible scores was observed for all scales. Continuity (personal relationship) and the two comprehensiveness domains were positively skewed, indicating distributions with more negative ratings of primary care. The other four scales were negatively skewed indicating more positive ratings among patients.

Further reliability

Forty four out of 50 patients (88%) returned for a second interview at the intra-rater reliability chosen facility while

Table 3 Results of exploratory factor analysis^a and internal consistency ($n = 323$) of PCAT-Mw

Scale	Number of retained items/original items	Factor loadings on the scale	Item-total correlation range	Cronbach's alpha
First contact- access	3/18	0.34–0.59	0.31–0.62	0.66
Continuity of care - communication	4/7	0.36–0.62	0.39–0.56	0.73
Continuity of care- personal relationship	4/9	0.47–0.70	0.53–0.63	0.78
Coordination	3/13	0.81–0.89	0.78–0.87	0.91
Comprehensiveness -services available	6/28	0.34–0.52	0.42–0.46	0.71
Comprehensiveness -services provided	6/14	0.50–0.68	0.43–0.59	0.80
Community orientation	3/6	0.41–0.57	0.49–0.67	0.78
Total	29/95			0.82

^aPrincipal axis factoring, varimax rotation

Table 4 Results of item convergent and discriminant validity testing ($n = 323$) of PCAT-Mw

Scale	Number of items	Item- scale correlation	Item- other scale correlation	Scaling success rate (%)
First contact - access	3	0.31–0.65	0.03–0.21	21/21 = 100%
Continuity of care - communication	4	0.46–0.72	0.01–0.41	28/28 = 100%
Continuity of care - personal relationship	4	0.34–0.70	0.10–0.33	28/28 = 100%
Coordination	3	0.69–0.81	0.02–0.41	21/21 = 100%
Comprehensiveness- services available	6	0.33–0.65	0.07–0.39	40/42 = 95%
Comprehensiveness- services provided	6	0.31–0.92	0.03–0.39	46/49 = 94%
Community orientation	3	0.36–0.52	0.05–0.38	21/21 = 100%

42 out of 50 patients (84%) returned for a second interview at the inter – rater chosen facility. A high level of reliability was found between the sum scores of the domain mean scores in both the intra-rater test re-test and the inter-rater reliability. The Intra-class Correlation Coefficient (ICC) for the intra-rater test re-test was 0.90 with a 95% confidence interval (CI) of 0.81–0.95 ($n = 44, p < 0.001$). The ICC for inter-rater reliability was 0.84, 95% CI 0.71–0.96 ($n = 42, p < 0.001$).

The final version of the adult PCAT-Mw questionnaire is attached as Additional file 2.

Discussion

This study developed a 29 item PCAT-Mw with seven scales as a tool for measuring the performance of primary care from adult patients’ experience in the Malawian context. The items in the PCAT-Mw measure the four core dimensions of primary care: first contact - access, continuity of care, coordination and comprehensiveness of services as well as the derivative dimension of community orientation. The PCAT-Mw is significantly shorter making it time efficient in administration and will contribute to the evaluation of primary care performance in Malawi.

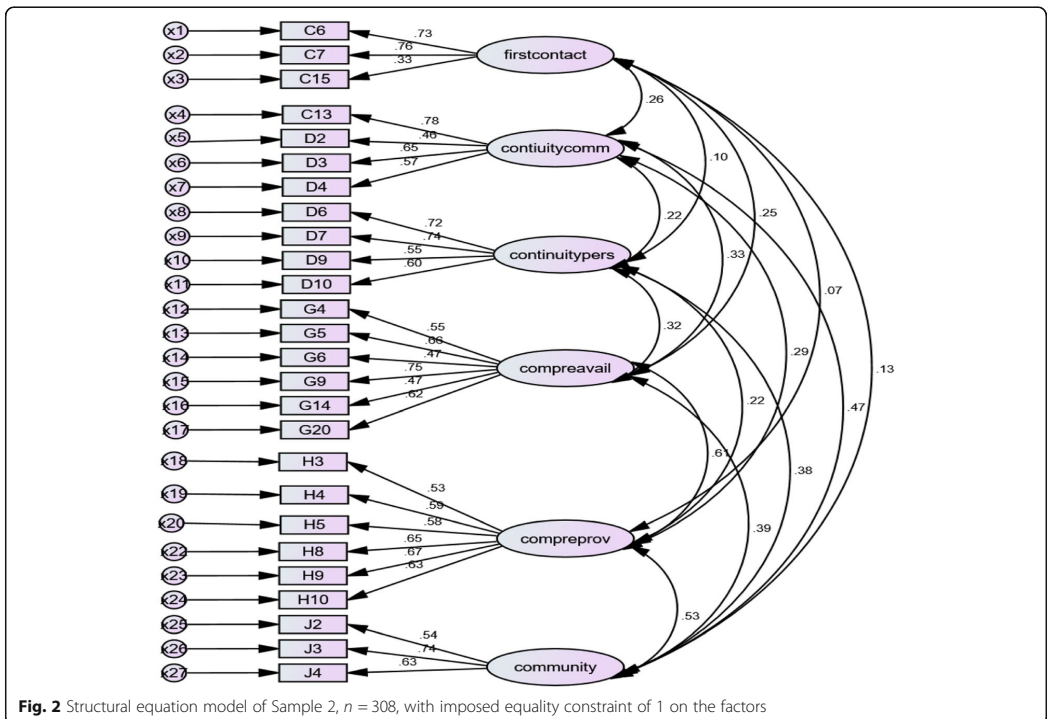


Fig. 2 Structural equation model of Sample 2, $n = 308$, with imposed equality constraint of 1 on the factors

Table 5 Descriptive features of PCAT-M

Scale	Number of items	Mean	Standard deviation	25th percentile	50th percentile	75th percentile	Range	Skewness	Kurtosis
First contact - access	3	8.48	2.44	7	9	10	3–12	-1.62	0.32
Continuity of care-communication	4	14.53	2.53	9	16	16	4–16	-2.18	3.84
Continuity of care- personal relationship	4	9.26	4.26	4	7	16	4–16	0.99	-1.68
Coordination	3	9.64	3.43	8	12	12	3–12	-1.14	-0.54
Comprehensiveness – services available	6	14.5	5.01	7	12	23	6–24	0.38	-1.04
Comprehensiveness – services provided	6	22.25	5.86	15	28	28	7–28	1.09	-0.36
Community orientation	3	11.80	3.79	7	16	16	4–16	-0.65	1.36

Accepted methods of cross-cultural adaptation were carried out on the South African version. The resultant PCAT-Mw underwent standard metric analyses to assess reliability and validity. The high ICC observed for both intra-rater and inter-rater reliability could be due to the fact that the PCAT-Mw measures patients' experience rather than satisfaction with care and that the 4 weeks' interval was optimal for repeat measurements.

The dimension of coordination was not included in the structural equation model (SEM) because of limited data as only 16% of patients reported to have been referred to a higher level of care. However confirmatory factor analysis performed on the items under first contact - access, continuity of care, comprehensiveness of services and community orientation yielded results that indicated that the retained items sufficiently represented the conceptual multidimensional nature of primary care. Models of these core dimensions and the one derivative dimension of community orientation showed satisfactory statistical fit.

This also supports the idea that the creation of effective primary care systems is context dependent and that the strength of a country's primary care system is determined by the degree of development of a combination of core primary care dimensions in the context of its health care system [46, 47]. With regards to Likert scale assumptions, the two comprehensiveness scales had some items that correlated with other scales. However, the other five scales achieved 100% item-other scale discriminant validity, and the other Likert scaling assumptions, including item convergent validity, equal item-scale correlation, and score reliability, were satisfied, which suggests by and large the appropriateness of the usage of the Likert scales in this study which can be used without standardization.

PCAT-Mw is different in the factor structure from the original PCAT adult expanded version and ZA-PCAT on which adaptation was based. The original version consists of four core dimensions represented by six scales and three derivative domains while the South African version has an additional derivative domain "the primary care team". Nonetheless, the final PCAT-Mw scales are consistent with

the theoretical four core principles of primary care. While the domain "primary care team" was eliminated at content validity stage, "family orientation" and "cultural competence" did not satisfy metric analysis requirements for retention similar to other studies [30–32].

There are a number of ways in which a reliable and valid tool such as the PCAT-Mw would be applied in health services research. This study shows that although primary care in Malawi is structured differently, it does conform to the accepted definition and reflects the multi-dimensionality as proposed by the Institute of Medicine [35]. The instrument can be used to assess the content and organization of primary care in Malawi in the regions where Chichewa is the main language. Another application is the use of the PCAT-Mw to set the standards of quality of primary care based on data on patients' experience of service delivery. In this regard, the PCAT-Mw can be used on its own as well as in combination with clinical outcome measures. Users of the PCAT-Mw should review the adequacy and relevance of the comprehensiveness domains to the context in which they are to be applied. Similarly, those items that showed lower item-total correlation may be considered to be used when more information on accessibility is desired.

The study had a number of potential limitations. First is that although an adequate sample size as confirmed by the Kaiser-Meyer-Olkin and Bartlett's test results, the study was carried out in one rural district, which may limit its generalizability to the national scale particularly in those regions where people largely speak another language other than Chichewa. This currently accounts for about 35% of the population. Cross cultural adaption will be needed when another language should be used. Another potential limitation on generalizability is the exclusion of acutely ill, frail and patients with severe mental illness. Further studies should consider different settings to include patients that initially presented with conditions that needed immediate attention to assess their experience of primary care. Second is the potential for recall bias inherent with this nature of studies. The intra-rater and inter-rater reliability tests and the one to one interviewing sought

to ascertain minimal measurement error that would arise from it.

The PCAT-Mw is a new instrument in this setting. However, it is based on a standardized and widely used questionnaire and a full validation procedure was undertaken. Further, future application of the tool in more regions and populations could add to its validation on a wider scale. Future studies could also develop tools for providers, managers and children to provide a comprehensive assessment of primary care as was developed in the original set of tools and could combine this methodology and disease specific quality of care measurement.

