



UNIVERSITI PUTRA MALAYSIA

***EFFECTIVENESS OF CONCISE MALARIA EDUCATIONAL TRAINING
ON KNOWLEDGE, ATTITUDES AND PRACTICES AMONG PATENTED
MEDICINE VENDORS IN YOBE, NIGERIA***

YAHAYA MOHAMMED KATAGUM

FPSK(P) 2018 20



**EFFECTIVENESS OF CONCISE MALARIA EDUCATIONAL
TRAINING ON KNOWLEDGE, ATTITUDES AND PRACTICES AMONG
PATENTED MEDICINE VENDORS IN YOBE, NIGERIA**

By

YAHAYA MOHAMMED KATAGUM

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,
in Fulfilment of the Requirements for the Degree of
Doctor of Philosophy**

March 2018

COPYRIGHT

All material contained within the thesis, including without limitation text, logos, icons, photographs and all other artwork, is copyright material of Universiti Putra Malaysia unless otherwise stated. Use may be made of any material contained within the thesis for non-commercial purposes from the copyright holder. Commercial use of material may only be made with the express, prior, written permission of Universiti Putra Malaysia.

Copyright © Universiti Putra Malaysia



DEDICATION

I dedicated this work to my deceased parents, my beloved wife and indeed my lovely children. Their collective support, prayers and understanding had kept me aiming higher and higher.



COPYRIGHT UPM

Abstract of this thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

EFFECTIVENESS OF CONCISE MALARIA EDUCATIONAL TRAINING ON KNOWLEDGE, ATTITUDES AND PRACTICES AMONG PATENTED MEDICINE VENDORS IN YOBE, NIGERIA

By

YAHAYA MOHAMMED KATAGUM

March 2018

**Chairman : Hayati Kadir @ Shahar, M.Com Health
Faculty : Medicine and Health Sciences**

Introduction: Over the years, malaria has been a major global public health and developmental challenge, with approximately 40% of the world's population, within the tropical and sub-tropical regions at risk. Worldwide, malaria accounts for an estimated 207 million cases leading to 627,000 deaths (0.03%) yearly. Furthermore, and paradoxically the disease is preventable, treatable and curable, thereby indicating the mortality figures being very alarming. There are no vaccines yet for malaria prevention, as such public health effort are still geared towards effective protection and drug treatment. In Nigeria, malaria is holo-endemic implying an all year round transmission and the Nigerian control strategies facing setbacks of trained manpower shortages. Thus, non-pharmacist drug retailers called Patent Medicine Vendors (PMVs) were incorporated by government to fill gaps based on WHO recommendations. But however, an assessments of PMVs performances consistently reveals lack of necessary knowledge, attitudes and practices (KAP) to effectively implement government strategies on malaria control. This study aims to evaluate the effectiveness of a developed Concise Malaria Educational Training (CONMET) on KAP among PMVs in Yobe-South district, Nigeria.

Methodology: A single-blinded and placebo effected randomised controlled trial was conducted among PMVs in the study location. A process of simple randomization was used to select and assign 292 PMV respondents into the intervention and control arms of study respectively. The development of module was based on the Information-motivation-behavioural (IMB) skills model of health behaviours. Validated pretested questionnaires were used to measure knowledge, attitude and practice at baseline, at immediate, at three months and at six months post-intervention. Data were analysed

using IBM SPSS version 23. A One way ANOVA, mixed design ANOVA and Bonferroni tests were used to assess effectiveness of the intervention. P-value of less than 0.05 was considered the point of significance and partial eta square was measure of effect size.

Results: Results of the study shows a total response rate of 99.6%. Knowledge, attitudes and practices showed statistically significant relationships with educational levels of respondents ($P < 0.001$), while only knowledge showed significant relationship with attendance of training by PMVs ($P = 0.042$). A statistically significant effect of intervention on knowledge was achieved in the intervention arm with a large effect size (partial eta $\eta^2 = 0.562$, $p < 0.001$). The intervention also had a significant effect on respondents attitudes with large effect size ($\eta^2 = 0.297$, $p < 0.001$) in the intervention group. Similarly, a statistically significant effect of intervention was achieved with respect to respondents malaria practices with a large effect size ($\eta^2 = 0.529$, $p < 0.001$) in the intervention group as compared to the control group.

Conclusion: The CONMET intervention was found to be effective in improving knowledge, attitudes, and practices of the selected respondents. The developed module and training approaches can be adopted by government, regulatory agencies and PMV associations to improve their malaria training curriculum.

Key words: patent medicine vendors, knowledge, attitude, practice, malaria training.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

**KEBERKESANAN LATIHAN DAN PENDIDIKAN MALARIA TERHADAP
PENGETAHUAN, SIKAP DAN AMALAN DI KALANGAN PEMBEKAL
PATEN PERUBATAN DI YOBE, NIGERIA**

Oleh

YAHAYA MOHAMMED KATAGUM

Mac 2018

**Pengerusi : Hayati Kadir @ Shahar, M.Com Health
Fakulti : Perubatan dan Sains Kesihatan**

Pengenalan: Setiap tahun, malaria telah menjadi masalah utama untuk kesihatan umum dan pembangunan global, yang merangkumi lebih kurang 40% penduduk dunia, dalam kawasan tropika dan sub-tropika yang berisiko. Di seluruh dunia, malaria menjangkiti lebih kurang 207 juta kes yang meyebabkan 627,000 kematian (0.03%) setiap tahun. Tambahan pula, hakikatnya, penyakit ini boleh dicegah, dirawat dan disembuhkan, walaupun menunjukkan angka kematian yang sangat membimbangkan. Belum ada vaksin lagi bagi pencegahan malaria, kerana usaha kesihatan awam masih menuju kearah keberkesanan perlindungan dan ubatan untuk rawatan. Di Nigeria, malaria adalah satu holo-endemik yang merangkumi segala jenis jangkitan dan langkah-langkah kawalan untuk masyarakat Nigeria terbatas kerana menghadapi masalah kekurangan tenaga kerja yang terlatih. Oleh itu, pembekal ubatan yang bukannya ahli farmasi yang dikenali sebagai Pembekal Perubatan Paten (PMV) telah diperkenalkan oleh kerajaan untuk mengisi kekurangan seperti yang dicadangkan oleh WHO. Walaubagaimanapun penilaian prestasi PMV yang konsisten menunjukkan bahawa kurangnya pengetahuan, sikap dan amalan (KAP) yang diperlukan untuk melaksanakan strategi kerajaan untuk kawalan malaria secara berkesan. Kajian ini bertujuan untuk menilai keberkesanan Latihan dan Pendidikan Ringkas Malaria (CONMET) terhadap KAP dalam kalangan PMV di daerah Yobe-Selatan, Nigeria.

Metodologi: Kajian rawak terkawal rabun sebelah dan kesan placebo telah dijalankan dalam kalangan PMV di lokasi kajian. Seramai 292 PMV telah dipilih secara rawak dan diagihkan kepada kumpulan intervensi dan kawalan dengan menggunakan teknik persampelan rawak bersistematik. Pembentukan modul adalah berasaskan model skil kemahiran-motivasi-tingkah laku dari perilaku kesihatan. Borang soal selidik yang disahkan telah digunakan untuk menilai pengetahuan, sikap dan amalan pada peringkat awal, segera, dalam masa tiga bulan dan enam bulan selepas intervensi. Data

dianalisis dengan menggunakan SPSS versi 23. Ujian ANOVA sehalu, ujian ANOVA gabungan dan Bonferroni telah digunakan untuk menilai keberkesanan intervensi. Nilai p kurang daripada 0.05 dianggap signifikan dan ujian eta persegi digunakan sebagai ukuran saiz keberkesanan.

Hasil Kajian: Hasil kajian ini menunjukkan kadar penyertaan sebanyak 99.6%. Pengetahuan, sikap dan amalan menunjukkan hubungan statistik yang signifikan dengan tahap pendidikan responden ($P < 0.001$), manakala hanya pengetahuan menunjukkan hubungan yang signifikan dengan kehadiran ke latihan oleh PMV ($P = 0.042$). Intervensi menunjukkan kesan yang signifikan dari segi statistik terhadap pengetahuan dengan saiz keberkesanan yang besar (η^2 separa = 0.562, $p < 0.001$). Intervensi juga mempunyai kesan yang signifikan terhadap sikap responden dengan saiz keberkesanan yang besar ($\eta^2 = 0.297$, $p < 0.001$). Begitu juga, intervensi terhadap amalan malaria responden menunjukkan kesan yang signifikan dengan saiz keberkesanan yang besar ($\eta^2 = 0.529$, $p < 0.001$) dalam kumpulan intervensi berbanding dengan kumpulan kawalan.

Kesimpulan: Intervensi CONMET ini didapati berkesan dalam meningkatkan pengetahuan, sikap, dan amalan responden yang dipilih. Pendekatan modul dan latihan yang dibentuk boleh digunakan oleh kerajaan, agensi kawal selia dan persatuan PMV untuk meningkatkan kurikulum latihan Malaria.

Kata kunci: pembekal ubat paten, pengetahuan, sikap, amalan, latihan malaria.

ACKNOWLEDGEMENTS

All praise and acknowledgements must first be to Allah, the lord of the worlds, the most beneficent and the most merciful, of whom by his magnanimity this work saw the light of the day.

I wish to express my profound gratitude to my supervisors: Dr. Hayati Kadir @ Shahar, Prof. Madya Dato' Dr. Faisal Hj. Ibrahim, Dr. Anisah Baharom, Dr. Mohd Rafee Baharudin and Prof. Dr. Kabiru Sabitu. I remain indebted to you all for your guidance, concerns, constructive criticisms, and above all the support in all respect that led to the success of this work. I thank you all for guiding me through the course of this work and for standing by me even when I had difficulties to continue with the program. You have indeed left an indelible mark on my life and that of my family. And I say, that completing this work is not adios between us.

Acknowledgement also goes to my parents, Rear Admiral I. N. Katagum, Hajiya Habiba Katagum and Alhaji Garba Katagum (all of blessed memory) who stood tirelessly to see me achieve the best education I could possible achieve and also gave me the opportunity to decide my career. May your souls rest in Jannatul Firdaus, Amin.

