South Africa

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Multilevel and spatial determinants of multimorbidity and optimal co-care delivery model in South Africa

Study Documentation

November 28, 2019

Metadata Production

Metadata Producer(s)	Africa Health Research Institute (AHRI)
Identification	DDI.AHRI.Vukuzazi.GeoSpartial.Multimorbidity.2019.V1.0

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Overview

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Version	V1.0

Abstract

We aim to identify the interactive effects and associations of the key individual, familial, household, and community determinants of communicable and non-communicable disease multimorbidity in rural kwazulu-natal. We will use state-of-the-art multi-level and spatial modelling techniques to understand the complex mechanisms and spatial distribution of the epidemics and establish a multilevel analytical, methodological, and theoretical framework to investigate emerging multimorbidity epidemics in other similar in ssa. The specific objectives are as following:

Aim 1. To quantify the spatial distribution of individual and multimorbid communicable and non-communicable disease epidemiology in rural kwazulu-natal. We posit that the spatial distribution and geographic density of prevalence of HIV, TB and NCDs (hypertension, diabetes and obesity) epidemics are heterogeneous with overlapping hot-spot areas within the surveillance area characterized by urbanicity, and social and economic activities. Understanding the geospatial distribution will inform the development of targeted interventions for disease prevention, management, and treatment.

Aim 2. To measure the relative and interactive contributions of individual, familial, household, and community factors on disease multimorbidity. We hypothesize that household and community factors substantially contribute to the presence of multimorbidity accounting for biological, individual or familiar factors and that key causal pathways exist across different comorbidity conditions. Mtulilevel regression models will allow quantifying the effects of different individual and contextual determinants and their interactions on multimorbidity as well as the level of clustering within household members or at the community-level.

Aim 3. To evaluate an optimal co-care delivery model for multimorbidity using agent-based simulation model (i.E. EMOD HIV/TB). We posit that provision of prevention and treatment for multimorbidity can be optimized through the co-care delivery model at both individual an population levels. We aim to adapt an existing EMOD HIV/TB model to interact with other multiple comorbidity conditions such as diabetes and hypertension. Model parameters for progression to different comorbidity conditions will be determined and calibrated to the key factors and epidemiological data from aim 1 and 2 as well as the longitudinal population-based demographic and hiv surveillance data. We will also estimate costs and effectiveness (i.e. disability-adjusted life year) for different scenariors of co-care delivery models.

Scope & Coverage

Keywords	HIV,TB, NCD, spatial, multimorbidity, optical care delivery
Time Period(s)	2018-2019
Countries	South Africa
Geographic Coverage	

Producers & Sponsors

Primary Investigator(s)	Thumbi Ndung'u, Africa Health Research Institute Mark Siedner, Africa Health Research Institute Emily Wong, Africa Health Research Institute
Other Producer(s)	Africa Health Research Institute (AHRI)

Other Acknowledgment(s)	Vukuzazi Study Participants

Sampling

Sampling Procedure

Data Collection

Data Collection Dates	start 2018-05-25 end 2019-11-19

Accessibility

Access Conditions

The representative of the Receiving Organization agrees to comply with the following conditions:

1. Access to the restricted data will be limited to the Lead Researcher and other members of the research team listed in this request.
2. Copies of the restricted data or any data created on the basis of the original data will not be copied or made available to anyone other than those mentioned in this Data Access Agreement, unless formally authorized by the Data Archive.
3. The data will only be processed for the stated statistical and research purpose. They will be used for solely for reporting of aggregated information, and not for investigation of specific individuals or organizations. Data will not in any way be used for any administrative, proprietary or law enforcement purposes.
4. The Lead Researcher must state if it is their intention to match the restricted microdata with any other micro-dataset. If any matching is to take place, details must be provided of the datasets to be matched and of the reasons for the matching. Any datasets created as a result of matching will be considered to be restricted and must comply with the terms of this Data Access Agreement.
5. The Lead Researcher undertakes that no attempt will be made to identify any individual person, family, business, enterprise or organization. If such a unique disclosure is made inadvertently, no use will be made of the identity of any person or establishment discovered and full details will be reported to the Data Archive. The identification will not be revealed to any other person not included in the Data Access Agreement.
6. The Lead Researcher will implement security measures to prevent unauthorized access to licensed microdata acquired from the Data Archive. The microdata must be destroyed upon the completion of this research, unless the Data Archive obtains satisfactory guarantee that the data can be secured and provides written authorization to the Receiving Organization to retain them. Destruction of the microdata will be confirmed in writing by the Lead Researcher to the Data Archive.
7. Any books, articles, conference papers, theses, dissertations, reports, or other publications that employ data obtained from the Data Archive will cite the source of data in accordance with the citation requirement provided with the dataset.
8. An electronic copy of all reports and publications based on the requested data will be sent to the Data Archive.
9. The original collector of the data, the Data Archive, and the relevant funding agencies bear no responsibility for use of the data or for interpretations or inferences based upon such uses.
10. This agreement will come into force on the date that approval is given for access to the restricted dataset and remain in force until the completion date of the project or an earlier date if the project is completed ahead of time.
11. If there are any changes to the project specification, security arrangements, personnel or organization detailed in this application form, it is the responsibility of the Lead Researcher to seek the agreement of the Data Archive to these changes. Where there is a change to the employer organization of the Lead Researcher this will involve a new application being made and termination of the original project.
12. Breaches of the agreement will be taken seriously and the Data Archive will take action against those responsible for the lapse if willful or accidental. Failure to comply with the directions of the Data Archive will be deemed to be a major breach of the agreement and may involve recourse to legal proceedings. The Data Archive will maintain and share with partner data archives a register of those individuals and organizations which are responsible for breaching the terms of the Data Access Agreement and will impose sanctions on release of future data to these parties.