Conclusion

This study indicates that the PCAT Mw is a reliable and valid tool to assess core concepts of primary care as seen from patients' perspective in Malawi. It can be used to establish baseline and to compare primary care performance from patients' perspectives over time. Further studies could focus on assessing responsiveness and developing tools for providers, managers and children and to compare measures of patients' experiences with disease specific outcomes in Malawi.

Additional files

Additional file 1: Exploratory factor analysis of PCAT-Mw - Rotated factor matrix after principal axis factoring, varimax rotation with Kaiser normalization. This presents the factor loadings of each item and the number of factors extracted after initial factor analysis. (DOCX 35 kb)

Additional file 2: Primary care assessment tool Malawi adult version (PCAT-Mw). This is the final validated PCAT-Mw with 29 items in English and the local language Chichewa and socio-demographic data and health care questions. (DOCX 188 kb)

Abbreviations

CFA: Confirmatory Factor Analysis; CFI: Comparative Fit Index; CI: Confidence Interval; EFA: Exploratory Factor Analysis; GFI: Goodness of Fit Index; ICC: Intra-class correlation coefficient; PCAT - Mw: Primary Care Assessment Tool – Malawian version; PCAT: Primacy Care Assessment Tool; PCLOSE: *P* value of close fit; RMSEA: Root Mean Squared Error of Approximation; SEM: Structural Equation Model; ZA-PCAT: Primary Care Assessment Tool – South African version

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Authors' contributions

LD conceived, designed and carried out the study, the data analysis and drafting of the paper. EM took part in the development of the study, the

analysis, interpretation of data and critically revised the paper. SG took part in the development of the study, supported interpretation of the results and critically revised the paper. ØH, TM and SG supported interpretation of the results and critically revised the paper. All authors read and approved the final paper.

Ethics approval and consent to participate

Ethical approval for the study was provided by the Malawi National Health Sciences Research Committee as part of the protocol "Evaluation of Clinical care in Neno." The District Health Officer and heads of facilities also provided approval. Study participants provided written consent.

Competing interests

The authors declare that they have no competing interests.

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Paper II

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RESEARCH ARTICLE

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Quality of primary care from patients' perspective: a cross sectional study of outpatients' experience in public health facilities in rural Malawi

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Abstract

Background: Assessing patients' experience with primary care complements measures of clinical health outcomes in evaluating service performance. Measuring patients' experience and satisfaction are among Malawi's health sector strategic goals. The purpose of this study was to investigate patients' experience with primary care and to identify associated patients' sociodemographic, healthcare and health characteristics.

Methods: This was a cross sectional survey using questionnaires administered in public primary care facilities in Neno district, Malawi. Data on patients' primary care experience and their sociodemographic, healthcare and health characteristics were collected through face to face interviews using a validated Malawian version of the primary care assessment tool (PCAT-Mw). Mean scores were derived for the following dimensions: first contact access, continuity of care, comprehensiveness, community orientation and total primary care. Linear regression models were used to assess association between primary care dimension scores and patients' characteristics.

Results: From 631 completed questionnaires, first contact access, relational continuity and comprehensiveness of services available scored below the defined minimum. Sex, geographical location, self-rated health status, duration of contact with facility and facility affiliation were associated with patients' experience with primary care. These factors explained 10.9% of the variance in total primary care scores; 25.2% in comprehensiveness of services available and 29.4% in first contact access.

Conclusion: This paper presents results from the first use of the validated PCAT-Mw. The study provides a baseline indicating areas that need improvement. The results can also be used alongside clinical outcome studies to provide comprehensive evaluation of primary care performance in Malawi.

Keywords: Primary care, Primary care performance, Primary care assessment tool, Patient experience measurement, Health services, Malawi

Background

Measuring patients' experience with care should be part of the process of establishing services and delivering primary care that users need [1]. This facilitates understanding of gaps [2], informs health authorities on trends of quality of care [3], and ensures transparency and

accountability [4]. Patient experience is also an important measure of healthcare quality [5, 6] and positive experiences are associated with better health outcomes [7].

Malawi's health sector strategic plan for 2017 to 2022 is based on principles of primary health care and aspires for patient satisfaction [8]. The country has recently registered notable progress especially in HIV/AIDS and child health indicators [9]. However significant challenges still remain including severe shortage of healthcare workers [10], access, equity [11] and protection of vulnerable people from catastrophic financial burden

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borne in the course of seeking healthcare even though public services are free at the point of care [12].

Malawi does not have a specific primary care policy that defines the gate-keeping role of primary care. However, patients enter the public health system through a primary care level staffed by nurses and mid-level provider medical assistants. Primary care facilities refer patients to district hospitals where, in addition to the mid-level providers, there are two to three physicians typically without any specialization. Tertiary hospitals are located in four regions of the country.

Neno, is a rural district with an estimated population of 170,000. The district is supported by the international non-governmental organization Partners In Health (PIH) to develop a model of district health services. There are two hospitals and seven health centers under the Ministry of Health; four health centers under a faith-based organization and one health center largely for employees of an electricity generation company. Faith-based health facilities charge user fees. With support from PIH, Neno has the highest per capita health funding in Malawi at nearly 66 US\$ [13] compared to the national average of 30 US\$ [8]. The additional resources are used to hire extra healthcare workers and procure supplementary medical supplies. Recent studies from Neno show better health outcomes in maternal and child mortality [13], HIV care [14, 15], Kaposi sarcoma and palliative care [16], and financial risk protection for vulnerable patients [17]. In addition, innovative primary care approaches have been implemented in non-communicable diseases [18, 19] and an extensive structure of community health workers is supporting the health system [20].

Methods

The aim of this study was to evaluate the performance of primary care in Neno based on patients' experience of services. Specifically, the study measured the performance of primary care in Neno through total primary care and dimension mean scores and assessed association between the scores and patients' sociodemographic, healthcare and health characteristics.

The instrument

Within primary health care research, the US Primary Care Assessment Tool (PCAT) has been widely adapted and used in patient surveys in many countries [21–26]. Based on the 1994 American Institute of Medicine's definition of primary care [27] the PCAT aims at a global assessment of primary care organization and its performance in the core dimensions of accessibility, comprehensiveness, coordination and continuity, and accountability. In addition, it also assesses derivative dimensions of family orientation, community orientation, and cultural competence.

The development and validation of the Malawian version of the primary care assessment tool (PCAT-Mw) has been documented in another paper [28]. The tool has 29 items (Table 1) measuring primary care performance in seven dimensions: first contact access (3 items), communication continuity of care (4 items), relational continuity of care (4 items), coordination (3 items), comprehensiveness of services available (6 items), comprehensiveness of services provided (6 items) and community orientation (3 items). First contact access is here defined as the manner in which services are organized to accommodate access whenever needed and ensure patient satisfaction. Continuity of care entails the existence of a regular source of care and the longitudinal relationship between primary care providers and patients, in terms of accommodation of patient's needs and preferences, such as communication and respect for patients. Coordination of care reflects the ability of primary care providers to facilitate and support patients to navigate use of other levels of health care when needed. Comprehensiveness of primary care services represents the range of services available in primary care to meet patients' health care needs. A distinction is made between services that are available and those that are actually provided. Community orientation defines the extent to which the primary care providers understand and address priority health problems in a particular community with evidence of community participation.

Items are scored on a 4-point Likert scale, with 1 indicating "definitely not," 2 indicating "probably not," 3 representing "probably," and 4 representing "definitely." For consistency with methods used in PCAT studies in other countries, a mid-scale value of 2.5 is assigned to "not sure" answers while the mean item score is used for missing data [22–24]. Additionally, there are questions to identify the usual primary care facility the patient uses and the patient's sociodemographic data. This paper excludes the 3 coordination items because insufficient number of patients had been referred for secondary level care.

Setting, study population and data collection

A face to face administered cross sectional study was carried out in August –September, 2016 in outpatient clinics of ten facilities – the two hospitals and eight health centers in Neno district. Facilities were selected purposefully to include all the public health facilities in the district. One of the faith-based health centers was included as it had signed a memorandum of understanding with the authorities to remove the user fees and run as a public facility. Patients were at least 18 years of age, must have used the facility for at least six months and must have visited the facility for at least 3 times. Acutely ill, frail looking or severe mental health patients were excluded in order to allow them to receive urgent medical

Table 1 Validated questionnaire items of the PCAT-Mw

First contact access (3 items)	<ol style="list-style-type: none"> 1. When this HC is closed on Saturday and Sunday and you get sick, would someone from here see you the same day? 2. When the HC is closed and you get sick during the night, would someone from here see you that night? 3. Is there a complaints / suggestion box at this HC?
Communication continuity of care (4 items)	<ol style="list-style-type: none"> 1. Is the staff friendly and approachable? 2. Do you think the staff at this HC understands what you say or ask? 3. Are your questions answered in a way that you understand? 4. Does this HC give you enough time to talk about your problems or worries?
Relational continuity of care (4 items)	<ol style="list-style-type: none"> 1. Does this HC know you very well as a person, rather than as someone with a medical problem? 2. Does this HC know who lives with you? 3. Does this HC know your complete medical history? 4. Does this HC know about your work or employment?
Coordination (3 items)	<ol style="list-style-type: none"> 1. Does this HC know what the results of the visit were? 2. After you went to the specialist or hospital, did this HC talk with you about what happened at that visit? 3. Does this HC seem interested in the quality of care that you get from that specialist or hospital?
Comprehensiveness of services available (6 items)	<ol style="list-style-type: none"> 1. Checking hearing 2. Dental check-up – checking and cleaning your teeth 3. Treatment by dental therapist eg extraction of bad teeth 4. Counseling for mental health problems 5. Plastering of fractures 6. Treatment of ingrown toe nails or removing part of a nail
Comprehensiveness of services provided (6 items)	<ol style="list-style-type: none"> 1. Advice on wearing reflectors when walking on the road at night 2. How to prevent hot burns 3. Advice about appropriate exercise for you 4. Advice on how to prevent accidental falls 5. Ways to handle family conflict; arguments; disagreements (that may arise from time to time) 6. Possible exposure to harmful substances in your home, at work or in your area e.g. paraffin; pesticides?
Community orientation (3 items)	<ol style="list-style-type: none"> 1. Do you think this HC knows about the important health problems of your area? 2. Does this HC get opinions and ideas from people or organizations with knowledge to help provide better health care? E.g. the local health committee, churches, other organizations? 3. Does this HC do surveys of patients to see if services are meeting the needs of the people?

attention. As this study's data collection was part of the validation of the PCAT-Mw through metric analyses, sample size was calculated based on similar studies using at least 5:1 subject to item ratio [22–26]. Sample size of 600 was targeted, 60 from each facility.