My acknowledgement must also extend to my wife, Hajiya Hafsat Abubakar Aliyu and my children Alhaji Ibrahim, Ordinary Abu-Bakr, Darling Rukky and my baby Umma-Habiba for the care, love, sacrifices and prayers you all made during the period of this study. May Allah bless you all and make it easy for you in this life and the one beyond.

I also wish to express my gratitude to numerous friends and well-wishers both in Nigeria and the ones here in Malaysia of which space may not permit me to mention names, your contributions and efforts will remain indefatigable on my mind. Lastly, I would like to appreciate the support and services of all the academic and non-academic staff of UPM that contributed in one way or the other, especially those of the Faculty of Medicine and Health Sciences for their services, talents and guidance in the course of this work.

I certify that a Thesis Examination Committee has met on 9 March 2018 to conduct the final examination of Yahaya Mohammed Katagum on his thesis entitled "Effectiveness of Concise Malaria Educational Training on Knowledge, Attitudes and Practices among Patented Medicine Vendors in Yobe, Nigeria" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

Members of the Thesis Examination Committee were as follows:

Rukman bin Awang Hamat, PhD

Associate Professor
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Chairman)

Hejar binti Abd. Rahman, PhD

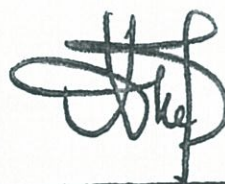
Associate Professor
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Internal Examiner)

Titi Rahmawati binti Hamedon, PhD

Senior Lecturer
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Internal Examiner)

Akm Fazlur Rahman, PhD

Professor
Bangladesh University of Health Sciences
Bangladesh
(External Examiner)



NOR AINI AB. SHUKOR, PhD
Professor and Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

Date: 24 May 2018

The thesis was submitted to the Senate of the Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. Members of the Supervisory Committee were as follows:

Hayati Kadir@Shahar, MBBch BAO, M.Comm. Health, PhD

Medical lecturer
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Chairman)

Faisal Bin Hj Ibrahim, MBBS, MPH, MPHM

Associate Professor
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Member)

Anisah Baharom, MBBS, MComm. Health, PhD

Medical lecturer
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Member)

Mohd Rafee Baharuddin, Bs.KPP, MSc., PhD

Senior lecturer
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Member)

Kabir Sabitu, MBBS, MIAD, MIPHA, FWAC

Professor
Faculty of Medicine
Ahmadu Bello University, Nigeria
(Member)

ROBIAH BINTI YUNUS, PhD

Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:

Declaration by graduate student

I hereby confirm that:

- this thesis is my original work,
- quotations, illustrations and citations have been duly referenced;
- the thesis has not been submitted previously or concurrently for any other degree at any other institutions;
- intellectual property from the thesis and copyright of thesis are fully-owned by Universiti Putra Malaysia, as according to the Universiti Putra Malaysia (Research) Rules 2012;
- written permission must be obtained from supervisor and the office of Deputy Vice-Chancellor (Research and Innovation) before thesis is published (in the form of written, printed or in electronic form) including books, journals, modules, proceedings, popular writings, seminar papers, manuscripts, posters, reports, lecture notes, learning modules or any other materials as stated in the Universiti Putra Malaysia (Research) Rules 2012;
- there is no plagiarism or data falsification / fabrication in the thesis, and scholarly integrity is upheld as according to the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) and the Universiti Putra Malaysia (Research) Rules 2012. The thesis has undergone plagiarism detection software.

Signature: _____ Date: _____

Name and Matric No: Yahaya Mohammed Katagum, GS38382

Declaration by members of Supervisory Committee

This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) are adhered to.

Signature: _____
Name of
Chairman of
Supervisory
Committee: Dr. Hayati Kadir@Shahar

Signature: _____
Name of
Member of
Supervisory
Committee: Associated Professor Dr. Faisal Bin Hj Ibrahim

Signature: _____
Name of
Member of
Supervisory
Committee: Dr. Anisah Baharom

Signature: _____
Name of
Member of
Supervisory
Committee: Dr. Mohd Rafee Baharuddin

Signature: _____
Name of
Member of
Supervisory
Committee: Professor Dr. Kabir Sabitu

TABLE OF CONTENTS

	Page
ABSTRACT	i
ABSTRAK	iii
ACKNOWLEDGEMENTS	v
APPROVAL	vi
DECLARATION	viii
LIST OF TABLES	xv
LIST OF FIGURES	xvii
LIST OF ABBREVIATIONS	xviii
CHAPTER	
1 INTRODUCTION	1
1.1 Background	1
1.2 Problem Statement / Justification of the study	3
1.3 Significance of the Study	6
1.4 Research Questions	8
1.5 Research Objectives	8
1.5.1 General Objectives	8
1.5.2 Specific Objectives	8
1.6 Research Hypothesis	8
2 LITERATURE REVIEW	10
2.1 Overview of malaria	10
2.2 Epidemiology of malaria	11
2.2.1 Global Trends	11
2.2.2 Malaria situation in Nigerian	12
2.2.3 Malaria situation in Yobe south district	13
2.3 Aetiology of malaria	13
2.4 Transmission of malaria	14
2.5 Disease Signs & Symptoms	15
2.6 Diagnosis of malaria	16
2.7 Treatment of malaria	16
2.7.1 General treatment of malaria	17
2.7.2 Malaria treatment by PMVs and the enabling policy in Nigeria	17
2.7.3 National Antimalarial Treatment and Control Policy.	18
2.8 Prevention of Malaria	20
2.9 Patent Medicine Vendors (PMVs)	22
2.9.1 Historical origin and social organisation of PMVs in Nigeria	22
2.9.2 The role of PMV in the treatment and prevention of malaria	23
2.9.3 Problems and shortfalls in PMVs operations	25

2.9.4	Factors associated with PMV's performance and activities	28
2.9.5	Association between KAP and personal factors of PMVs	30
2.9.6	Existing training program for PMVs in Yobe	31
2.10	Systematic review of the effectiveness of malaria intervention programmes among patent medicine vendors.	32
2.10.1	Background	32
2.10.2	Materials and Method	33
2.10.3	Results	35
2.10.4	Discussion	40
2.10.5	Conclusion	42
2.11	Theoretical Framework	43
2.11.1	The Health Belief Model (HBM)	43
2.11.2	Social Cognitive Theory (SCT)	44
2.11.3	The Precede-Proceed Model	45
2.11.4	Information-Motivation- Behaviour Skills Model (IMB)	45
2.11.5	The Component of Information Motivation Behavioural (IMB) skill model used in the intervention delivery of this study	47
2.12	Conceptual Framework	49
2.13	Conclusion	52
3	METHODOLOGY	53
3.1	Study location	53
3.2	Study Design	54
3.3	Study Population	55
3.3.1	Inclusion Criteria	55
3.3.2	Exclusion Criteria	55
3.4	Sampling technique	55
3.4.1	Randomisation sequence and allocation	55
3.4.2	Blinding of Participants	56
3.4.3	Allocation concealment	56
3.4.4	Wait-list group	56
3.5	Sampling Frame	57
3.6	Sampling Population	57
3.7	Sample Size Calculation	57
3.8	Instruments	59
3.8.1	Questionnaire	59
3.8.1.1	Socio-Demographic Information Questionnaire (SDQ)	59
3.8.1.2	Malaria Knowledge Questionnaire (KQ)	59
3.8.1.3	Malaria Attitude Questionnaire (AQ)	60
3.8.1.4	Malaria Practice Questionnaire (PQ)	60
3.8.2	The CONMET Intervention training module	60
3.8.2.1	Process of the CONMET module development	61
3.9	The Intervention Protocol and Delivery	62

3.9.1	The Intervention training	62
3.9.2	Intervention by imparting theory on the protocol delivery	62
3.9.3	Training of Facilitators	63
3.9.4	Intervention program delivery and participation	64
3.9.5	Delivery of the lecture to the control group	68
3.9.6	Remunerations / Other provisions to participants	69
3.10	Data Collection Process	70
3.11	Quality assurance / Validity and Reliability of the study Instruments	72
3.11.1	Face Validity of the Questionnaire	72
3.11.2	Content Validity of Questionnaire	72
3.11.3	Reliability Test for Questionnaire	72
3.11.4	Pre-testing the CONMET module	72
3.11.5	Content Validity of the CONMET module	73
3.11.6	Reliability analysis for the CONMET module	73
3.12	Data Analysis	74
3.13	Ethical Consideration	75
3.14	Operational Definitions	75
3.14.1	Variables (Independent and Dependent)	75
3.14.2	Definitions of terms	76
3.15	Conclusion	77
4	RESULTS	78
4.1	Response Rate of the study	78
4.2	Characteristics of Data	81
4.2.1	Checking of Data	81
4.2.2	Test for Normality	81
4.2.3	Multi collinearity of Data	82
4.3	Sociodemographic characteristics, working experiences and previous training experiences of respondent PMVs, and their comparison between the intervention group and the control groups at baseline	82
4.4	Knowledge, attitudes and practices of respondent PMVs on malaria at baseline	84
4.4.1	Baseline comparison of the mean scores for knowledge, attitude and practice of the respondents.	85
4.4.2	Baseline comparison of level of knowledge, level of attitude and level of practice of respondents between the intervention and control groups	85
4.5	Association between knowledge, attitudes and practices (KAP) with the personal factors (socio-demographic variables, working experiences and training experiences) of respondent PMVs	86
4.5.1	Association between knowledge of respondents and the socio-demographic factors, working experience and training experience of respondents	87