Citation Requirements

Ndung'u, T., Siedner, M., & Wong, E. (2019). Multilevel and spatial determinants of multimorbidity and optimal co-care delivery model in South Africa [Data set]. Africa Health Research Institute (AHRI). https://doi.org/10.23664/AHRI.VUKUZAZI.GEOSPARTIAL.MULTIMORBIDITY.2019

Files Description

Dataset contains 1 file(s)

AHRI.Vukuzazi.VukuzaziGeoSpartialMultimorbidity.2019.V1.0	
# Cases	16997
# Variable(s)	21

Variables List

Dataset contains 21 variable(s)

File AHRI.Vukuzazi.VukuzaziGeoSpartialMultimorbidity.2019.V1.0							
#	Name	Label	Type	Format	Valid	Invalid	Question
1	Individu ..	Unique Internal Id of Individual	continuous	numeric-12.0	16997	0	-
2	IIntId	PIP Individual identifier	continuous	numeric-12.0	16997	0	-
3	Sex	Gender	discrete	numeric-12.0	16997	0	-
4	DateOfBi ..	Individual's Date of Birth	discrete	character-11	16997	-	-
5	ClinicVi ..	Mobile Clinic Visit Date	discrete	character-11	16973	-	-
6	Rifampicin	Rifampicin Resistance	discrete	numeric-10.0	8776	8221	-
7	GeneXpert	TB GeneXpert Test Result	discrete	numeric-10.0	8776	8221	-
8	LiquidCu ..	Liquid Culture Result(MGIT)	discrete	numeric-10.0	8356	8641	-
9	HIVElisa	HIV Elisa Result	discrete	numeric-10.0	16822	175	-
10	VL	HIV Viral Load Result	discrete	numeric-10.0	5718	11279	-
11	TBTxCurr ..	Are you currently on TB treatment?	discrete	numeric-12.0	16973	24	-
12	TBTxEver	Have you been on TB treatment before?	discrete	numeric-12.0	16973	24	-
13	RadOldTB	Radiologist Diagnostic OldTB	discrete	numeric-12.0	2677	14320	-
14	BPSecond ..	BP Second Systolic	continuous	numeric-12.0	16969	28	-
15	BPThirdS ..	BP Third Systolic	continuous	numeric-12.0	16969	28	-
16	BPSecond ..	BP Second Diastolic	continuous	numeric-12.0	16969	28	-
17	BPThirdD ..	BP Third Diastolic	continuous	numeric-12.0	16969	28	-
18	HighBPTx ..	In the past two weeks, have you taken any drugs (medication) for raised blood pre	discrete	numeric-12.0	9630	7367	-
19	HBA1CPer ..	HBA1C Percent	continuous	numeric-10.0	16821	176	-
20	InsulinT ..	Are you currently taking insulin for diabetes prescribed by a doctor or other hea	discrete	numeric-12.0	8092	8905	-
21	HighBSug ..	In the past two weeks, have you taken any drugs (medication) for diabetes prescri	discrete	numeric-12.0	8092	8905	-

Variables Description

Dataset contains 21 variable(s)

File : AHRI.Vukuzazi.VukuzaziGeoSpartialMultimorbidity.2019.V1.0

IndividualId: Unique Internal Id of Individual

Information	[Type= continuous] [Format=numeric] [Range= 5-37359] [Missing=*]
Statistics [NW/ W]	[Valid=16997 /-] [Invalid=0 /-] [Mean=17759.084 /-] [StdDev=10897.072 /-]

IIntId: PIP Individual identifier

Information	[Type= continuous] [Format=numeric] [Range= 17-242166] [Missing=*]
Statistics [NW/ W]	[Valid=16997 /-] [Invalid=0 /-] [Mean=76572.147 /-] [StdDev=52567.475 /-]

Sex: Gender

Information	[Type= discrete] [Format=numeric] [Range= 1-9] [Missing=*]
Statistics [NW/ W]	[Valid=16997 /-] [Invalid=0 /-]

Value	Label	Cases	Percentage
1	Male	5460	32.1%
2	Female	11537	67.9%
9	Unknown	0	

Warning: these figures indicate the number of cases found in the data file. They cannot be interpreted as summary statistics of the population of interest.