Six interviewers were trained to conduct the PCAT-Mw survey. A pilot study showed that the questionnaire would take about 45 min to administer. Each interviewer was therefore expected to interview seven patients per day. The sampling frame was 50–60 patients waiting to be seen on each working day. Sampling interval (n) was calculated by dividing the number of waiting patients by seven. A random starting point was obtained using a smart phone random number generator. Each n^{th} patient was then asked for consent to participate in the study.

Sociodemographic, health care and health measures

Independent variables were sex, age, education, geographical location, duration of contact with facility, reason for attending; chronic or acute condition, distance to facility measured through time taken to walk to the facility, cost of travel to the facility, waiting time, individual health facility affiliation and self-rated health status.

Statistical analysis

Data were entered into and analyzed using the IBM SPSS Statistics 24.0.0 (2016) package. Dimension mean scores were derived by dividing the sum of the item means by the number of items in the dimension. A score ≥ 3 was considered 'acceptable to good performance' and < 3 as 'poor performance'. [28, 29] Total primary care was calculated as the sum of all dimension means. Sociodemographic, health care and health characteristics of the patients were compared between sexes by performing cross table analyses with chi squared significance testing to highlight differences between male and female patients.

Next, independent sample T tests were done to compare dimension means and total primary care scores between the sexes. Multiple linear regression models were used to assess association between sociodemographic, health care and health characteristics and total primary care scores after adjusting for sex and age. Further, stepwise exclusion regression models were used to identify independent variables that accounted for significant variances in patients' experiences with regard to total primary care and individual dimension mean scores. For all tests, confidence intervals of 95% and a p -value less than 0.05 were used as thresholds of statistical significance.

Results

Patients' characteristics

A total of 649 patients were approached and 18 (2.8%) declined to participate in the study. This paper presents

results from 631 completed questionnaires. Missing data accounted for approximately 1.9% of all data. Table 2 compares sociodemographic, health care and health characteristics of study participants between sexes. Overall, 65.0% of primary care visits were from female patients. (Table 2: Sociodemographic, health care and

Table 2 Sociodemographic, health care and health characteristics among 631 patients attending outpatient clinics in Neno district, Malawi in August and September, 2016 compared between sexes

Characteristic	Female (n = 410) (%)	Male (n = 221) (%)
Age		
18–30 years	197 (48.0)	73 (33.0)
31–45 years	152 (37.1)	94 (42.6)
Above 45	61 (14.9)	54 (24.4)**
Education		
None	48 (11.7)	12 (5.5)
Up to 5 years primary	153 (37.3)	58 (26.2)
5–8 years primary	145 (35.4)	95 (43.0)
At least secondary	64 (15.6)	56 (25.3)**
Duration of contact with facility		
Up to 2 years	66 (16.1)	27 (12.2)
2–4 years	88 (21.5)	41 (18.6)
> 4 years	256 (62.4)	153 (69.2)
Time to walk to facility		
< 1 h	198 (48.3)	136 (61.5)
≥ 1 h	212 (51.7)	85 (38.5)*
Cost of travel to facility#		
0 MK	299 (73.9)	143 (64.7)
Up to 500 MK	45 (11.0)	17 (7.7)
> 500 MK	66 (15.1)	61 (27.6)*
Waiting time at facility		
Up to 30 mins	167 (40.7)	69 (31.2)
30–90 min	136 (33.2)	81 (36.7)
> 90mins	107 (26.1)	71 (32.1)
Reason for attending facility		
Chronic condition	161 (39.3)	89 (40.3)
Acute condition	249 (60.7)	132(59.7)
Self-rated health status		
Poor to fair	129 (31.5)	83 (37.6)
Good	60 (14.6)	36 (16.3)
Very good to excellent	221 (54.0)	102(46.1)
Geographical location		
Upper Neno	153 (37.3)	106 (48.0)
Lower Neno	257 (62.7)	115 (52.0)*

Chi squared p value * < 0.01

**< 0.001

500MK is close to US\$0.75

health characteristics among 631 patients attending outpatient clinics in Neno district, Malawi in August and September, 2016 compared between sexes).

Primary care dimension scores

Table 3 shows poor performance in relational continuity (2.3), comprehensiveness of services available (2.4) and first contact access (2.8). The highest score was in communication continuity of care (3.6). Community orientation and comprehensiveness of services provided also achieved acceptable performance at 3.1 and 3.2 respectively. Female patients scored lower than male patients in all dimensions but the difference was significant only in total primary care ($p = 0.01$), first contact access ($p = 0.021$), relational continuity ($p = 0.044$) and comprehensiveness of services available ($p = 0.017$).

Multivariate analyses

(Table 4: Linear regression models assessing association between sociodemographic and health care factors and total primary care scores with unstandardized beta values among 631 patients attending outpatient clinics in Neno district, Malawi (August–September, 2016). Table 4 presents the linear regression models assessing association between patient characteristics and total primary care scores. Male patients scored 0.7 points higher than females (95% CI = 0.2, 1.2; $p = 0.01$). After adjusting for sex and age, patients in upper Neno scored total primary care 0.5 points higher than lower Neno patients (95% CI = 0.04, 1.0; $p = 0.033$). Increasing self-rated health status (rated on a 5 point Likert scale from very poor to excellent) was associated 0.8 points higher scores at good (95% CI = 0.1, 1.5; $p = 0.034$) and 0.9 points for very good to excellent (95% CI = 0.3, 1.4; $p = 0.002$), duration of contact with facility of more than 4 years was associated with scores 1.1 points higher (95%CI = 0.4, 1.2; $p = 0.003$) while acute presentation was associated with 0.6 points lower (95% CI = - 1.0, - 0.1; $p = 0.03$). At the individual facility level, patients from the health centers scored significantly below the reference outpatient clinic at the district hospital by points ranging from 0.6 to 2.0. Level of education, distance to the facility, cost of travel to the facility and waiting time were not associated with total primary care scores.

(Table 5: Association between predictors and total primary care scores, access and comprehensiveness of services available mean scores with unstandardized beta values among 631 patients attending outpatient clinics in Neno, Malawi (August – September, 2016)). The investigated factors explained 10.9% of the noted variance in total primary care scores. Looking at each dimension, these sociodemographic and health care characteristics explained 29.4% of variance in first contact access and 25.2% in comprehensiveness of services available (Table 5).

Table 3 Primary care dimension mean scores among patients attending outpatient clinics in Neno district in August–September, 2016 compared between the total sample ($N = 631$), male ($n = 221$) and female patients ($n = 440$)

Primary care dimension	Number of items	Mean scores (SEM)		
		Total	F	M
Sample size		631	410	221
First contact access	3	2.8 (0.03)	2.8 (0.04)	2.9 (0.05)*
Communication continuity	4	3.6 (0.02)	3.6 (0.03)	3.6 (0.04)
Relational continuity	4	2.3 (0.04)	2.2 (0.05)	2.4 (0.07)*
Comprehensiveness				
Services available	6	2.4 (0.03)	2.4 (0.04)	2.5(0.06)*
Services provided	6	3.2 (0.04)	3.1 (0.04)	3.2(0.06)
Community orientation	3	3.1 (0.04)	3.1 (0.05)	3.1(0.07)
Total primary care score	26	17.4 (0.12)	17.2 (0.15)	17.7 (0.21)*

Independent sample T-test p values: * < 0.05

These factors also explained 3% of variance in comprehensiveness of services provided, 3.7% in community orientation, 4.4% in relational continuity of care and 5.2% in communication continuity of care (data not shown in the table).

Discussion

To our knowledge, this paper is the first time primary care performance has been measured based on patients' experience in Malawi. The study shows poor performance in relational continuity, comprehensiveness of services available and first contact access. Acceptable performance was achieved in community orientation, comprehensiveness of services provided, and communication continuity of care.

The study shows that more primary care visits were from female patients; who also tended to have lower levels of education similar to findings in a South African study [29]. The female patients in this study also rated their primary care experience lower than male patients. Literature review of health-seeking behavior studies shows that women consult more frequently than men [30]. Since the women in this study were younger, reproductive health reasons might at least partially explain the gender difference as was the case in a UK study [31]. Further studies are needed to understand this difference in primary care experience in the Malawi context in order to better inform options for interventions to close the gap such as more comprehensive sexual and reproductive services.

Most public primary care facilities in Malawi serve a geographically recognizable catchment population. This provides opportunity for relational continuity of care and population based primary care approaches. Population management, stable patient-team partnership, and continuity of care are known building blocks of effective primary care systems [32] This study shows that most patients had affiliation with their public primary care

facilities for at least 4 years. Duration of contact of four years or longer was associated with higher total primary care scores but the direction of the association cannot be ascertained in this study. Relational continuity was poor and as such was one of the areas that need further exploration and improvement.

Most patients' reason for their primary care visit in this study was care for acute conditions. However, care for chronic conditions was associated with better overall experience. Chronic care patients were given appointments for their visits and were usually attended by the same team. Community health workers also followed up patients when they missed their appointments. Further prospective studies should be carried out to assess if these processes of care would explain the differences and if the primary care experience of patients presenting with acute conditions would improve when offered the same management.

Health centers play an important gate-keeping role that is essential to well-functioning health systems. This is not clearly defined in Malawi's district health system although patients are expected to first report to their public primary care facilities by virtue of proximity. In this study, health centers were scored lower than the outpatient clinics at the hospitals with regard to total primary care, first contact access and comprehensiveness of services available. A study in several African countries showed that staffing levels, experience of providers and facility management were associated with quality of care provided [33]. While there is need to investigate factors that would account for this variation at facility level, the gate-keeping function of health centers could be enhanced both through clear policy formulation as well as interventions such as providing better qualified staff, and paying more attention to facility management to improve access to quality and comprehensive package of services in the public health centers.