4.5.2	Association between attitudes of respondents and their socio-demographic factors, working experience and training experience	91
4.5.3	Association between practices of respondents and their socio-demographic factors, working experiences and training experiences	95
4.6	Effectiveness of the intervention on knowledge of malaria within and between the intervention and the control groups	99
4.6.1	Group main effects on malaria knowledge mean scores between the intervention and the control groups	99
4.6.2	Change in malaria knowledge within the groups from baseline level to six months post-intervention (within subject effects)	100
4.6.3	Group main effect of malaria knowledge scores between intervention and control groups (between subjects effect)	101
4.6.4	Estimated marginal means of measure for knowledge.	102
4.7	Effectiveness of the intervention program on attitude of respondents within and between the intervention and the control group	103
4.7.1	Group main effects on malaria attitude mean scores between the intervention and the control groups	103
4.7.2	Change to attitude towards malaria following the intervention program within group (within subject effects)	104
4.7.3	Group main effect between the intervention and the control groups of respondents towards malaria attitudes scores (between subjects effect)	105
4.7.4	Estimated marginal means for attitudes	106
4.8	Effectiveness of the intervention on practices of malaria within and between the intervention group and the control groups	107
4.8.1	Group main effects on malaria practice mean scores between the intervention group and the control group.	107
4.8.2	Change to good practice within the group following the intervention from baseline level to 6 months post-intervention (within subject effects)	108
4.8.3	Group main effect of malaria between the intervention and control groups of respondents towards malaria practices (between subjects effect)	109
4.8.4	Estimated marginal means for practices of respondents	110
5	DISCUSSION	112
5.1	Attrition rate	112
5.2	Baseline Personal factors of respondents (socio-demographic factors, working experiences and training experiences) of respondents	112
5.2.1	Age of respondent PMVs	112
5.2.2	Gender of respondent PMVs	113

5.2.3	Educational levels attained by respondent PMVs	113
5.2.4	Working experiences of PMVs	114
5.2.5	Attendance of trainings by respondent PMVs	115
5.3	Comparison of baseline assessments regarding malaria among respondent PMVs in the intervention and the control groups	116
5.3.1	Overall baseline good knowledge of respondents	116
5.3.2	Overall baseline positive attitude of respondents	117
5.3.3	Overall baseline good practices of respondents	118
5.4	Association between KAP of PMVs and their personal factors	119
5.4.1	Association between knowledge of respondents and their personal factors	119
5.4.2	Association between attitudes of respondents and their personal factors	120
5.4.3	Association between practices of respondents and their personal factors	120
5.5	Evaluating the effectiveness of the intervention on outcome measures	121
5.5.1	Effect of intervention on malaria knowledge	122
5.5.2	Effect of intervention on malaria attitudes	124
5.5.3	Effect of intervention on malaria practices	126
6	SUMMARY, CONCLUSION, AND RECOMMENDATIONS	129
6.1	Strengths of the study	129
6.2	Limitations	131
6.3	Conclusion	131
6.4	Recommendations and Implications	132
6.4.1	Recommendations for future research	132
6.4.2	Implication for services	133
	REFERENCES	134
	APPENDICES	146
	BIODATA OF STUDENT	232
	PUBLICATION	233

LIST OF TABLES

Table	Page
2.1 Summary of training curriculum for patent medicine vendors in Yobe	32
2.2 Review of Related Studies	36
2.3 Review of Related Studies...continued	37
2.4 Review of Related Studies ...continued	38
2.5 Review of Related Studies ...continued	39
3.1 Level of participation offered by various training methods employed	63
3.2 Topics covered in modules & strategy for program delivery sessions with respect to theory	65
3.3 Topics covered in the Control group lectures	69
3.4 Reliability Test Results for Questionnaire at Pre-test (N = 30)	72
3.5 Results of reliability of module (N = 44)	74
4.1 Response Rate for the Study	79
4.2 Correlation Matrix for the outcome measures	82
4.3 Baseline socio-demographic characteristics, working experiences and previous training experiences of respondent PMVs in the two groups and their comparison (between Intervention and Control) (n = 292)	84
4.4 Baseline mean scores of malaria knowledge, attitudes, and practices of the respondents and their comparison (between the intervention group and the control groups) (n=292)	85
4.5 Overall baseline performance of respondents	86
4.6 Baseline comparison of level of knowledge, level of attitude, and level of practices among intervention and control group (n = 292)	86
4.7 Association between knowledge of respondents with age group & gender	88
4.8 Association between knowledge of respondents with their attained educational levels and years of practice	89
4.9 Association between knowledge of respondents and having attended various trainings	90
4.10 Association between attitude of respondent's with age groups & gender	92
4.11 Association between attitude of respondent's with attained educational levels & years of practice	93
4.12 Association between attitude of respondent's and having attending various trainings	94

4.13	Association between practice of respondent's with age groups & gender	96
4.14	Association between practice of respondent's with educational levels attained & years of practice	97
4.15	Association between practice of respondent's and having attended various trainings	98
4.16	Group main effect on malaria knowledge scores at baseline level, immediately post-intervention, three months and six months post intervention between the intervention and control groups	100
4.17	Change in knowledge of malaria following intervention within group	100
4.18	Effect of intervention on knowledge between the intervention and control groups (Between subject effects)	101
4.19	Multiple pairwise comparisons of malaria knowledge at different level trial between the intervention and control group	102
4.20	Group main effect on malaria attitude scores by comparison at baseline level, immediately post-intervention, three months post-intervention and six months post-intervention between the intervention and the control groups	104
4.21	Change in positive attitude following the intervention within group	104
4.22	Effect of group, time and group x time interaction for attitude scores towards malaria treatment & prevention (between subject effects)	105
4.23	Multiple pairwise comparisons of malaria attitudes at different level trial between the intervention and control groups	106
4.24	Group main effect on malaria practice scores at baseline level, immediately post-intervention, three months post-intervention and six months post-intervention between the intervention group and the control group	108
4.25	Change in positive practices following the intervention within group (within subject effects)	108
4.26	Effect of group, time and group x time interaction for practice scores towards malaria treatment & prevention (Between subject effects)	109
4.27	Multiple pairwise comparisons of malaria practices at different level trial between the intervention and control groups	110

LIST OF FIGURES

Figure	Page
1.1 A diagrammatic approximation of parts of the world where malaria transmission occurs. Adopted from the Centre for Disease Control & Prevention (CDC), 2014	2
2.1 PRISMA search & selection flow diagram	34
2.2 Information-motivation-behavioural skills model	47
2.3 Conceptual Framework of the effects of training program on KAP of PMVs	51
3.1 Map of Nigeria showing Study Location	53
3.2 Research Framework of the study	54
3.3 Flow Chart of the Study	71
4.1 Consort flow chart of the study	80
4.2 Interaction plot between group and time of mean knowledge scores in respect of malaria for the intervention and the control groups	102
4.3 Interaction plot between group and time of mean attitude scores towards malaria for the intervention and the control groups	106
4.4 Interaction plot between group and time of mean practice scores for malaria for the intervention and the control groups	110

LIST OF ABBREVIATIONS

Δ	mean difference
ACT	Artemisinin Combination Therapy
ANOVA	Analysis of Variance
AQ	Attitude questionnaire
CDC	Centre for Disease Control & Prevention
CI	Confidence Interval
CONMET	Concise Malaria Educational Training
CQ	Chloroquine
GDP	Good Dispensing Practices
HBM	Health Belief Model
IMB	Information-Motivation- Behaviour Skills Model
ITN	Insecticide treated bed nets
KAP	Knowledge, Attitudes and Practices
KQ	Knowledge questionnaire
LG	Local Government Councils
LLINs	Long Lasting Insecticidal Nets
MDGs	Millennium Development Goals
MIT	Motivational interviewing techniques
NATCP	National Antimalarial Treatment and Control Policy
NGO's	Non-Governmental Organizations
OTC	Over the counter drugs
PHC	Primary healthcare
PI	Post Intervention
PMV	Patent Medicine Vendor
POM	Prescriptions only medicines
PPMVL	Patent & Proprietary Medicine Vendor Licence

PQ	Practice questionnaire
RBC's	Red blood cells
RBM	Roll back malaria
RCT	Randomised controlled trial
RDTs	Rapid Diagnostic Tests
SD	Standard deviation
SPSS	Statistical package for social sciences
SSA	Sub-Saharan Africa
UKAID	United Kingdom Agency for International Development
UNICEF	United Nations Children Fund
USAID	United States Agency for International Development
WHO	World Health Organisation

CHAPTER 1

INTRODUCTION

This chapter introduces the study, it entails a study background, the problem statement, the significance of the study, the research questions, the objectives of study (general and specific), the research questions and the research hypothesis.

1.1 Background

Malaria remains a major global public health and development challenge over the years and in its World Malaria Report 2013, the World Health Organization (WHO) states that an estimated 3.4 billion people are at risk of malaria, and that an estimated 207 million cases had led to about 627,000 deaths in the year 2012 alone (World Health Organisation, 2013). Three years later in 2016, the WHO reported an increase in the number of cases to 212 million but with a corresponding decrease in the number of deaths to 429,000 deaths worldwide in 2015 (WHO, 2016). According to the report, reduction in mortality is attributed largely to effective containment efforts by some countries that are now no longer malaria endemic, these are countries located in South America, Europe, Asia and North Africa (WHO, 2016). Furthermore, the observed increase in number of malaria cases is found within the sub-Saharan African region where the most malaria endemic countries lie and these countries had accounted for 81% of all malaria cases and 91% of deaths (Center for Disease Control and Prevention, 2015, 2010; WHO, 2011).

Malaria, a parasitic protozoans from the genus Plasmodium is still the major public health issue in sub-Saharan African countries and many other parts of the developing countries (Gay-Andrieu, Adehossi, Lacroix, Gongara, Ibrahim, Kouma, et al., 2005; Barat, Palmer, Basu, Worrall, & Mills, 2004; Pluess, Levi, & Smith, 2009). But paradoxically, the disease is still preventable, treatable and curable (Nabarro & Mendis, 2000; Sachs & Malaney, 2002), thus making the figure of casualties very alarming despite the recent decline in mortalities. There are not yet any potent vaccines to prevent this leading cause of illness and death, as such public health effort are still geared towards effective protective measures and the drug treatment.