DateOfBirth: Individual's Date of Birth

Information	[Type= discrete] [Format=character] [Missing=*]
Statistics [NW/ W]	[Valid=16997 /-]

ClinicVisitDate: Mobile Clinic Visit Date

Information	[Type= discrete] [Format=character] [Missing=*]
Statistics [NW/ W]	[Valid=16973 /-]

Rifampicin: Rifampicin Resistance

Information	[Type= discrete] [Format=numeric] [Range= 0-7] [Missing=*/11]
Statistics [NW/ W]	[Valid=8776 /-] [Invalid=8221 /-]

Value	Label	Cases	Percentage
0	Not detected	76	0.9%
1	Detected	4	0.0%
2	Indeterminate	58	0.7%
7	Not applicable	8638	98.4%
11	..	0	
Sysmiss		8221	

Warning: these figures indicate the number of cases found in the data file. They cannot be interpreted as summary statistics of the population of interest.

GeneXpert: TB GeneXpert Test Result

Information	[Type= discrete] [Format=numeric] [Range= 1-7] [Missing=*/11]
Statistics [NW/ W]	[Valid=8776 /-] [Invalid=8221 /-]

Value	Label	Cases	Percentage
1	MTB Not Detected	8638	98.4%
2	MTB Detected Very Low	38	0.4%
3	MTB Detected Low	32	0.4%
4	MTB Detected Medium	5	0.1%
5	MTB Detected High	6	0.1%
6	MTB Detected	0	

File : AHRI.Vukuzazi.VukuzaziGeoSpartialMultimorbidity.2019.V1.0

GeneXpert: TB GeneXpert Test Result

Value	Label	Cases	Percentage
7		57	0.6%
11	..	0	
Sysmiss		8221	

Warning: these figures indicate the number of cases found in the data file. They cannot be interpreted as summary statistics of the population of interest.

LiquidCulture: Liquid Culture Result(MGIT)

Information	[Type= discrete] [Format=numeric] [Range= 1-7] [Missing=*/11]
Statistics [NW/ W]	[Valid=8356 /-] [Invalid=8641 /-]

Value	Label	Cases	Percentage
1	Negative MTB Not Isolated	7519	90.0%
2	Positive MTB Only(Mycobacterium Tuberculosis isolated)	97	1.2%
3	Positive NTM Only	174	2.1%
4	Culture Contaminated	422	5.1%
5	Positive MTB And Contaminated(Mycobacterium Tuberculosis isolated)	0	
6	Positive NTM And contaminated	144	1.7%
7	Positive MTB And Positive NTM(Mycobacterium Tuberculosis isolated)	0	
11	..	0	
Sysmiss		8641	

Warning: these figures indicate the number of cases found in the data file. They cannot be interpreted as summary statistics of the population of interest.

HIVElisa: HIV Elisa Result

Information	[Type= discrete] [Format=numeric] [Range= 1-3] [Missing=*/11]
Statistics [NW/ W]	[Valid=16822 /-] [Invalid=175 /-]

Value	Label	Cases	Percentage
1	Positive	5726	34.0%
2	Negative	11094	65.9%
3		2	0.0%
11	..	0	
Sysmiss		175	

Warning: these figures indicate the number of cases found in the data file. They cannot be interpreted as summary statistics of the population of interest.

VL: HIV Viral Load Result

Information	[Type= discrete] [Format=numeric] [Range= 1-10000001] [Missing=*/100000001]
Statistics [NW/ W]	[Valid=5718 /-] [Invalid=11279 /-]

Value	Label	Cases	Percentage
1	< 40		
2	NOT DETECTED		
100000001	..		

Warning: these figures indicate the number of cases found in the data file. They cannot be interpreted as summary statistics of the population of interest.

TBTxCurrent: Are you currently on TB treatment?

Information	[Type= discrete] [Format=numeric] [Range= 1-3] [Missing=*]
Statistics [NW/ W]	[Valid=16973 /-] [Invalid=24 /-]

File : AHRI.Vukuzazi.VukuzaziGeoSpartialMultimorbidity.2019.V1.0

TBTxCurrent: Are you currently on TB treatment?