Table 4 Linear regression models assessing association between sociodemographic and health care factors and total primary care scores with unstandardized beta values among 631 patients attending outpatient clinics in Neno district, Malawi (August–September, 2016)

Factor	B	95%CI	P value
Sex^a			
Female ^c	17.1	16.8, 17.4	
Male	0.7	0.2, 1.2	0.01
Age^a			
18–30 years ^c	17.2	16.8, 17.6	
30–45 years	0.2	−0.3, 0.8	0.43
> 45 years	0.4	−0.3, 1.1	0.24
Education^b			
0–5 years primary ^c	17.0	16.5, 17.4	
6–8 years primary	0.3	−0.2, 0.9	0.23
At least secondary	−0.4	−1.1, 0.3	0.28
Geographical location^b			
Lower Neno ^c	16.8	16.4, 17.3	
Upper Neno	0.5	0.04, 1.0	0.033
Distance to facility^b			
< 1 h walk ^c	16.9	16.5, 17.4	
> 1 h walk	0.2	−0.3, 0.7	0.38
Cost of travel to facility^b			
0 MK ^c	17.1	16.7, 17.5	
1–500 MK	−1.0	−1.8, −0.2	0.016
> 500 MK	0.2	−0.4, 0.8	0.57
Waiting times at facility			
Up to 30 mins ^c	17.0	16.5, 17.5	
30–90 min	−0.3	−0.9, 0.3	0.31
> 90 mins	0.4	−0.2, 1.0	0.20
Duration of contact^b			
Up to 2 years ^c	16.3	15.7, 17.0	
2–4 years	0.3	−0.5, 1.2	0.42
> 4 years	1.1	0.4, 1.2	0.003
Reason for attendance^b			
Chronic condition ^c	17.4	16.9, 17.9	
Acute condition	−0.6	−1.0, −0.1	0.03
Self-rated health status^b			
Poor – fair ^c	16.4	15.8, 16.9	
Good	0.8	0.1, 1.5	0.034
> good	0.9	0.3, 1.4	0.002
By health facility^b			
A ^c (hospital outpatient clinic)	18.3	17.5, 19.1	
B (health center)	−1.2	−1.2, −0.2	0.018
C (health center)	−0.6	−1.6, 0.5	0.30
D (health center)	−1.5	−2.5, −0.4	0.006

Table 4 Linear regression models assessing association between sociodemographic and health care factors and total primary care scores with unstandardized beta values among 631 patients attending outpatient clinics in Neno district, Malawi (August–September, 2016) (Continued)

Factor	B	95%CI	P value
E (health center)	−1.6	−2.7, −0.6	0.002
F (hospital outpatient clinic)	0.5	−0.53, 1.51	0.34
G (health center)	−2.0	−3.1, −1.0	< 0.001
H (health center)	−1.7	−2.8, −0.7	0.001
I (health center)	−2.0	−3.0, −1.0	< 0.001
J (health center)	−1.5	−2.7, −0.4	0.01

^aunadjusted linear regression models^blinear regression models adjusted for sex and age^cReference

Users who rated their health status as ‘good’ or ‘very good’ also rated primary care experience better than those who rated their health as ‘poor’. Similar findings have been reported in the Korean and South African PCAT studies [24, 29]. Although it is possible that those who reported better health had actually benefited from the care itself, the direction of the association cannot be ascertained through a cross sectional study such as this.

Education, age, distance to facility and cost of travel were not associated with total primary care scores. A lack of association between socioeconomic factors and patients’ experience of primary care has also been reported in other studies. [24, 29, 34] This might be ascribed to the robustness of the questionnaire to accurately measure users’ primary care experience independent of differences among patients such as age, gender, poverty or educational levels.

Low scores noted in first contact access, comprehensiveness of services available and relational continuity of care are similar to findings in other studies [29, 34]. In Malawi, this is likely related to acute shortage of staff especially in primary care, inadequate staff training and lack of equipment and supplies particularly at health centers.

The factors that were significantly associated with patients’ experience of primary care accounted for much higher variances in first contact access and comprehensiveness of services provided dimensions, 29.4 and 25.2% respectively. This underscores the importance of access and availability of services as the core factors on which the other dimensions of primary care depend. Utilization, continuity, coordination and service provision will take place successfully only when people have effective access to facilities and services that they need which is an important objective of universal health coverage [35]. Improved primary care will therefore require multi-level interventions to address these gaps and countries need to translate political will into action in order to attain primary care for all.

Table 5 Association between predictors and total primary care scores, access and comprehensiveness of services available mean scores with unstandardized beta values among 631 patients attending outpatient clinics in Neno, Malawi (August – September, 2016)^a

	B	95% CI	p value
Model 1: Total primary care scores			
Reference	15.8	15.1, 16.4	
Facility F	2.3	1.6, 3.1	< 0.001
Upper Neno	0.9	0.4, 1.4	< 0.001
Self-rated health = good	1.1	0.3, 1.3	< 0.001
Duration of contact > 4 years	0.8	0.6, 1.7	0.001
Education >at least secondary	-0.8	-1.3, -0.2	0.011
Self-rated health = very good/excellent	0.9	0.2, 1.6	0.013
Acute presentation	-0.6	-1.1, -0.1	0.017
Male sex	0.5	0.03, 1.0	0.036
Unadjusted R ²		12.1%	
Adjusted R ²		10.9%	
Model 2 First contact access dimension scores			
Reference	2.9	2.9, 3.1	
Facility F	0.8	0.8, 1.0	< 0.001
Facility G	-0.8	-0.8, -0.6	< 0.001
Facility H	-0.6	-0.6, -0.4	< 0.001
Facility I	-0.3	-0.3, -0.1	0.001
chronic condition	-0.2	-0.2, -0.1	0.003
Cost of travel >MK500	0.1	0.1, 0.3	0.047
Unadjusted R ²		30.1%	
Adjusted R ²		29.4%	
Model 3 Comprehensiveness of services available dimension sum scores			
Reference	2.0	1.9, 2.2	
Upper Neno	0.9	0.7, 1.1	< 0.001
Facility B	1.2	1.0, 1.5	< 0.001
Facility C	-1.2	-1.5, -1.0	< 0.001
Facility D	-1.1	-1.4, -0.9	< 0.001
Facility F	-0.9	-1.1, -0.7	< 0.001
Education >at least secondary	-0.2	-0.4, -0.1	0.002
Travel time > 1 h	0.2	0.03, 0.3	0.012
Self-health rating = very good/excellent	0.1	0.01, 0.2	0.04
Unadjusted R ²		26.1%	
Adjusted R ²		25.2%	

^aMultivariate regression with stepwise exclusion method where significant predictors are retained in the models

Strengths and limitations

Strengths of the study include use of a globally accepted tool that had been culturally adapted and validated for use in Malawi [28]. The PCAT-Mw has advantages compared to other tools that measure patient perspectives in that it assesses patient experience with care. Since this is the first

time the PCAT-Mw has been applied in a clinical setting in Malawi, the results of the paper provide a measure of the performance of primary care in Malawi. This also adds to the construct validation of the questionnaire.

The study had a number of limitations. First, because this was a cross-sectional study, causal inferences to findings are not possible. Second, liability to several types of bias is noted: recall, response and selection. The face to face interview partly minimized recall bias through clarifying questions whenever that was necessary. Potential for response bias was possible because data collection was done during clinic visit. Selection bias might have resulted from excluding those who were acutely ill, frail or had severe mental illness and interviewing only patients who attended clinics and might have had better experience than the patients excluded. The study was also carried out in one district only. In another subsequent study, we have included multiple sites to improve generalizability of results. Third, the factors identified accounted for 10.9% of total primary care score variances, 25.2% in the comprehensiveness of services available and 29.4% in the first contact access. Potential unmeasured factors such as the actual quality of services provided and health care workers' skills, attitude and behaviors might confound the results. Fourth, this was a study of patient experiences of primary care and not of health outcomes. Further studies could assess correlations between clinical outcomes and patient experiences of care and the extent to which patient experiences predict later health outcomes.

Conclusions

This paper presents results from the first use of the validated PCAT-Mw to assess patients' experience of primary care and associated sociodemographic, health care and health factors in a rural district in Malawi. Patients reported acceptable levels of performance in the primary care dimensions of communication continuity of care, comprehensiveness of services provided and community orientation. Poor performance was reported in first contact access, comprehensiveness of services available and relational continuity of care. Our experience indicates that the PCAT-Mw can be used alongside clinical health outcome studies to provide

comprehensive evaluation of primary care performance in Malawi. The areas of poor patient experience need further research to evaluate possible explanations and to inform appropriate interventions.

Abbreviations

PCAT - Mw: Primary Care Assessment Tool – Malawian version;
PCAT: Primacy Care Assessment Tool; PIH: Partners In Health

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request and are available on Open Science Framework at <https://osf.io/nyp7m>.

Authors' contributions

LD conceived, designed and carried out the study, the data analysis and drafting of the paper. EM took part in the development of the study, the analysis, interpretation of data and critically revised the paper. SG took part in the development of the study, supported interpretation of the results and critically revised the paper. ØH, TM and SG supported interpretation of the results and critically revised the paper. All authors read and approved the final paper.

Ethics approval and consent to participate

Ethical approval for the study was provided by the Malawi National Health Sciences Research Committee as part of the protocol "Evaluation of Clinical care in Neno" with approval number: 1216. The District Health Officer and heads of facilities also provided approval. Study participants provided written consent.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Paper III



BMJ Open Performance of primary care in different healthcare facilities: a cross-sectional study of patients' experiences in Southern Malawi

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ABSTRACT

Objective In most African countries, primary care is delivered through a district health system. Many factors, including staffing levels, staff experience, availability of equipment and facility management, affect the quality of primary care between and within countries. The purpose of this study was to assess the quality of primary care in different types of public health facilities in Southern Malawi.