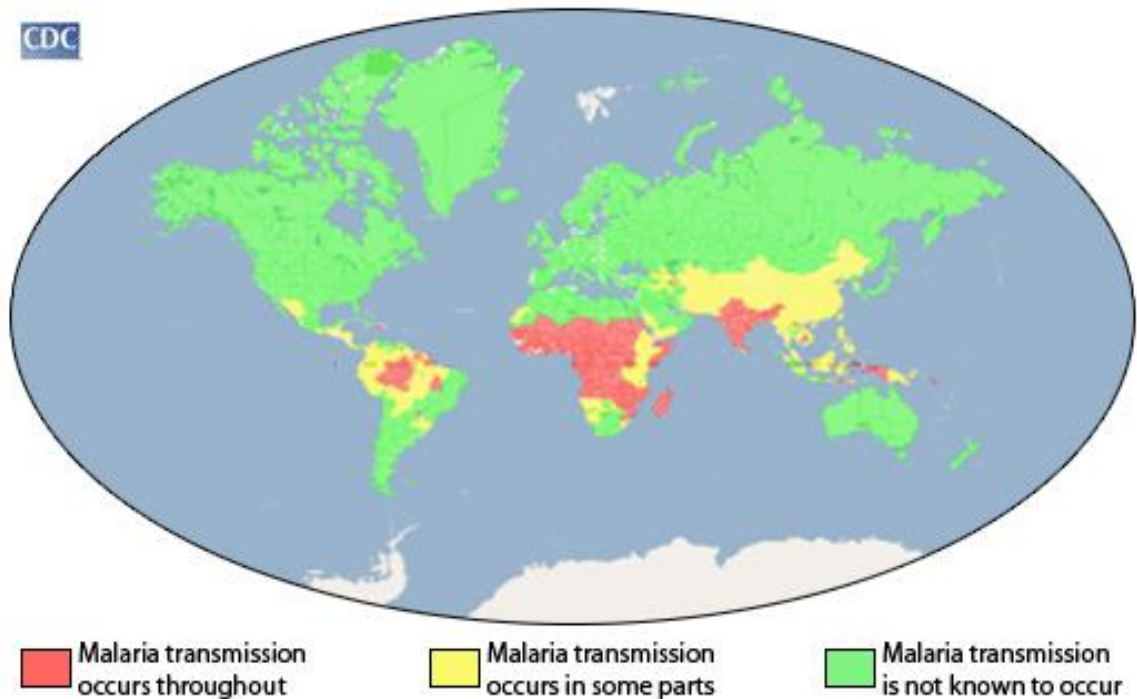


Figure 1.1 : A diagrammatic approximation of parts of the world where malaria transmission occurs. Adopted from the Centre for Disease Control & Prevention (CDC), 2014

In Nigeria where malaria is holo-endemic there is greater intensity in the rainy than in the dry seasons (Idowu, Mafiana, Luwoye, & Adehanloye, 2008; Coker, Chukwuani, Ifudu, & Aina, 2001). According to the Nigeria Malaria Indicator Survey (NMIS, 2012), malaria was tagged a major public health issue because Nigeria alone bears up to 25 percent of the malarial disease burden in Africa, and the disease had already overburdened the already-weakened health system with nearly 110 million clinical cases diagnosed each year (NMIS,2012).

As a fallout of all these factors mentioned, the huge mortality and / or morbidity rates due to persistent infection and re-infection became difficult to handle in both the rural and urban areas and this is primarily due to the shortage of trained health professionals to cover the country's huge population growth (NMIS, 2012). Thus, retail Patent Medicine Vendor's (non-Pharmacist operated drug dealers) whom commonly serve as sources of Over-the-Counter (OTC) medicines and services were available to complement these services. Patent Medicine Vendors (PMVs) provide antimalarial treatment and other healthcare services throughout Sub-Saharan Africa, and they potentially play a very critical role in the fight against malaria (Berendes, Adeyem, Oladele, Oresanya, Okoh, & Valadez, 2012).

However, it should also be noted that a systematic assessments of PMVs performance of quality are undoubtedly crucial if their role is to be managed within the healthcare system (Berendes et al., 2012) this is because PMVs do not have a formal pharmacy training but ‘sell orthodox pharmaceutical products on a retail basis for profit’ (Brieger et al., 2004). On the overall, PMVs have generally been considered to have a poor knowledge of the Nigerian national policies on malaria, because less than 20% have heard about the 2011 national policy on malaria as well as the recommended diagnosis and treatment patterns, and yet still less than 5% of PMVs have seen or read a copy of the document (Future Health Systems, 2014). Furthermore, given the lack of awareness of the PMVs, it is not surprising that the quality of their practices on the symptoms, diagnosis, treatment and prevention of malaria is consistently reported to be of poor standings (Okebe, Walther, Bojang, et al., 2010; FHS, 2014; Akuse, et al., 2010). These findings from documented studies of poor activities by the PMVs give justification to this study aimed at improving PMV knowledge, attitudes and practices.

The strategy of this study was to adopt a theory based approach in training PMVs on KAP so as to yield a more result oriented training. A similar strategy was employed in Ghana to train caregivers of children and Community Health Workers by Abbey, Bartholomew, Chinbuah, Gyapong, and van den Borne (2017). These researchers systematically developed a theory- and evidence-based health promotion program with regards to their intervention which led to achieving their primary program goals of reducing mortality up to 30% and 44% among children undergoing antimalarial treatments. Furthermore, the study by these researchers contributed meaningfully in responding to recent calls for a more detailed description of the development of interventions and trials with theoretical approaches (Abbey et al., 2017). Adopting the strategy had a positive effect on the present study considering the consistently poor KAP of most PMVs, even for those who claimed to have attended trainings. It is also worthy of note that all documented PMV interventions on malaria that were reviewed lacked theoretical backing in their designs. Introducing theoretical backing to an intervention study design is also a more scientifically acceptable way of conducting intervention studies in behaviour modification and as such results thereof will be easier to understand, explained and accepted.

1.2 Problem Statement / Justification of the study

Malaria still remains a leading cause of death and illnesses especially among tropical countries, with the African continent alone accounting for 91% of all malaria deaths (CDC, 2015). Particularly, malaria accounts for more cases and deaths in Nigeria than any other country in the world, with an estimated 100 million cases and 300, 000 deaths yearly (WHO, 2016). These statistic figures are way too alarming and hence unbearable for a preventable, treatable and fully curable disease.

Malaria which constitutes the major public health problem in Nigeria also exposes up to 97 percent of the country’s more than 160 million people (with an estimated annual growth rate of about 2.6%) at risk of getting the disease (NMIS, 2012) and this

happens in a country lacking enough trained health manpower (WHO, 2011). The manpower deficiencies in healthcare providers gave justification for the inclusion of PMVs in the country's malaria containment efforts. But however, the strategy had not proved to be very effective because KAP among PMVs were still revealed by several studies to be generally poor and is considered a serious challenge to the identified potentials the PMVs possess in malaria containment (Oyeyemi, 2014; Akuse, 2010; Abuya, 2010; Buabeng, 2010, Livinus, 2009, Okeke & Uzorchukwu, 2009). The poor KAP of PMVs justifies the need for drastic improvement on the little training PMVs receive at inception which is an all-encompassing course, without special emphasis on malaria.

Furthermore, there is no structured training or health education intervention module on KAP directed and specific for PMVs regarding malaria in Nigeria (Berendes et al, 2012). There is also little or no provisions for re-training programs on malaria treatment and prevention except, in some instances where local and informal trainings are conducted and reported by some PMVs (Berendes, Adeyemi, Oladele, Oresanya, Okoh, & Valadez, 2012). There is also no existing policy on a periodic re-certification for the PMVs as is the case with Pharmacists that are also being regulated by the same regulatory agency, the Pharmacist Council of Nigeria. In addition, the majority of PMV Association executives and their members are unaware of the 2011 National Policy on malaria which categorically specifies recommended treatment guidelines for malaria (FHS, 2014), this is due to absence of training and re-training where only few PMVs are opportuned to attended workshops / trainings on malaria after commencing practice (FHS, 2014) which further adds to the poor KAP. Little emphasis is also given to signs, symptoms and diagnosis, referrals and prevention practices of malaria in the initial training of PMVs for those who undergo the training which is because the limited training they attend encompasses all aspects of PMV training including PMV laws and ethics, other diseases, dispensing practices and prescription interpretation, categorization of drugs and their uses amongst others and within a limited training period.

Furthermore, very few intervention studies on KAP regarding malaria among PMVs are available (FHS, 2014; FMH, 2009), which concurs with claims by various literature arguing that the activities of PMVs are neither well-studied nor well-documented (Akuse et al., 2010; FHS, 2008). Review of literature has also variously revealed only short term interventions on malaria treatment and prevention to PMVs, though in all cases had yielded a fairly significant results as in studies by Abuya et al., 2010 (OR; 9.4: 95% CI 1.1, 83.7); Nsimba, 2007 ($p < 0.01$); Fatungase et al., 2012 ($p < 0.001$), but these studies also show that KAP of the PMVs from most of the communities are still at a low level even after the significant effects of the short training. Furthermore, all reviewed intervention trainings on malaria lacked the advantages of a follow-up trainings to assess effect of multiple trainings or booster sessions on respondents KAP long after initial training, this additional training input will appreciably re-enforce initial training (Anka et al., 2016). So also, of all documented studies available on malaria interventions none had a theory based approach to its training, which would have presented a more formidable, scientifically

proven and result oriented study design. Theory based behavioural studies thus have acceptable explanations to observed changes and strength of study improves with the use of theoretical frameworks (Wilroy and Knowlden, 2015).

Little is also known about the malaria treatment and prevention activities of the PMVs and the poorly regulated market in which they operate (FHS, 2007; FHS, 2008). This also makes activities involving PMVs such as planning, evaluation and research very difficult if not impossible. Despite PMVs being recognised as major potentials in the fight against malaria by the WHO and the Nigerian government (FMH, 2005a), PMVs are yet to receive the needed attention from researchers, health institutions academic institutions and policy makers in this direction, considering the role they could play in a major public health issue like malaria. Goodman, et al., (2007) also observed that governments in most developing countries have only concentrated on training the health workers in the public sector of their healthcare. This leaves out the health providers in the private sectors, of which PMVs alone are mostly the first points of contact once there are signs or other symptoms of malaria or other diseases in over 57% of cases in Nigeria (FHS, 2014).