Value	Label	Cases	Percentage
1	Yes	68	0.4%
2	No	16905	99.6%
3	NA	0	
Sysmiss		24	

Warning: these figures indicate the number of cases found in the data file. They cannot be interpreted as summary statistics of the population of interest.

TBTxEver: Have you been on TB treatment before?

Information	[Type= discrete] [Format=numeric] [Range= 1-3] [Missing=*]
Statistics [NW/ W]	[Valid=16973 /-] [Invalid=24 /-]

Value	Label	Cases	Percentage
1	Yes	1941	11.4%
2	No	14145	83.3%
3	NA	887	5.2%
Sysmiss		24	

Warning: these figures indicate the number of cases found in the data file. They cannot be interpreted as summary statistics of the population of interest.

RadOldTB: Radiologist Diagnostic OldTB

Information	[Type= discrete] [Format=numeric] [Range= 1-3] [Missing=*]
Statistics [NW/ W]	[Valid=2677 /-] [Invalid=14320 /-]

Value	Label	Cases	Percentage
1	Yes	2677	100.0%
2	No	0	
3	NA	0	
Sysmiss		14320	

Warning: these figures indicate the number of cases found in the data file. They cannot be interpreted as summary statistics of the population of interest.

BPSecondSystolic: BP Second Systolic

Information	[Type= continuous] [Format=numeric] [Range= 1-7128] [Missing=*]
Statistics [NW/ W]	[Valid=16969 /-] [Invalid=28 /-] [Mean=120.281 /-] [StdDev=60.563 /-]

BPThirdSystolic: BP Third Systolic

Information	[Type= continuous] [Format=numeric] [Range= 10-12968] [Missing=*]
Statistics [NW/ W]	[Valid=16969 /-] [Invalid=28 /-] [Mean=119.041 /-] [StdDev=101.72 /-]

BPSecondDiastolic: BP Second Diastolic

Information	[Type= continuous] [Format=numeric] [Range= 5-6985] [Missing=*]
Statistics [NW/ W]	[Valid=16969 /-] [Invalid=28 /-] [Mean=74.821 /-] [StdDev=54.966 /-]

BPThirdDiastolic: BP Third Diastolic

Information	[Type= continuous] [Format=numeric] [Range= 7-7372] [Missing=*]
Statistics [NW/ W]	[Valid=16969 /-] [Invalid=28 /-] [Mean=74.371 /-] [StdDev=76.308 /-]

HighBPTx2wks: In the past two weeks, have you taken any drugs (medication) for raised blood pre

Information	[Type= discrete] [Format=numeric] [Range= 1-3] [Missing=*]
Statistics [NW/ W]	[Valid=9630 /-] [Invalid=7367 /-]

File : AHRI.Vukuzazi.VukuzaziGeoSpartialMultimorbidity.2019.V1.0

HighBPTx2wks: In the past two weeks, have you taken any drugs (medication) for raised blood pre

Value	Label	Cases	Percentage
1	Yes	2910	30.2%
2	No	6720	69.8%
3	NA	0	
Sysmiss		7367	

Warning: these figures indicate the number of cases found in the data file. They cannot be interpreted as summary statistics of the population of interest.

HBA1CPercent: HBA1C Percent

Information	[Type= continuous] [Format=numeric] [Range= 3.7-18.9] [Missing=*/101]
Statistics [NW/ W]	[Valid=16821 /-] [Invalid=176 /-] [Mean=5.841 /-] [StdDev=1.15 /-]

Value	Label	Cases	Percentage
101	..		

Warning: these figures indicate the number of cases found in the data file. They cannot be interpreted as summary statistics of the population of interest.

InsulinTxCurr: Are you currently taking insulin for diabetes prescribed by a doctor or other hea

Information	[Type= discrete] [Format=numeric] [Range= 1-3] [Missing=*]
Statistics [NW/ W]	[Valid=8092 /-] [Invalid=8905 /-]

Value	Label	Cases	Percentage
1	Yes	179	2.2%
2	No	7913	97.8%
3	NA	0	
Sysmiss		8905	

Warning: these figures indicate the number of cases found in the data file. They cannot be interpreted as summary statistics of the population of interest.

HighBSugarTx2wks: In the past two weeks, have you taken any drugs (medication) for diabetes prescri

Information	[Type= discrete] [Format=numeric] [Range= 1-3] [Missing=*]
Statistics [NW/ W]	[Valid=8092 /-] [Invalid=8905 /-]

Value	Label	Cases	Percentage
1	Yes	660	8.2%
2	No	7432	91.8%
3	NA	0	
Sysmiss		8905	

Warning: these figures indicate the number of cases found in the data file. They cannot be interpreted as summary statistics of the population of interest.