Study design This was a cross-sectional quantitative study.

Setting The study was conducted in 12 public primary care facilities in Neno, Blantyre and Thyolo districts in July 2018.

Participants Patients aged ≥18 years, excluding the severely ill, were selected to participate in the study.

Primary outcomes We used the Malawian primary care assessment tool to conduct face-to-face interviews. Analysis of variance at 0.05 significance level was performed to compare primary care dimension means and total primary care scores. Linear regression models at 95% CI were used to assess associations between primary care dimension scores, patients' characteristics and healthcare setting.

Results The final number of respondents was 962 representing 96.1% response rate. Patients in Neno hospitals scored 3.77 points higher than those in Thyolo health centres, and 2.87 higher than those in Blantyre health centres in total primary care performance. Primary care performance in health centres and in hospital clinics was similar in Neno (20.9 vs 19.0, $p=0.608$) while in Thyolo, it was higher at the hospital than at the health centres (19.9 vs 15.2, $p<0.001$). Urban and rural facilities showed a similar pattern of performance.

Conclusion These results showed considerable variation in experiences among primary care users in the public health facilities in Malawi. Factors such as funding, policy and clinic-level interventions influence patients' reports of primary care performance. These factors should be further examined in longitudinal and experimental settings.

BACKGROUND

Primary care is first contact, continuous, comprehensive, coordinated care that is provided to populations undifferentiated

Strengths and limitations of this study

- This study is the first attempt in Malawi to measure the quality of primary care in different types of health facilities based on patients' experiences.
- This study used a culturally adapted and locally validated measurement tool that has been widely used globally.
- There might have been potential for selection, response and recall bias as the data were collected from patients in a clinical setting; however, the face-to-face interviews provided opportunity for follow-up clarifying questions to minimise the recall bias.

by gender, disease or organ system.¹ Strong evidence suggests that effective primary care is associated with improved equity and access to healthcare services, reduced hospitalisations and better cost effectiveness.^{2–5} Primary care is also considered as a vehicle for accelerating progress towards universal health coverage.^{6,7}

In most African countries, primary care is delivered through a district health system. At primary-level facilities, healthcare workers (HCWs) and community health workers (CHWs) provide integrated preventive and curative services to a geographically defined population under the supportive supervision of a district hospital and district health management team and with active participation of the community.⁸

The quality of primary care between and within countries is affected by many factors. In a recent study in several African countries, staffing levels, staff experience, availability of equipment and facility management were some factors that accounted for variation in the quality of primary care.⁹ In the US healthcare setting, it was found that health centres generally achieved higher quality of primary care while primary care in hospitals

was associated with less continuity.¹⁰ Similar results were found in a Chinese study which showed that community health centres provided better-quality primary care when compared with secondary and tertiary healthcare facilities.¹¹ In a South African study, public rural and urban primary care users had similar experiences of quality. This was attributed to standardised service packages and treatment guidelines within the sector.¹²

Malawi has in the recent past registered notable progress particularly in HIV/AIDS and child health indicators.¹³ However, significant persisting challenges include poor access to services,¹⁴ inequity and inadequate financial risk protection.^{15 16} The new 2017–2022 national health sector strategic plan (HSSP II) seeks to achieve universal health coverage and improved patient satisfaction.¹⁶ As no studies have been conducted in Malawi to compare patients' experience of quality of primary care in the different settings of the public health sector, the results of this study contribute to the HSSP II goals. The study is also a baseline of the experiences of patients with regard to the performance of primary care in the southern Malawi and thus provides a basis for quality improvement in service delivery.

The purpose of this study was to assess the quality of primary care in different types of public health facilities and to discuss implications of the findings in the context of using the district health system model to achieve universal health coverage in the South West health zone in Malawi. Study objectives were to compare primary care performance between districts, between rural and urban health centres and between hospital clinics and health centres and to assess the association between primary care performance and characteristics of the primary care facilities. The null hypothesis for the study was that there is no difference in performance of primary care between the different types of healthcare facilities.

MATERIALS AND METHODS

Study design

This was an observational quantitative cross-sectional study and we used the STROBE cross-sectional reporting guidelines¹⁷ to report the results.

Sampling procedure

The study was conducted in 12 facilities in three districts in the South West health zone in July and August 2018.

The South West health zone includes seven districts serving a population of about 3 million. Two districts were purposefully selected: Neno because it receives the highest per capital funding in Malawi¹⁸ and Blantyre because it has an urban population. The remaining five districts were assigned numbers 1–5 by using the alphabetical order of their first letters. The third participating district was selected by using a computer random number generator.

The two hospitals in Neno and the district hospital in Thyolo were purposefully selected on the basis of being

the only public hospitals offering primary care within the study districts. All public health centres in each district were assigned numbers in ascending order by using the alphabetical order of their first letters. Participating health centres were selected by using a computer random number generator so that each district had four study health facilities. The study population included adult patients attending outpatient care in public health centres and hospitals in the selected districts. Study participants were at least 18 years of age, must have used the facility for at least 6 months and must have visited the facility for at least three times. Patients with acute illness or with severe mental health disorders were excluded to allow them receive the urgent care that they needed.

There was no booking system for outpatients in the facilities where patients were seen. Patients reported to the outpatient clinics directly and received services on first come first served basis. Each interviewer was expected to conduct 12 interviews per day based on prior experience with the questionnaire. Potential subjects were identified through a pre-calculated interval which was based on the expected duration of each interview and the number of waiting patients at the beginning of each day. The interviewer approached the potential subject to administer the screening questions and the written consent. If the potential subject did not consent, the next potential subject was approached using the same procedure described above.

Sample size determination

The sample size was calculated based on findings from a previous paper that compared primary care assessment set of tools (PCAT) scores between patients in county, secondary and tertiary hospitals and rural health and community health centres.¹¹ The minimum sample size of this study was estimated as 900 with a 95% CI and a power of 80% and considering 2.5% incomplete or missing data.

Measurement instrument and data collection

The PCAT are among the most widely used tools internationally in primary healthcare assessment.¹⁹ The PCAT aims at a global assessment of primary care organisation and its performance in the core dimensions of accessibility, comprehensiveness, coordination and continuity and accountability. The tool was originally developed by Starfield *et al.*²⁰ It has since been adapted and validated for use in numerous countries, which allows for comparison of primary care performance in different settings.^{21–25}

We used the Malawian version of the PCAT (PCAT-Mw) whose validation was reported in another paper.²⁶ The PCAT-Mw is a multi-item multidimension questionnaire that measures primary care performance covering core dimensions of primary care (attached as online supplementary file: validated PCAT-Mw items). The tool has 29 items measuring primary care performance in seven dimensions: first contact access (three items), communication continuity of care (four items), relational continuity of care (four items), coordination (three items), comprehensiveness of services available (six items),

comprehensiveness of services provided (six items) and community orientation (three items). First contact access is here defined as the manner in which services are organised to accommodate access whenever needed and ensure patient satisfaction. Continuity of care entails the existence of a regular source of care and the longitudinal relationship between primary care providers and patients, in terms of accommodation of patient's needs and preferences, such as communication and respect for patients. Coordination of care reflects the ability of primary care providers to facilitate and support patients to navigate use of other levels of healthcare when needed. Comprehensiveness of primary care services represents the range of services available in primary care to meet patients' healthcare needs. A distinction is made between services that are available and those that are actually provided. Community orientation defines the extent to which the primary care providers understand and address priority health problems in a particular community with evidence of community participation.

Items are scored on a four-point Likert scale, with 1 indicating 'definitely not', 2 indicating 'probably not', 3 representing 'probably' and 4 representing 'definitely'. Additionally, there are questions to identify the usual primary care facility the patient uses and the patient's sociodemographic data.

Data collection was done through face-to-face interviewer-administered questionnaire from eligible patients in July 2018. Research assistants with prior interviewing experience received a 2-day refresher training before the start of data collection interviews.

Conceptual framework of the study

The study uses the Starfield primary care quality theoretical model²⁷ in which the primary care system includes its organisation, governance, available financial and human resources and its information systems. The primary care dimensions form its process of care including accessibility, continuity of care, coordination of care, comprehensiveness of services and community orientation. The outcomes of primary care include improved health status, user evaluation, health behaviour change, equity, efficiency and safety. The interplay between the primary care system and its process to bring about the desired outcomes is modified by environmental and patient characteristics. In this study, the dimensions of primary care are used as the process indicators for quality of primary care. Patients' positive experience reflecting acceptable performance in the dimensions of primary care is indicative of a high-quality delivery system.

Study variables

Study outcome measures were mean scores of each primary care dimension and the total primary care score. Independent variables included sociodemographic characteristics: age, sex, education, employment status of the patient and/or the head of the household, patient's disability status; healthcare measures: acute or chronic

presentation, duration of contact with facility, estimated time taken to get to the facility, frequency of visits in the past 2 years, satisfaction with care and self-rated health status. Data were also collected on district characteristics such as location (rural/urban), catchment population, number of HCWs, number of community HCWs and estimated per capita health funding.

Data entry and statistical analysis

Data analysis was done using the IBM SPSS Statistics V.25.0.0 (2017) package. For consistency with methods used in PCAT studies in other countries, a mid-scale value of 2.5 was assigned to 'not sure' answers while the mean item score was used for missing data.^{21 22 25 28}

First, X^2 analyses were applied to compare sociodemographic, healthcare and health characteristics of patients in the different types of facilities. Primary care dimension mean scores were derived by dividing the sum of the item means by the number of items in the dimension. A score ≥ 3 was considered 'acceptable to good performance' and < 3 as 'poor performance'.^{12 29} Total primary care was calculated as the sum of all dimension mean scores. Next, independent sample t-tests and analysis of variance were performed to compare performance of primary care dimensions in different types of healthcare facilities. Multiple linear regression models were then used to assess the association between types of facility and performance of primary care dimensions after controlling for patients' sociodemographic, healthcare and health characteristics.

Patient and public involvement

We did not involve patients and the public in the design of the study.

Ethical approval and consent to participate

District Health Officers gave permission for the study in their respective districts. Study participants provided written consent.