The inadequacy of knowledge, attitudes and practices (KAP) among PMVs and other structural or behavioural factors if unattended to, could further lead to additional complications such as misdiagnosis, delayed referrals, over- and under-treatment with drugs, and a resultant increased risk of the disease progression, toxicity and above all, the development of drug resistance to hitherto sensitive drugs and an increase in morbidity / mortality as grave consequences (Okeke, Uzochukwu, & Okafor, 2006; Goodman et al., 2007). This deficiency in proper KAP towards malaria treatment and its prevention has characterised the practice by PMVs and as a result, had led to the formal health establishments to often view PMV activities with great alarm and despair. But at the same time, the lack of adequately trained health manpower capacity limits the contributions of the formal health sector in malaria control (NMIS, 2012). For these reasons, many communities have no options than to continue relying on the poorly trained, or in some cases untrained PMVs for their malaria health needs, and knowingly or unknowingly bearing all the risks and consequences involved.

From the foregoing, all the factors discussed expose the PMVs to insufficient knowledge, attitudes and practices on malaria of which lack of training is identified as the main reason for the widely reported poor KAP on malaria practices (Oyeyemi et al., 2014; Oladepo, et al., 2011; Akuse et al., 2010; Buabeng et al., 2010; Abuya, et al., 2010; Okeke & Uzochukwu, 2009; Livinus et al. 2009). This had led to increasing calls for interventions to improve the treatment and prevention practices obtained from PMVs (Rusk et al., 2012; Berendes et al., 2012; Okeke et al., 2006). In addition, for the many Nigerians who patronise and depend on PMVs for their health issues, it is difficult for them to know if they have access to quality treatment and prevention services (FHS, 2009). It then becomes very necessary to plan an intervention program to explore the gaps in PMV KAP regarding malaria and to develop a theory based concise training module with a different approach to training and that will sustainably improve on the existing PMV KAP within the selected study location. The study will

then evaluate the long term effectiveness of the developed training module on knowledge, attitudes and practices of PMV who are a convenient and more accepted link to the majority of the community members on malaria issues. The efforts will therefore lead to an improvement in public health practices within communities of the study district by increasing KAP that is critical to exploiting PMV potentials.

1.3 Significance of the Study

This study provides a new structured multi-component educational intervention with evidence based health education modules for the training of PMVs. The new training module was specifically developed for the PMVs. Furthermore, since short term training on malaria either formal or informal, had yielded some meaningful results (Abate et al, 2013; Dike et al, 2006), a comprehensive yet concise training for the respondent PMVs (for periods of five days and an incorporated booster session three months after) with strong emphasis on malaria is presumed to be more effective in increasing PMVs KAP. This module can therefore be used as a model to train other PMVs and can serve as a reference to the PMV associations to be used when training and re-trainings are conducted.

This study will demonstrate the effectiveness of the Information Motivation Behavioural skills model (Fisher & Fisher, 2009) as a useful instrument in explaining the stages of this theoretically based health education intervention program in malaria. This study will be the first documented study that employs this theory to studies involving the training of PMVs in a malaria intervention set up. By so doing, this study will have opened up the use of this robust theory in other aspects of malaria interventions such as studies targeted at changing approaches and behaviours patterns to preventive strategies, which is till now, the mainstay in malaria containment efforts.

The study will also improve malaria control activities within the study communities and by so doing contributed to stepping-up the general malaria control activities of the study communities where it is carried out, particularly to the clients that patronise these PMVs because the clients of PMVs are the ones at the receiving end of any consequence of inadequate KAP by the PMVs such as administration of in-effective and obsolete anti-malarials, wrong instructions on dosage regimens, poor advice on prevention, and others alike, so study communities are the recipients of the poor services by untrained PMV on malaria. For this reason, the communities are the major indirect beneficiaries of any improvement due to this intervention on the PMV activities relating to malaria. Again, since the findings of this study changed the knowledge, attitudes and practices of PMVs on malaria by the improvement in recognition of signs, symptoms and diagnosis, treatment, referrals and prevention practices that clients receive from the ill-informed PMVs, this improvement is expected to inhibit malaria progression within the communities and thereby cause a reduction in morbidity and mortality rates due to malaria from these study communities.

Furthermore, to the health planners, regulatory government agencies and their policy formulation activities with regards to malaria, the study provides baseline information on the level of malaria awareness, diagnosis, prevention methods and treatment types among the PMVs, thereby indicating baseline levels to which standard practices are employed by PMVs. With these information the study is available to help health planners, policy formulators and other health providers to understand the actual practices of PMVs and their perceived problems with a view to planning ahead, this is because, so far the activities of PMVs are neither well studied nor well documented (Akuse et al., 2010). It then implies that the baseline data of PMV activities and their levels of improvement from this intervention can be cited from this study as little is actually known for now about the PMVs themselves and the poorly regulated market in which they operate (FHS, 2008).

The study also contributes to the economy of individuals, communities and the nation at large by minimizing the treatment duration and costs, and / or even hospitalization cost for malaria patients which subsequently would ease out the financial burden on relations of patients, the communities and government as a whole. The cost implications of hitherto re-treatments, failed treatments and unnecessary hospitalisation within the community is thereby saved. This fact that averting the many complications as a result of malaria is important as it is a main aim and objective of malaria management, pending the development of a safe and effective prophylactic vaccine.

This study also encouraged a more pragmatic involvement of PMVs in the management of malaria by effectively utilising their majorly untapped potentials in the right and most effective manner. Since PMVs have been found to be the most patronised and easily reached group of healthcare providers on malaria issues (Akuse et al., 2010; Uzochukwu et al., 2014), this training program serves to incorporate them more into malaria control activities by empowering them. The respondent PMVs are therefore more equipped at the end of this study because they are encouraged to take more informed decisions on malaria treatment and prevention.

Furthermore, the study has a significance to the scientific community by increasing research activities on malaria through having the findings of the study being published in academic journals to be cited with other research studies in relevant fields, thus adding to the body of knowledge on malaria research. Moreover, the study leaves clues on other research areas which have not been studied yet in order to explore those areas by subsequent studies. So also, the study and the developed modules serves as tool to assist in improving other health educator's work by enriching their treatment and preventive programs to target other health workers or communities within Nigeria, sub-Saharan Africa and other parts of the world ravaged by malaria.

1.4 Research Questions

1. What are the socio-demographic characteristics, working experiences and previous training experiences of PMVs?
1. What are the current knowledge, attitudes and practices of PMVs on malaria?
2. Does the CONMET training program improve PMV's KAP with regards to malaria?

1.5 Research Objectives

1.5.1 General Objectives

The general objective of this study is to develop, implement and determine the effectiveness of a concise malaria educational training (CONMET) program on knowledge, attitudes and practices among Patent Medicine Vendors in Yobe-south district, Nigeria.

1.5.2 Specific Objectives

1. To assess the socio-demographic characteristics, the working experience and the previous training experience of PMVs.
2. To assess and to compare the knowledge, attitudes and practices of PMVs related to malaria at baseline between the intervention and control group.
3. To determine the association between knowledge, attitudes and practices of PMVs and their socio-demographic characteristics, working experiences and previous training experiences.
4. To develop a concise malaria educational training (CONMET) module based on the IMB skills model.
5. To implement the concise malaria training module.
6. To evaluate the effectiveness of the CONMET intervention program in improving KAP among PMV respondents within and between the intervention and the wait-list (control) groups at immediately after the intervention, at three months and at six months post intervention, after adjustments for other covariates.

1.6 Research Hypothesis

- H1. There is a significant relationship between the knowledge, attitudes and practices and the personal factors (socio-demographic factors, working experiences and previous training experiences) of PMV respondents between the intervention and control groups at baseline.

- H2. There is a significant association between the knowledge, attitudes and practices of PMVs and their socio-demographic factors, working experiences and previous training experiences.
- H3. There is a significant difference in knowledge, attitude and practice levels within group of PMVs at baseline, at immediately post intervention, at three months and at six month post training.
- H4. There is significant difference in knowledge, attitude and practice levels between the intervention and wait-list groups of PMVs at immediately, at three months and at six month post training.



REFERENCES

- Abasiattai, A. M., Etukumana, E. A., & Umoiyoho, A. J. (2009). Awareness and practice of malaria prevention strategies among pregnant women in Uyo, South-South Nigeria. *The Internet J Gyn Obs*, 11(1).
- Abate, A., Degarege, A., & Erko, B. (2013). Community knowledge, attitude and practice about malaria in a low endemic setting of Shewa Robit Town, north-eastern Ethiopia. *BMC Public Health*, 13(1), 312.
- Abbey, M., Bartholomew, L. K., Chinbuah, M. A., Gyapong, M., Gyapong, J. O., & van den Borne, B. (2017). Development of a theory and evidence-based program to promote community treatment of fevers in children under five in a rural district in Southern Ghana: An intervention mapping approach. *BMC public health*, 17(1), 120.
- Abdullatif Alnasir, F., & Jaradat, A. A. K. (2013). The effect of training in primary health care centers on medical students' clinical skills. *ISRN family medicine*, 2013.
- Abuya, T. O., Fegan, G., Amin, A. A., Akhwale, S. W., Noor, M. A., Snow, R. W., and Marsh, V. (2010). Evaluating different dimensions of programme effectiveness for private medicine retailer malaria control interventions in Kenya. *PLoS ONE* 5(1): e8937. doi:10.1371/journal.pone.0008937
- Abuya, T., Fegan, G., Rowa, Y., Karisa, B., Ochola, S., Mutemi, W., & Marsh, V. (2009). Impact of ministry of health interventions on private medicine retailer knowledge and practices on anti-malarial treatment in Kenya. *The American journal of tropical medicine and hygiene*, 80(6), 905-913.
- ACT Watch Group Nigeria and the Independent Evaluation Team. (2009). Outlet survey report 2009 for the baseline independent evaluation of the affordable medicines facility (AMFm), Nigeria, ACTwatch/SFH/PSI. Available: <http://www.actwatch.info/sites/default/files/content/publications/attachments/ACTwatch%20HH%20Report%20Multicountry%20Baseline%200and%20Endline.pdf>
- Ademiluyi, I. A. and Aluko-Arowolo, S. O. (2009). Infrastructural distribution of healthcare services in Nigeria: An Overview. *Journal of Geography and Regional Planning* 2(5), 104-110.
- Aderaw, Z., & Gedefaw, M. (2013). Knowledge, attitude and practice of the community towards malaria prevention and control options in anti-malaria association intervention zones of Amahara National Regional State, Ethiopia. *Journal of Tropical Diseases*. 1: 118. doi:10.4172/2329-891X.1000118