RESULTS

This paper presents results from 962 completed questionnaires out of 1001 potential respondents who were approached representing 96.1% response rate. Those who declined cited lack of time to participate. Missing data accounted for approximately 1.2% of all data.

District characteristics

Table 1 shows that Neno had the highest density of both primary HCWs and CHWs followed by Blantyre for HCWs and Thyolo for CHWs, respectively. With regards to funding, Neno received about three times as much total per capita healthcare funding as Thyolo and Blantyre, respectively, during 2017–2018 financial year.

Demographic and healthcare characteristics of participants

Table 2 compares the distribution of patient characteristics for the five types of healthcare settings. Sixty-four

Table 1 Structural and organisational characteristics of primary care facilities in South West health zone, Malawi, in July–August 2018

Facility	Type of facility	Location	Catchment population	Number of HCWs* (per 1000 pop)	Number of CHWs† (per 1000 pop)	District per capita health funding in US\$ per year
Neno						60
1	Hospital	Rural	20 711	9 (0.4)	143 (6.9)	
2	Hospital	Rural	11 284	4 (0.4)	112 (9.9)	
3	Health centre	Rural	14 433	3 (0.2)	98 (6.8)	
4	Health centre	Rural	8936	4 (0.4)	58 (6.5)	
Thyolo						22
5	Hospital	Rural	51 318	21 (0.4)	24 (0.5)	
6	Health centre	Rural	19 444	1 (0.1)	14 (0.7)	
7	Health centre	Rural	47 092	8 (0.2)	29 (0.6)	
8	Health centre	Rural	52 782	7 (0.1)	22 (0.4)	
Blantyre						18
9	Health centre	Urban	78 561	25 (0.3)	37 (0.5)	
10	Health centre	Urban	79 675	33 (0.4)	41 (0.5)	
11	Health centre	Urban	135 726	31 (0.2)	44 (0.3)	
12	Health centre	Urban	145 821	23 (0.2)	46 (0.3)	

*HCWs comprised nurses/nurse-midwives/medical assistants/clinical officers.

†CHWs comprised health surveillance assistants and community health volunteers on stipend.

CHWs, community health workers; HCWs, healthcare workers.

percent of primary care visits were from females and >80% of patients were between 18 and 45 years of age. Among rural patients, 81% were affiliated to their primary care facilities for >4 years compared with 55% among urban patients. Fifteen percent of respondents in Blantyre had 5 years or less of education compared with 37% among Thyolo health centres respondents and 45% in Neno health centres. About 60% of patients in Neno walked for more than 1 hour to their facility compared with 48% in Thyolo and 17% in Blantyre.

Primary care performance by district

Table 3 compares primary care performance at the district level through total PCAT-Mw and individual dimension mean scores. Patients in Neno reported a significantly higher total primary care performance at 20.3 (n=303, 95% CI 20.0 to 20.6) compared with both Thyolo and Blantyre at 16.8 (n=358, 95% CI 16.4 to 17.2) and 16.4 (n=301, 95% CI 16.1 to 16.7), respectively (p ≤ 0.01). This same difference was found in all but one (relational continuity) of the primary care dimensions measured. In Neno, acceptable performance was reported in first contact access (3.1), communication continuity (3.6), coordination (3.1) and community orientation (3.2). Poor performance was reported in relational continuity (1.9), comprehensiveness of services available and provided, at 2.7 each.

There was no significant difference between Thyolo and Blantyre with regard to total primary care performance. Patients in Thyolo reported significantly higher scores

relative to patients in Blantyre in relational continuity (2.0 vs 1.6, p<0.01) and comprehensiveness of services provided (2.5 vs 2.3, p<0.05) but patients from Blantyre reported higher scores in first contact access (2.5 vs 2.3, p<0.05) and comprehensiveness of services available (2.2 vs 2.0, p<0.05). Both Blantyre and Thyolo had acceptable performance score (3.4) in communication continuity. Poor performance was reported in other primary care dimensions in both districts. The lowest scores were reported in coordination (1.8 and 1.7).

Primary care performance in rural and urban facilities

Table 4 shows the bivariate results comparing primary care dimension scores in health centres to highlight differences between urban and rural settings. Patients in Neno reported a significantly higher total primary care performance at 20.9 (n=152, 95% CI 20.4 to 21.4) compared with both Thyolo and Blantyre at 16.8 (n=226, 95% CI 14.8 to 15.6) and 16.4 (n=301, 95% CI 16.1 to 16.7), respectively (p ≤ 0.01). Neno health centres also reported better performance in all of the primary care dimensions. In Neno, acceptable performance was reported in first contact access (3.0), communication continuity (3.6), coordination (3.6) and community orientation (3.1). Poor performance was reported in relational continuity (2.3), comprehensiveness of services available (2.4) and comprehensiveness of services provided at 2.9. Blantyre and Thyolo health centres reported acceptable performance only in communication continuity (3.4). Both

Table 2 Demographic, socioeconomic and health measures of the patients attending clinics in South West health zone, Malawi, in July and August 2018, shown by type of facility

Characteristic	Total (n=962) (%)	Neno hospitals (n=151) (%)	Neno health centres (n=152) (%)	Thyolo hospital (n=132) (%)	Thyolo health centres (n=226) (%)	Blantyre Urban health centres (n=301) (%)
Sex						
Female	616 (64.0)	89 (58.9)	107 (70.4)	78 (59.1)	145 (64.2)	197 (65.4)
Male	346 (36.0)	62 (41.1)	45 (29.6)	54 (40.9)	81 (35.8)	104 (34.6)
Age**						
18–30 years	448 (46.6)	70 (46.4)	79 (52.0)	35 (26.5)	99 (43.8)	165 (54.8)
31–45 years	342 (35.6)	56 (37.1)	46 (30.3)	63 (47.7)	70 (31.0)	107 (35.5)
46–60 years	128 (13.2)	16 (10.6)	18 (11.8)	25 (19.9)	45 (19.9)	24 (8.0)
>60 years	44 (4.6)	9 (6.0)	9 (5.9)	9 (6.8)	12 (5.3)	5 (1.7)
Education**						
None	108 (11.2)	34 (22.5)	28 (18.4)	17 (12.9)	20 (8.8)	9 (3.0)
Up to 5 years primary	206 (21.4)	29 (19.2)	40 (26.3)	37 (28.0)	64 (28.3)	36 (12.0)
5–8 years primary	302 (31.4)	38 (25.2)	59 (38.8)	40 (30.3)	88 (38.9)	77 (25.6)
At least secondary	296 (36.0)	50 (33.1)	25 (16.5)	38 (28.8)	41 (23.9)	179 (59.4)
Employment status**						
Part-time or full time	273 (28.4)	30 (19.9)	46 (30.3)	35 (26.5)	54 (23.9)	108 (35.9)
Self-employed	395 (41.1)	53 (35.1)	84 (55.3)	75 (56.8)	103 (45.6)	80 (25.6)
Home maker	293 (30.5)	68 (45.0)	22 (14.6)	22 (16.6)	69 (20.5)	113 (37.5)
Duration of facility affiliation*						
6 months to 2 years	153 (15.9)	10 (6.6)	16 (10.5)	15 (11.4)	23 (10.2)	89 (29.6)
2–4 years	107 (11.0)	14 (9.3)	7 (4.6)	15 (11.4)	26 (11.5)	45 (15.0)
>4 years	702 (73.0)	127 (84.1)	129 (84.9)	102 (77.2)	177 (78.2)	167 (55.4)
Number of clinic visits in 2 years**						
3–5	413 (42.9)	49 (32.5)	60 (39.5)	60 (45.5)	78 (34.5)	166 (55.1)
>5	549 (57.1)	102 (67.5)	92 (60.5)	72 (54.5)	148 (65.5)	135 (44.9)
Time to travel to facility**						
<30 mins	316 (32.8)	31 (20.5)	35 (23.0)	34 (25.8)	71 (31.4)	145 (48.2)
30–60 mins	247 (25.7)	26 (17.2)	29 (19.1)	24 (18.2)	62 (27.4)	106 (35.1)
>60 mins	399 (41.5)	94 (62.3)	88 (57.9)	74 (56.0)	93 (41.2)	50 (16.7)
Disability (physical, mental)**						
No	850 (88.4)	143 (94.7)	130 (85.5)	94 (71.2)	217 (96.0)	266 (88.4)
Yes	112 (11.6)	8 (5.3)	22 (14.5)	38 (28.8)	9 (4.0)	35 (11.6)
Self-rated health**						
Poor (VP/P/F)	466 (48.4)	57 (37.7)	62 (40.8)	63 (47.7)	125 (55.3)	176 (58.5)
Good (G/VG)	496 (51.6)	94 (62.3)	90 (59.2)	69 (52.3)	101 (44.7)	125 (41.5)
Patient satisfaction**						
Poor (VP/P/F)	475 (49.4)	58 (38.4)	61 (40.1)	70 (53.0)	128 (56.6)	158 (52.3)
Good (G/VG)	487 (50.6)	93 (61.6)	91 (59.9)	62 (47.0)	98 (43.4)	143 (47.7)

*P<0.05, Duration of facility affiliation. **P<0.01, based on X² test of difference across healthcare settings.

districts reported poor performance in the other dimensions and coordination was lowest (1.7).

Primary care dimension scores in hospital and health centre clinics

Table 5 shows results of primary care dimension scores compared between hospitals and health centre clinics. Because of the performance differences between the

districts as noted above, Neno and Thyolo are compared separately. There is no public hospital in Blantyre.

Health centres and hospitals performed equally well in both districts in communication continuity and equally poorly in comprehensiveness of services provided. Hospitals performed better than health centres in both districts in community orientation and comprehensiveness of services available. Thyolo hospital also performed better

Table 3 Primary care dimension mean scores in South West health zone, Malawi, in July and August 2018, shown by district

Characteristic	Total (95% CI)	Neno (95% CI)	Thyolo (95% CI)	Blantyre (95% CI)
Sample size	962	303	358	301
First contact—access	2.6 (2.5 to 2.7)	3.1 (3.0 to 3.2)**	2.3 (2.2 to 2.4)**#	2.5 (2.4 to 2.6)**#
Communication continuity	3.4 (3.3 to 3.5)	3.6 (3.5 to 3.7)*	3.4 (3.3 to 3.5)*	3.4 (3.3 to 3.5)*
Relational Continuity	1.8 (1.7 to 1.9)	1.9 (1.8 to 2.0)**	2.0 (1.9 to 2.1)##	1.6 (1.5 to 1.7)**##
Coordination	2.0 (1.8 to 2.2)	3.1 (2.8 to 3.4)**	1.8 (1.5 to 2.1)**	1.7 (1.5 to 1.9)**
Comprehensiveness				
Services available	2.3 (2.2 to 2.4)	2.7 (2.6 to 2.8)**	2.0 (1.9 to 2.1)**#	2.2 (2.1 to 2.3)**#
Services provided	2.5 (2.4 to 2.6)	2.7 (2.6 to 2.8)**	2.5 (2.4 to 2.6)**#	2.3 (2.2 to 2.4)**#
Community orientation	2.9 (2.8 to 3.0)	3.2 (3.1 to 3.3)**	2.8 (2.7 to 2.9)**	2.7 (2.6 to 2.8)**
Total PCAT-Mw score	17.5 (17.3 to 17.7)	20.3 (20.0 to 20.6)**	16.8 (16.4 to 17.2)**	16.4 (16.1 to 16.7)**

Based on ANOVA Bonferroni post-hoc means test.

*P<0.05, **P<0.01 comparing Neno and Thyolo and Blantyre.

#P<0.05, ##P<0.01 comparing Thyolo and Blantyre.

ANOVA, analysis of variance; PCAT-Mw, Malawian version of the primary care assessment set of tools.

in first contact access, relational continuity, coordination and total PCAT-Mw scores than health centres. Coordination and relational continuity were reported better in health centres than hospitals in Neno. The only difference between Neno and Thyolo hospitals was a better relational continuity in Thyolo.

Figure 1 shows a radar chart showing dimension performance according to the different settings. The figure shows that the differences between the contexts were most evident in first contact access and coordination comprehensiveness of services available. Neno health centres performed better than the other facilities in coordination.

Multivariate analyses of primary care dimension mean scores

Table 6 presents the results of the multivariable linear regression analyses used to assess the association between facility characteristics and primary care total and dimension performance mean scores after controlling for patients' sociodemographic and healthcare and health characteristics.

Using Neno hospitals as the reference, the coefficient for Thyolo health centres was -3.77 , and -2.87 for the health centres in Blantyre in total primary care. Thus, patients in Neno hospitals would have on average an estimated 3.77 points greater score than those in Thyolo

Table 4 Primary care dimension mean scores in South West health zone, Malawi, in July and August 2018, comparing rural and urban health facilities

Characteristic	Total (95% CI)	Neno Health centres (Rural) (95% CI)	Thyolo health centres (Rural) (95% CI)	Blantyre Urban Health centres (95% CI)
Sample size	962	152	226	301
First contact—access	2.6 (2.4 to 2.7)	3.0 (2.9 to 3.1)**	1.8 (1.7 to 1.9)**##	2.5 (2.4 to 2.6)**##
Communication continuity	3.4 (3.3 to 3.5)	3.6 (3.5 to 3.7)	3.4 (3.3 to 3.5)	3.4 (3.3 to 3.5)
Relational continuity	1.8 (1.7 to 1.9)	2.3 (2.1 to 2.5)**	1.8 (1.7 to 1.9)**#	1.6 (1.5 to 1.6)**#
Coordination	2.0 (1.8 to 2.2)	3.6 (3.3 to 3.9)**	1.7 (1.4 to 2.0)**	1.7 (1.5 to 1.9)**
Comprehensiveness				
Services available	2.3 (2.2 to 2.4)	2.4 (2.3 to 2.5)**	1.4 (1.3 to 1.5)**##	2.2 (2.1 to 2.3)**##
Services provided	2.5 (2.4 to 2.6)	2.9 (2.8 to 3.0)**	2.5 (2.4 to 2.6)**#	2.3 (2.2 to 2.4)**#
Community orientation	2.9 (2.8 to 3.0)	3.1 (3.0 to 3.2)*	2.6 (2.4 to 2.7)*	2.7 (2.6 to 2.8)*
Total PCAT-Mw score	17.5 (17.3 to 17.7)	20.9 (20.4 to 21.4)**	15.2 (14.8 to 15.6)**##	16.4 (16.1 to 16.7)**##

Based on ANOVA Bonferroni post-hoc means test.

*P<0.05, Duration of facility affiliation. **P<0.01 comparing Neno and Thyolo and Blantyre.

#P<0.05, ##P<0.01 comparing Thyolo and Blantyre.

ANOVA, analysis of variance; PCAT-Mw, Malawian version of the primary care assessment set of tools.

Table 5 Primary care dimension mean scores among patients attending outpatient clinics in South West health zone, Malawi, in July and August 2018, shown by hospital and health centre clinics.

Characteristic	Neno hospitals (SE)	Neno Health centres (SE)	P value	Thyolo hospital (SE)	Thyolo health centres (SE)	P value
Sample size	151	152		132	226	
First contact—access	3.1 (0.05)	3.0 (0.05)	0.308	3.1 (0.07)	1.8 (0.05)	<0.001**
Communication continuity	3.6 (0.05)	3.6 (0.05)	0.816	3.5 (0.07)	3.4 (0.06)	0.371
Relational continuity	1.6 (0.06)#	2.3 (0.08)	<0.001**	2.3 (0.08)#	1.8 (0.06)	<0.001**
Coordination	2.5 (0.27)	3.6 (0.17)	0.001*	2.2 (0.27)	1.7 (0.17)	<0.001**
Comprehensiveness						
Services available	3.1 (0.05)	2.4 (0.05)	<0.001**	3.1 (0.06)	1.4 (0.04)	<0.001**
Services provided	2.7 (0.08)	2.9 (0.07)	0.085	2.5 (0.06)	2.5 (0.07)	0.753
Community orientation	3.3 (0.07)	3.1 (0.06)	0.025*	3.2 (0.08)	2.6 (0.06)	<0.001**
Total PCAT-Mw score	19.0 (0.18)	20.9 (0.25)	0.608	19.9 (0.31)	15.2 (0.20)	<0.001**

Based on ANOVA Bonferroni post-hoc means test.

*P<0.05, **P<0.01 comparing hospitals and health centres;

#P<0.05 when Neno and Thyolo hospitals were compared.

ANOVA, analysis of variance; PCAT-Mw, Malawian version of the primary care assessment set of tools.

health centres, and 2.87 greater score than those in Blantyre health centres. The variables studied explained 30% of the variances observed with regard to total primary care scores.

With respect to dimensions, similar results were seen in coordination of care, first contact access and comprehensiveness of services available. In these dimensions, the studied variables explained 22.4%, 37.7% and 54.4% of the variances observed.

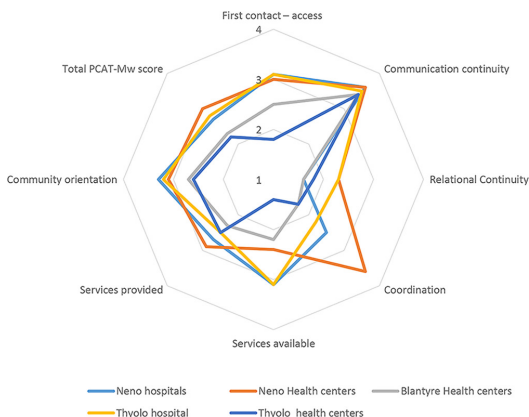


Figure 1 Mean primary care attribute scores among patients attending outpatient clinics in South West health zone, Malawi, in July and August 2018, shown by hospitals and health centre clinics. HC, health centre; PCAT-Mw, Malawian version of the primary care assessment set of tools.

DISCUSSION

This study assessed the performance of primary care as experienced and reported by patients in different types of public health facilities in three districts in the South West health zone in Malawi. We used an internationally recognised and locally validated tool, PCAT. When performance was compared among the three districts, Neno achieved a significantly higher total primary care score than Blantyre and Thyolo, respectively. Patients in Neno also reported acceptable scores in first contact access, communication continuity of care, coordination and community orientation compared with good performance in only one dimension (communication continuity of care) in Thyolo and Blantyre.

These results can partly be explained by the significantly higher per capita health funding that Neno currently receives compared with the other districts. Similar conclusions were made when Neno was compared with other districts in programme performance outcomes in maternal and child health¹⁸ and HIV care indicators³⁰ in previous studies.