- Adjuik M, Babiker A, Garner P, Olliaro P, Taylor W, White N., (2004). International Artemisinin Study Group. Artesunate combinations for treatment of malaria: meta-analysis. *Lancet* 2004; 363:9–17.
- Adome, R. O., Hardon, A. & Reynolds-Whyte, S. (1996). Popular Pills: Community Drug Use in Uganda. *Het Spinhuis*, Amsterdam.
- Agyepong, I. A., (1992) Malaria: ethnomedical perceptions and practices in an Adangbe farming community and implications for control. *Social Science and Medicine*. 35, 131–137.
- Ahmadi, M. S., Vatandoost, H., Shaeghi, M., Raeisi, A., Abedi, F., Eshraghian, M. R., Aghamolaei, T., Madani, A. H., Safari, R., Jamshidi, M., and Alimorad, A., (2012). Effects of educational intervention on long-lasting insecticidal nets use in a malarious area, Southeast Iran. *Acta Medica Iranica*, Vol. 50, No. 4 (2012). <http://journals.tums.ac.ir/>
- Ajayi, I. O., Falade, C. O., Adeniyi, J. D., & Bolaji, M. O. (2002). The role of patent medicine sellers in home management of childhood malaria: a situational analysis of experience in rural Nigeria. *International Quarterly of Community Health Education*, 21(3), 271-281.
- Akuse, R. M., Eseigbe, E., Ahmed A., and Brieger, W. R., (2010). Patent Medicine Sellers: How can they help control childhood malaria? SAGE-Hindawi Access to Research. *Malaria Research and Treatment Volume 2010*, Article ID 470754, 7 pages doi:10.4061/2010/470754
- Alemu, A., Abebe, G., Tsegaye, W., & Golassa, L. (2011). Climatic variables and malaria transmission dynamics in Jimma town, South West Ethiopia. *Parasites & vectors*, 4(1), 30.
- Alnasir, A. F., & Jaradat, A. A. K. (2013). The effect of training in primary health care centers on medical students' clinical skills. *ISRN family medicine*, 2013.
- Anka, Y. H., Rampal, L., Ibrahim, N. B., Sidik, S. M., & Iliyasu, Z. The effectiveness of education intervention program for improving knowledge, attitude and practice related to hepatitis-B infection among non-medical and non-veterinary undergraduate university student in northern Nigeria, a randomized control community trial.
- Awodele, O., Adeniran, A., & Awodele, D. F. (2012). Pharmacovigilance amongst patent medicine vendors (PMVs) in Ekiti state, Nigeria. *International Journal of Risk & Safety in Medicine*, 24(2), 65-72.
- Barat L.M., Palmer N., Basu S, Worrall E, Mills A. (2004). Do malaria interventions reach the poor? A review through the equity lens. *Am. J. Trop. Med. Hyg.*; 71:174-78.
- Bashar, K., Al-Amin, H. M., Reza, M. S., Islam, M., & Ahmed, T. U. (2012). Socio-demographic factors influencing knowledge, attitude and practice (KAP) regarding malaria in Bangladesh. *BMC Public Health*, 12(1), 1084.

- Berendes, S., Adeyemi, O., Oladele, E. A., Oresanya, O. B., Okoh, F., & Valadez, J. J. (2012). Are patent medicine vendors effective agents in malaria control? Using lot quality assurance sampling to assess quality of practice in Jigawa, Nigeria. *PLoS One*, 7(9), e44775.
- Beyeler N., Liu J., Sieverding M., (2015) A Systematic Review of the Role of Proprietary and Patent Medicine Vendors in Healthcare Provision in Nigeria. *PLoS ONE* 10(1): e0117165. doi:10.1371/ journal.pone.0117165
- Breman, J. (2015). Epidemiology prevention, and control of malaria in endemic areas. UpTo Date Waltham MA., *Ultimo accesso* 26 dic 2014.[Links].
- Brieger W.R., Unwin A., Greer G., Meek S., (2004). Interventions to improve the role of informal private providers in malaria case management for children in Africa. *BASICS II and the Malaria Consortium*. Prepared for The Malaria Case Management Working Group, Roll Back Malaria.
- Brugha, R & Zwi, A., "Improving the quality of private sector delivery of public health services: challenges and strategies," *Health Policy and Planning*, vol. 13, no. 2, pp. 107–120, 1998.
- Brunette, M. J. (2005). Development of educational and training materials on safety and health: Targeting Hispanic workers in the construction industry. *Family & community health*. 28(3), 253-266.
- BSS, (2000). Behavioural Surveillance Survey: *Guidelines for Repeated Behavioural Survey in Populations at Risk of HIV*. Family Health International.
- Buabeng, K. O., Matowe, L. K., Smith, F., Duwiejua, M., & Enlund, H. (2010). Knowledge of medicine outlets' staff and their practices for prevention and management of malaria in Ghana. *Pharmacy World & Science*, 32(4), 424-431. Available at: https://www.researchgate.net/publication/44623984_Knowledge_of_medicine_outlets'_staff_and_their_practices_for_prevention_and_management_of_malaria_in_Ghana
- Burton, D. C., Flannery, B., Onyango, B., Larson, C., Alaii, J., Zhang, X., Hamel M.J., Breiman R.F., Feikin D.R., (2011). Healthcare-seeking behaviour for common infectious disease-related illnesses in rural Kenya: a community-based house-to-house survey. *Journal of Health, Population and Nutrition*. 61-70.
- Carter R., Mendis K.N., (2002). Evolutionary and historical aspects of the burden of malaria. *Clin Microbiol Rev*. 2002; 15:564–94. [PMC free article] [PubMed].
- CDC, (2010): Center for Disease Control & Prevention. Malaria <https://www.cdc.gov/malaria/>
- CDC, (2014): Center for Disease Control & Prevention. Where malaria occurs. <http://www.cdc.gov/malaria/about/distribution.html> Atlanta, GA 30333, USA

- CDC, (2015): Center for Disease Control and Prevention. Malaria program. https://www.cdc.gov/malaria/resources/pdf/fsp/cdc_malaria_program_508.pdf
- Chambers R., Gill W., Alison B., (2006). Supporting Self Care in Primary Care. *Radcliffe Publishing*. pp. 15, 101, 105. ISBN 1846190703
- Chang, S. J., Choi, S., Kim, S. A., & Song, M. (2014). Intervention strategies based on information-motivation-behavioral skills model for health behavior change: a systematic review. *Asian Nursing Research*, 8(3), 172-181.
- Chukwuocha, U. M., Nwakwuo, G. C., & Mmerole, I. (2013). Artemisinin-based combination therapy: knowledge and perceptions of patent medicine dealers in Owerri Metropolis, Imo State, Nigeria and implications for compliance with current malaria treatment protocol. *Journal of Community health*, 38(4), 759-765.
- Chuma J., Abuya T., Memusi D., Juma E., Akhwale W., Ntwiga J., Nyandigisi A., Tetteh G., Shretta R., Amin A., (2009). Reviewing the literature on access to prompt and effective malaria treatment in Kenya: implications for meeting the Abuja targets. *Malar J* 2009, 8:243.
- Chuma J., Okungu V., Molyneux C., (2010). Barriers to prompt and effective malaria treatment among the poorest population in Kenya. *Malar Journal* 2010, 9:144.
- Coker, H. A. B., Chukwuani, C. M., Ifudu, N. D., & Aina, B. A. (2001). The malaria scourge. Concepts in disease management. *The Nigerian Journal of Pharmacy*, 32, 19-47.
- Crosby, R. A., Kegler, M. C., & DiClemente, R. J. (2009). Theory in health promotion practice and research. *Emerging theories in health promotion practice and research*, 2.
- Cuevas C.D., (2011). Towards a clarification of terminology in medicine taking behaviour: compliance, adherence and concordance are related although different terms with different uses. *Curr Clin Pharmacol*. May 2011; 6(2):74-7.
- Daboer, J. C., John, C., Jamda, A. M., Chingle, M. P., & Ogbonna, C. (2010). Knowledge and treatment practices of malaria among mothers and caregivers of children in an urban slum in Jos, Nigeria. *Nigerian Journal of Medicine*, 19(2).
- Davis, D. A., & Taylor-Vaisey, A. (1997). Translating guidelines into practice: a systematic review of theoretic concepts, practical experience and research evidence in the adoption of clinical practice guidelines. *Canadian Medical Association Journal*, 157(4), 408-416.
- Deressa W., Ali A., Enqusellassie F., (2003). Self-treatment of malaria in rural communities, Butajira, southern Ethiopia. *Bull World Health Organ* 81: 261–268.