Another related possible explanation is the low HCW–patient and CHW–patient ratios observed in Neno. Staffing levels were among factors that were identified to have affected quality of primary care in a study in several African countries including Malawi.⁹ Achieving Malawi's HSSP II goals of better health outcomes and patient satisfaction will therefore require more investment to increase healthcare spending above the national average of 40 US\$ per capita which is the lowest in the South African Development Community region¹⁶ since it is known that increase in public healthcare spending has a long-lasting impact in low-resource communities³¹ and is associated with better health outcomes.³²

Table 6 Linear regression models assessing association between sociodemographic, healthcare, health factors, primary care dimension mean scores and types of health facilities with unstandardised beta values among 962 patients attending outpatient clinics in South West zone, Malawi, in July–August 2018

	Total Primary care	First contact access	Communication continuity	Continuity relational	Coordination	Services available	Services provided	Community orientation
	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)
Reference	17.12 (0.55)	3.10 (0.14)	3.47 (0.15)	1.77 (0.16)	2.96 (0.51)	3.05 (0.11)	2.39 (0.19)	3.37 (0.17)
Sex (Ref: M)†								
Female	-0.29 (0.20)	0.04 (0.05)	-0.09 (0.05)	-0.11 (0.06)*	0.25 (0.21)	-0.09 (0.04)*	-0.08 (0.07)	0.03 (0.06)
Age (Ref: 18–30 years)†								
30–45 years	-0.24 (0.21)	0.08 (0.05)	-0.15 (0.06)**	0.02 (0.06)	-0.14 (0.18)	-0.01 (0.04)	-0.13 (0.07)	-0.05 (0.07)
45–60 years	-0.35 (0.30)	-0.01 (0.07)	-0.31 (0.08)**	0.09 (0.09)	0.10 (0.28)	0.05 (0.06)	-0.12 (0.10)	-0.05 (0.09)
>60 years	0.07 (0.45)	0.09 (0.11)	-0.04 (0.12)	0.13 (0.13)	-0.46 (0.47)	-0.01 (0.09)	-0.18 (0.16)	0.09 (0.14)
Education (Ref: 0–5 years primary)†								
Primary 6–8	0.34 (0.23)	0.07 (0.06)	0.12 (0.06)*	0.02 (0.07)	0.14 (0.22)	-0.01 (0.05)	0.15 (0.08)	-0.002 (0.07)
Sec school	0.47 (0.25)	0.07 (0.06)	0.004 (0.07)	0.09 (0.07)	0.18 (0.22)	-0.04 (0.05)	0.15 (0.09)	0.20 (0.08)*
Post sec school	0.17 (0.45)	0.08 (0.11)	-0.03 (0.12)	-0.003 (0.13)	0.66 (0.41)	0.03 (0.09)	0.19 (0.16)	-0.10 (0.14)
Time to walk to HF (Ref: <30 mins)†								
30–60 mins	-0.23 (0.23)	0.001 (0.06)	-0.05 (0.07)	-0.11 (0.07)	-0.18 (0.21)	0.01 (0.05)	0.09 (0.08)	-0.15 (0.07)*
>60 mins	-0.51 (0.23)*	-0.12 (0.06)*	-0.09 (0.06)	-0.19 (0.07)**	-0.37 (0.21)	0.05 (0.05)	0.04 (0.08)	-0.21 (0.07)**
Disability (Ref: No)†								
Yes	0.06 (0.29)	-0.09 (0.07)	0.05 (0.08)	-0.03 (0.08)	-0.24 (0.24)	0.03 (0.06)	0.18 (0.10)	-0.08 (0.09)
Employment (Ref: Yes)†								
No	-0.14 (0.21)	0.04 (0.05)	0.14 (0.06)*	-0.19 (0.06)**	0.08 (0.20)	0.04 (0.04)	-0.03 (0.07)	-0.14 (0.07)*
Visits frequency in 2 years (Ref: 3–5)†								
>5 times	0.16 (0.19)	-0.09 (0.05)	0.13 (0.05)*	-0.16 (0.06)**	-0.21 (0.17)	0.02 (0.04)	0.18 (0.07)	0.07 (0.06)
Self-rated health (Ref: VP/P/F)†								
G/V/G	0.43 (0.19)*	0.05 (0.05)	0.05 (0.05)	0.10 (0.06)	0.08 (0.17)	0.06 (0.04)	0.09 (0.07)	0.18 (0.06)**
Satisfaction (Ref: VP/P/F)†								
G/V/G	1.41 (0.19)**	0.07 (0.05)	0.37 (0.05)**	0.24 (0.06)**	0.35 (0.17)*	0.17 (0.04)**	0.18 (0.07)	0.39 (0.06)**
Years affiliated with HF (Ref: 6 months to 2 years)†								
2–4 years	-0.14 (0.36)	-0.01 (0.09)	-0.08 (0.10)	0.04 (0.10)	-0.61 (0.39)	-0.03 (0.07)	-0.02 (0.12)	-0.05 (0.11)
>4 years	-0.19 (0.26)	0.02 (0.07)	-0.11 (0.07)	0.03 (0.08)	-0.33 (0.24)	-0.11 (0.05)*	0.02 (0.09)	-0.04 (0.08)
Type of health facility (Ref: Neno hosp)†								
Neno HCs	-0.11 (0.33)	-0.07 (0.08)	0.02 (0.09)	0.66 (0.10)**	1.03 (0.35)**	-0.68 (0.07)**	0.20 (0.12)	-0.25 (0.10)
Thyolo HCs	3.77 (0.30)**	-1.35 (0.07)**	-0.12 (0.08)	0.22 (0.09)*	-0.89 (0.32)**	-1.64 (0.06)**	-0.18 (0.11)*	-0.70 (0.09)**
Thyolo hospital	0.36 (0.35)	-0.03 (0.09)	-0.03 (0.09)	0.68 (0.10)**	-0.37 (0.36)	0.04 (0.07)	-0.18 (0.12)	-0.11 (0.11)**
Blantyre HCs	2.87 (0.31)**	-0.69 (0.08)**	-0.17 (0.08)*	-0.04 (0.09)	-1.10 (0.31)**	-0.83 (0.06)**	-0.45 (0.11)**	-0.70 (0.10)**
R ²	30.0%	37.7%	9.0%	15.7%	22.4%	54.4%	5.7%	14.6%

†Unadjusted linear regression models.

‡Linear regression models adjusted for sociodemographic, healthcare and health characteristics of patients.

*P ≤ 0.05; **P ≤ 0.01.

HCs, health centres; HF, health facility.

Performance of primary care in health centres was compared with highlighted differences between urban and rural settings. The better performance reported in Neno health centres is probably due to the same factors as described above. Blantyre and Thyolo districts had similar per capita funding and HCW–patient and CHW–patient ratio. The pattern of performance is also similar across all primary care dimensions although differences in scores among individual dimensions resulted in higher total primary care in the urban facilities. The similar pattern of performance is likely because of the just noted

similarities in their primary care inputs. In addition to having similar available resources, standardised protocols and clinical guidelines are used by the HCWs who provide primary care and would have received similar training. Results of a South African study on organisation and performance of primary care in the Cape Town region, where standardised protocols were used, also did not show a significant difference in experiences of patients from rural and urban settings.¹² This probably implies that equitable distribution of resources is more

important than the setting per se in the quality of services that patients experience.

We also compared primary care experiences among patients attending health centre and hospital clinics. This was done by using facilities in Neno and Thyolo. Health centres play an important gate-keeping role that is essential to well-functioning health systems. In this study, health centres from Thyolo scored lower than the hospital clinic in total primary care and all of the individual dimensions except communication continuity of care. In most districts, the peripheral facilities face more acute challenges than the district hospital. A qualitative assessment of primary healthcare in Malawi found that some of the challenges that peripheral facilities experienced were inadequacy of supplies, shortage of personnel, poor quality of infrastructures and unavailable transport and communication equipment.³³ The same study also found that health partners preferred district-level to health centre-level implementation thereby exacerbating uneven distribution of resources. The poor performance in health centres may also be a result of people's lack of trust in primary care providers and their services.

In Neno, total primary care was similar at the hospitals and health centres. There were, however, differences in performances between the two levels among the individual dimensions with health centres doing better in relational continuity and coordination of care. Smaller facilities tend to favour relational continuity and coordination of care.³⁴ Funding and staffing levels are likely not the only factors that impact on patients' reporting of primary care performance. Further prospective studies could explore the reasons for the similarities in primary care performance between the hospital clinics (Neno and Thyolo) and health centres in Neno.

The differences in primary performance reported by patients from different types of health facilities held true in this study irrespective of the patients' sociodemographic and healthcare characteristics. Among the primary care dimensions, first contact access and comprehensiveness of services available contributed more to the observed variation. The factors that were assessed explained 37.7% and 54.4% of the variances in first contact access and comprehensiveness of services available, respectively. This is a suggestion of some order of importance among the dimensions at least as shown in this study. Utilisation, coordination and continuity of services can effectively take place only when people have access to the services that they need. WHO states in its report on universal health coverage that the first objective is that everybody should be able to access a full range of quality health services.³⁵ A systematic review of the literature on the dimensions of primary care by Kringos *et al* concludes that a hierarchy of importance could be observed. The hierarchy consisted of access to primary care services, the comprehensiveness of services available and provided, continuity and coordination of care.³⁶ The improvement of access to services that people need is therefore a reasonable step towards improving quality of primary care.

Access and comprehensiveness of services largely depend on the facility infrastructure, availability of medical supplies and adequate supply of appropriately trained primary HCWs (including CHWs). On the other hand, continuity of care, coordination and community orientation depend on the local clinic operations.³⁷ Improving primary care in Malawi will therefore require both policy and clinic level interventions. The results of this study also showed that there was no significant difference in communication continuity across the different types of facilities. This dimension also performed well across all facilities. A possible explanation for this might be the similar preservice training that primary care providers receive regarding patient-provider communication. Further studies could explore the role of preservice training interventions in affecting the quality of primary care delivered.

The strength of this study lies in the use of a culturally adapted and locally validated tool that has been used widely globally to assess performance of primary care from patients' perspective in many different settings. Additionally, it is the first time that this kind of study has been undertaken in the three districts. The results of this study, therefore, provide insight into patients' perspective of primary care performance thereby complementing clinical health outcome measures in evaluating quality of health services.

The study had a number of limitations. First, there is potential for bias in the data. Recall bias could occur as the patients were asked to provide information not only from current but also from historical experience. The face-to-face interview partly minimised recall bias through clarifying questions whenever that was necessary. Potential for response bias was possible because data collection was done onsite during a clinic visit. Selection bias might have resulted from excluding those who were acutely ill, frail or had severe mental illness and interviewing only patients who attended clinics. Second, a cross-sectional study is an efficient way of obtaining a large sample. However, it is not possible to make causal inferences from the analysis. Third, this was a study of patient experiences of primary care and not of disease-specific clinical outcomes. Further studies could assess correlations between clinical outcomes and patient experiences of care and the extent to which patient experiences predict later health outcomes. Fourth, there could be unmeasured confounding factors that might affect patients' experience of primary care other than those studied.

CONCLUSION

Despite these limitations, the findings of this study are helpful in providing insight into the performance of primary care in different types of public facilities in Malawi. This paper showed that there is considerable variation in experiences among primary care users in the public health facilities in Malawi. Factors such as funding, policy and clinic-level interventions influence patients'

reports of primary care performance. These factors should be further examined in longitudinal and experimental settings.

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