- Dike N., Onwujekwe O., Ojukwu J., Ikeme A., Uzochukwu B., Shu E., (2006) Influence of education and knowledge on perceptions and practices to control malaria in Southeast Nigeria. *Social Science & Medicine* 63 (2006) 103–106.
- Doane, D. P., & Seward, L. E. (2011). Measuring skewness: a forgotten statistic. *Journal of Statistics Education*, 19(2), 1-18.
- Dunyo S.K., Afari E.A., Koram K.A., Ahorlu C.K., Abubakar I., Nkrumah F.K., (2000). Health centre versus home presumptive diagnosis of malaria in southern Ghana: Implications for home-based care policy. *Trans R Soc Trop Med Hyg* 94: 285–288.
- Emeka, P. C. (2011). The impact of culture and religion on the healthcare seeking behavior amongst the residents of Anambra State, Nigeria with regards to malaria treatment (Doctoral dissertation published, Walden University). UMI dissertation publishing, UMI 3454338, copyright by ProQuest LLC.
- Fatungase, K. O., Amoran, O. E., & Alausa, K. O. (2012). The effect of health education intervention on the home management of malaria among the caregivers of children aged under 5 years in Ogun State, Nigeria. *European Journal of Medical Research*, 17(1), 11.
- FHS, (2007). Future Health Systems: Malaria treatment and policy in three regions in Nigeria: The role of patent medicine vendors. Working paper 1. September 2007.
- FHS, (2008). Future Health Systems: Innovations and knowledge for future health systems for the poor. Policy Brief March. No: 01 <https://www.ids.ac.uk/files/dmfile/fhsPolicyBriefNIGERIAMarch08.pdf>
- FHS, (2014). Future Health Systems: Strengthening Patent Medicine Vendors' Associations in Nigeria for improved malaria management (SPANIMM). Accordia Global Health Foundation and West African Infectious Diseases Institute. Phase 1 Final Report. June 2014.
- Fisher, J. D., Fisher, W. A., & Shuper, P. A. (2009). The information-motivation-behavioral-skills model of HIV prevention behavior. In R. J. DiClemente, R. A. Crosby, & M. C. Kegler (Eds.), *Emerging theories in health promotion practice and research* (pp. 21e63). San Francisco, CA: Jossey-Bass.
- Fisher, J. D., Fisher, W. A., Amico, K. R., & Harman, J. J. (2006). An information motivation-behavioral skills model of adherence to antiretroviral therapy. *Health Psychology*, 25(4), 462e473. <http://dx.doi.org/10.1037/0278-6133.25.4.462>.
- Fisher, J. D., Fisher, W. A., Misovich, S. J., Kimble, D. L., & Malloy, T. E. (1996). Changing AIDS risk behavior: Effects of an intervention emphasizing AIDS risk reduction information, motivation, and behavioral skills in a college student population. *Health Psychology*, 15(2), 114.

- FMH, (2004): Federal Ministry of Health for malaria control in Nigeria: A Strategy for Behavioural Change Communication. Abuja: FMOH, 2004.
- FMH, (2005a): Federal Ministry of Health. National Antimalarial Treatment Policy. National Malaria and Vector Control Division, Federal Ministry of Health. Abuja-Nigeria.
- FMH, (2005b): Federal Ministry of Health. (2005). National Artemisinin Combination Therapy Anti-malarial Treatment Policy.1-32. Federal Ministry of Health. Abuja-Nigeria.
- FMH, (2012): National Malaria Control Programme, Abuja - Nigeria. Training Manual. Module II: Case Management of Malaria.
- Gay-Andrieu, F., Adehossi, E., Lacroix, V., Gagara, M., Ibrahim, M. L., Kourna, H., & Boureima, H. (2005). Epidemiological, clinical and biological features of malaria among children in Niamey, Niger. *Malaria journal*, 4(1), 10.
- Gerstl, S., Dunkley, S., Mukhtar, A., Baker, S., & Maikere, J. (2010). Successful introduction of artesunate combination therapy is not enough to fight malaria: results from an adherence study in Sierra Leone. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 104(5), 328-335.
- Gething P.W., Patil A.P., Smith D.L., Guerra C.A., Elyazar I.R.F., Johnston G.L., et al. (2010). A new world malaria map: Plasmodium falciparum Endemicity in 2010. *Malaria J* 2011; 10: 378-393.
- Glanz, K., Rimer, B. K., & Viswanath, K. (Eds.). (2008). Health behavior and health education: theory, research, and practice. *John Wiley & Sons*. p28
- Goodman C., Brieger W., Unwin A., Mills A., Meek S., & Greer G., (2007). Medicine sellers and malaria treatment in sub-Saharan Africa: What do they do and how can their practice be improved? *The American Journal of Tropical Medicine and Hygiene*, 77 (Suppl 6), 203–218.
- Goodman, C. A., Mutemi, W. M., Baya, E. K., Willetts, A., & Marsh, V. (2006). The cost-effectiveness of improving malaria home management: shopkeeper training in rural Kenya. *Health Policy and Planning*, 21(4), 275-288.
- Goodman, C., Patrick Kachur, S., Abdulla, S., Mwageni, E., Nyoni, J., Schellenberg, J. A., & Bloland, P. (2004). Retail supply of malaria-related drugs in rural Tanzania: risks and opportunities. *Tropical Medicine & International Health*, 9(6), 655-663.
- Green, S., Higgins, J. P. T., Alderson, P., Clarke, M., Mulrow, C. D., & Oxman, A. D. (2008). Assessing risk of bias in included studies. *Cochrane Handbook for Systematic Reviews of Interventions*. Version, 5(1).
- Hanafi-Bojd, A. A., Azari-Hamidian, S., Hassan, V., & Zabihollah, C. (2011). Spatio—temporal distribution of malaria vectors (Diptera: Culicidae) across

different climatic zones of Iran. *Asian Pacific journal of tropical medicine*, 4(6), 498-504.

Hausmann-Muela, S., Ribera, J. M., & Nyamongo, I. (2003). Health-seeking behaviour and the health system response. *Disease Control Priorities Project working paper No14*.

Hetzel M.W., Dillip A., Lengeler C., Obrist B., Msechu J.J., Makemba A.M., Mshana C., Schulze A., Mshinda H., (2008). Malaria treatment in the retail sector: knowledge and practices of drug sellers in rural Tanzania. *BMC Public Health* 8: 157.

Houben, C. H., Fleischmann, H., & Gückel, M. (2013). Malaria prevalence in north-eastern Nigeria: A cross-sectional study. *Asian Pacific Journal of Tropical Medicine*, 6(11), 865-868.

Hussain, A., Ibrahim, M. I., & Malik, M., (2013) Impact of educational intervention on knowledge of dispensers working at community pharmacies in Pakistan. *Pharmacy Practice* 2013 Jul-Sep; 11(3):144-148.

Idowu, O. A., Mafiana, C. F., Luwoye, I. J., & Adehanloye, O., (2008). Perceptions and home management practices of malaria in some rural communities in Abeokuta, Nigeria. *Travel Medicine and Infectious Disease* 6, 210–214 doi:10.1016/j.tmaid.2007.10.007.

Lakens, D. (2013). Calculating and reporting effect sizes to facilitate cumulative science: a practical primer for t-tests and ANOVAs. *Frontiers in Psychology*, 4.

Lantos, P. M., Ahouidi, A. D., Bei, A. K., Jennings, C. V., Sarr, O., Ndir, O., ... & Duraisingh, M. T. (2009). Erythrocyte invasion profiles are associated with a common invasion ligand polymorphism in Senegalese isolates of *Plasmodium falciparum*. *Parasitology*, 136(1), 1-9.

Launiala, A. (2009). How much can a KAP survey tell us about people's knowledge, attitudes and practices? Some observations from medical anthropology research on malaria in pregnancy in Malawi. *Anthropology Matters*, 11(1).

Livinus C. A., Ibrahim M. O. T., Isezuo S. A., and Bello S. O., (2009). The impact of training on malaria treatment practices: a study of patent medicine vendors in Birnin-kebbi. *Sahel Medical Journal*. Vol. 12 No.2 April – June, 2009 (58 - 64).

Mangham, L. J., Cundill, B., Ezeoke, O., Nwala, E., Uzochukwu, B. S., Wiseman, V., & Onwujekwe, O. (2011). Treatment of uncomplicated malaria at public health facilities and medicine retailers in south-eastern Nigeria. *Malaria Journal*, 10(1), 155.

Marsh, V. M., Mutemi, W. M., Willetts, A., Bayah, K., Were, S., Ross, A., & Marsh, K. (2004). Improving malaria home treatment by training drug retailers in rural Kenya. *Tropical Medicine & International Health*, 9(4), 451-460.

- Mary S. F, Kathy K., Aul. S., Richard M. M., Andy N., Mijna, H. A., Berthold K. & Alan L. (2013). How much loss to follow-up is acceptable in long-term randomized trials and prospective studies. *Arch Dis Child*, 93(6), 458-461
- Mazzuca, S. A. (1982). Does patient education in chronic disease have therapeutic value? *Journal of Chronic Diseases*, 35(7), 521-529.
- McGinnis, J. M., & Foege, W. H. (1993). Actual causes of death in the United States. *Jama*, 270(18), 2207-2212.
- Momodu R. O., (2008). Knowledge and practices of patent medicine vendors in the use of Artemisinin-based Combination Therapy in the treatment of malaria in an urban community in Lagos. Published Thesis 2008, University of the Western Cape. Available from: <https://etd.uwc.ac.za/bitstream/handle/11394/2423/Momodu MPH 2008.pdf?sequence=1&isAllowed=y>
- Muty U., & Arora N., (2008). Prioritization of malaria endemic zones in Arunachal Pradesh: A novel application of self-organizing maps (SOM). *Journal of Tropical Medicine*, 3(3), 3-3. May 2, 2008.
- Mwanje, L. F., (2013). Knowledge, attitudes and practices on malaria prevention and control in Uganda: A case study of Nsaabwa village, Mukono district, Uganda. Published dissertation. January 2013. Available online from: <http://www.musphcdc.ac.ug/files/pdf/Knowledge%2C%20attitudes%20>
- Nabarro D, & Mendis K., (2000). Roll back malaria is unarguably both necessary and possible. *Bull World Health Organ*. 2000; 78:1454-5.
- Nájera, J. A. (2001). Malaria control: achievements, problems and strategies. *Parassitologia*, 43(1-2), 1-89.
- NMIS, (2011). Nigeria Malaria Indicator Survey 2010. Preliminary Report, 2011. Abuja, Nigeria. Available online at: https://pdf.usaid.gov/pdf_docs/PNADW164.pdf
- NMIS, (2012). Nigeria Malaria Indicator Survey 2010. Final Report, 2012. Abuja, Nigeria, 1-66. Available online at: <https://dhsprogram.com/publications/publication-mis8-mis-final-reports.cfm>
- Noah, S. M & Ahmad, J. (2005). Construction module: how to build training modules and academic modules, Serdang. Publisher: Universiti Putra Malaysia
- NPC, (2009). National Population Commission: Nigeria Demographic & Health Survey, 2009. Federal Republic of Nigeria - Abuja, Nigeria. Available online: https://www.unicef.org/nigeria/ng_publications_Nigeria DHS 2008 Final Report.pdf
- NPC, (2013). National Population Commission: Nigeria Demographic & Health Survey, 2013. Federal Republic of Nigeria - Abuja, Nigeria. Available online: <https://dhsprogram.com/pubs/pdf/fr293/fr293.pdf>

- Nsimba, S. E. D. (2007). Assessing the impact of educational intervention for improving management of malaria and other childhood illnesses in Kibaha district-Tanzania. *East African Journal of Public Health*, 4(1): 5-11.
- NVBDCP, (2012): Directorate of National Vector Borne Diseases Control Programme, Directorate General of Health Services, Ministry of Health and Family Welfare, India. <http://nvbdcp.gov.in/Doc/MPW-training-module.pdf>
- Ogbudimkpa, Emeka A. Jerry (1986). Introducing a health education program on malaria disease at Nkanu local government area – Nigeria. Published Thesis. PhD. 1986. University Microfilms International, A. Bell & Howell Information Company, Michigan 48106.
- Okebe, J. U., Walther, B., Bojang, K., et al., 2010. Prescribing practice for malaria following introduction of artemether-lumefantrine in an urban area with declining endemicity in West Africa. *Malaria Journal* 2010, 9:180.
- Okeke, T. A., & Okeibunor, J. C. (2010). Rural–urban differences in health-seeking for the treatment of childhood malaria in south-east Nigeria. *Health Policy*, 95 (1), 62-68.
- Okeke, T. A., & Uzochukwu, B. S. (2009). Improving childhood malaria treatment and referral practices by training patent medicine vendors in rural south-east Nigeria. *Malaria Journal*, 8(1), 260.
- Okeke, T. A., Uzochukwu, B. S., & Okafor, H. U. (2006). An in-depth study of patent medicine sellers' perspectives on malaria in a rural Nigerian community. *Malaria Journal*, 5(1), 97.
- Oladepo, O., Brieger, W., Adeoye, B., Lawal, B., & Peters, D. H. (2011). Awareness of anti-malarial policy and malaria treatment practices of patent medicine vendors in three Nigerian states. *African Journal of Medicine and Medical Sciences*, 40(4), 345-352.
- Oladepo, O., Salami, K. K., Adeoye, B. W., Oshiname, F., Ofi, B., Oladepo, M., & Peters, D. H. (2007). Malaria treatment and policy in three regions in Nigeria: the role of patent medicine vendors. *Future Health Systems*, 1-29.
- Onwujekwe, O., Uzochukwu, B., Eze, S., Obikeze, E., Okoli, C., & Ochonma, O. (2008). Improving equity in malaria treatment: relationship of socio-economic status with health seeking as well as with perceptions of ease of using the services of different providers for the treatment of malaria in Nigeria. *Malaria Journal*, 7(1), 5.
- Onyeneho, N. G., & Chukwu, J. N. (2010). Is there a role for patent medicine vendors in tuberculosis control in southern Nigeria? *Journal of Health, Population and Nutrition*, 567-577.
- Oshiname, F. O., & Brieger, W. R. (1992). Primary care training for patent medicine vendors in rural Nigeria. *Social Science & Medicine*, 35(12), 1477-1484.

- Owumi, B., & Raji, S. O. (2013). Rational Choice Theory and the Choice of Healthcare Services in the Treatment of Malaria in Nigeria. *Journal of Sociological Research*, 4(1), 110.
- Oyeyemi, A. S., Ogunnowo, B. E., & Odukoya, O. O. (2014). Patent medicine vendors in rural areas of Lagos Nigeria: compliance with regulatory guidelines and implications for malaria control. *Tropical Journal of Pharmaceutical Research*, 13(1), 163-169.
- PCN, (2009): Pharmacist Council of Nigeria. Lecture Notes for the Orientation Programme of Patent Medicine Vendors in Nigeria. PCN.EdT.002.
- Petty, R. E., Cacioppo, J. T., & Goldman, R. (1981). Personal involvement as a determinant of argument-based persuasion. *Journal of Personality and Social Psychology*, 41(5), 847.
- Pluess, B., et al, Levi D, King G, Smith TA, (2009). Lengeler C. Malaria-a major health problem within an oil plantation around Popondetta, Papua, New Guinea. *Malar. J.* 2009; 8:e56.
- Rakhshani, F., & Mohammadi, M., (2009). Improving Community Health Workers' knowledge and behaviour about proper content in malaria education. *Journal of Pakistani Medical Association* 59:395; 2009.
- Razali, N. M., & Wah, Y. B. (2011). Power comparisons of Shapiro-Wilk, Kolmogorov-Smirnov, Lilliefors and Anderson-Darling tests. *Journal of Statistical Modeling and Analytics*, 2(1), 21-33.
- Rosner, B., (2010) *Fundamentals of Biostatistics*. p156 – 401. Seventh Edition. Harvard University.
- Rusell, J. D. (1974). *Modular Instructions: A guide to the design, selection, utilization and evaluation of modular materials*. Minnesota: Burgess Publishing
- Rusk, A., Smith, N., Menya, D., Obala, A., Simiyu, C., Khwa-Otsyula, B., & O'Meara, W. (2012). Does anti-malarial drug knowledge predict anti-malarial dispensing practice in drug outlets? A survey of medicine retailers in western Kenya. *Malaria Journal*, 11(1), 263.
- Sachs J., & Malaney P. (2002). The economic and social burden of malaria. *Nature*. 2002; 415:680–5.
- Shapiro, S. S., & Wilk, M. B. (1965). An analysis of variance test for normality (complete samples). *Biometrika*, 52(3-4), 591-611.
- Snow, R. W., Guerra, C. A., Noor, A. M., Myint, H. Y., & Hay, S. I. (2005). The global distribution of clinical episodes of Plasmodium falciparum malaria. *Nature*, 434(7030), 214-217.

- Tavrow, P., Shabahang, J., & Makama, S. (2003). Vendor-to-vendor education to improve malaria treatment by private drug outlets in Bungoma District, Kenya. *Malaria Journal*, 2(1), 10.
- Tobin-West, C. I., & Adeniji, F. O. (2012). Knowledge and practices of patent medicine vendors in Rivers State, Nigeria: implications for malaria control in rural and sub-urban communities. *Indian Journal of Pharmacy Practice*, 5(1).
- University Hospital Birmingham, (2017). NHS foundation trust. Accessed 26/4/2017 <https://www.gov.uk/.../groups/university-hospitals-birmingham/>
- Uzochukwu, B. S., Onwujekwe, O. E., Okwuosa, C., & Ibe, O. P. (2014). Patent medicine dealers and irrational use of medicines in children: the economic cost and implications for reducing childhood mortality in Southeast Nigeria. *PLoS One*, 9(3), e91667.
- Wilroy, J., & Knowlden, A. (2016). Systematic review of theory-based interventions aimed at increasing physical activity in individuals with spinal cord injury. *American Journal of Health Education*, 47(3), 163-175.
- Work Experience benefits. Web Online Accesses Downloaded 21/3/17. Available at: <http://www.uhb.nhs.uk/work-experience-benefits.htm>
- World Health Organisation. (2003). Implementation of the Global Malaria Control Strategy: *Report of a WHO Study Group on the Implementation of the Global Plan of Action for Malaria Control (1993-2000)*. Technical Report Series No 839 World Health Organization. Geneva; 1993. Available online at: <http://apps.who.int/iris/handle/10665/37106>
- World Health Organisation. (2004). Scaling Up Home Management of Malaria: From Research to Implementation. 2004., Geneva: World Health Organization. Available online at: http://www.who.int/malaria/publications/atoz/who_htm_mal_2004_1096/en/
- World Health Organization. (2005b) Process of Module Development. Available on: whqlibdoc.who.int/hq/2005/WHO_HTM_TB_2005.354_part1_eng.pdf
- World Health Organization. (2008). World Malaria Report 2008. World Health Organization. Available online: <http://www.who.int/malaria/publications/atoz/9789241563697/en/>
- World Health Organization. (2009). World Malaria Report 2009. World Health Organization, Geneva; 2009. Available online: http://www.who.int/malaria/world_malaria_report_2009/en/
- World Health Organization. (2010). World Health Statistics 2010. World Health Organization. Available online: http://www.who.int/gho/publications/world_health_statistics/EN_WHS10_Full.pdf

- World Health Organization. (2011). World Malaria Report 2011. Geneva: World Health Organization: http://www.who.int/malaria/world_malaria_report_2011/wmr2011_summary_keypoints.pdf?ua=1
- World Health Organization. (2011a). Impact of malaria control (Chapter 7). In: World malaria report. 2011. World Health Organization, Geneva: WHO; 2011, p. 51-79. www.who.int/2011_WMR
- World Health Organization. (2011c). World malaria report 2011. World Health Organization, Geneva; 2011, p. 149. Available online: http://www.who.int/malaria/world_malaria_report_2011/WMR2011_factsheet.pdf
- World Health Organization. (2011d). Summary and key points. In: World malaria report 2011. World Health Organization, Geneva; 2011, p. ix - xiii. Available online: <http://www.who.int/malaria/publications/atoz/9789241564403/en/>
- World Health Organization. (2012). WHO Training module. Guide for tutors. Training on Malaria Control. 2012. Geneva. World Health Organization. Available online: apps.who.int/iris/bitstream/10665/78070/1/9789241503976_eng.pdf
- World Health Organization. (2013). Facts Sheet on World Malaria Report; 2013. World Health Organisation, Geneva. Available online: http://www.who.int/malaria/publications/world_malaria_report_2013/en/
- World Health Organization. (2015). World malaria report 2015. Geneva: World Health Organization. Available online: <http://www.who.int/malaria/publications/world-malaria-report-2015/report/en/>
- World Health Organization. (2016). World malaria report 2016. Geneva: World Health Organization. Available online: <http://www.who.int/malaria/publications/world-malaria-report-2016/report/en/>
- World Health Organization. (2017). World malaria report 2017. Geneva: World Health Organization. Available online: <http://apps.who.int/iris/bitstream/10665/254912/1/WHO-HTM-GMP-2017.4-eng.pdf?ua=1>