Abstract Report

Annual SAPRIN Conference

Societies in Motion: Understanding Population Health

WITS RHI, Hillbrow, Johannesburg; 24 - 26 June 2024

SAPRIN
POPULATION-BASED SCIENCE
SOUTH AFRICAN POPULATION RESEARCH INFRASTRUCTURE NETWORK

Contents

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USINGA UMLAZI SURVEILLANCE INITIATIVE TO NURTURE GRASSROOTS ACTION

1. Overview

The SAPRIN Nodal Best Practice Workshop has been an annual feature on our calendars for the past 5 years. The workshop was aimed at the highly diverse HDSS nodes to ensure there was harmony of approaches and methods in implementing the SAPRIN Core-Protocol in a cost-efficient and cost-effective manner. The workshop was an important platform for fostering collaboration and mutual support between the various HDSS nodes. The Best Practice Workshop played a role in developing synergies and putting in place the fundamental building blocks of nodal operations.

Over the years the workshops were organised against the backdrop of a central best practice theme. In 2024 the shape and form of the Best Practice Workship will evolve to become the Annual SAPRIN Conference. The move to a fully fledged conference marks the progression of the annual workshop from an operationally focused gathering to a more holistic and science-focused event.

The conference programme will include scientific, operations and communication tracks. The inclusion of the communication track aims to work at bridging the gap between science and the communication of SAPRIN findings to stakeholders and the public.

The call for abstracts yielded 27 abstract submissions. This report contains the 8 abstracts that were successful and will be presented as part of the programme for the scientific segment. It also includes11 abstracts that were submitted but not chosen for presentation at the conference.

2. Abstracts presented at Annual SAPRIN Conference

Abstract 1: Mental health within low-income urban settings during the COVID-19 pandemic

Author: Rhena Delport

Background

We explored the impact of the COVID-19 pandemic and associated regulations on self-reported mental health and perceived social and economic challenges in very low- to low-middle-income households in four urban typologies in South Africa: formal township dwellings, backyard dwellings, inner-city high-density apartments, and informal settlement dwellings.

Methods

The study was designed as a cross-sectional observational study. Structured interviews were conducted with 300 adults (≥18 years) from a stratified random sample from each urban typology from March to October 2021 before and after the third SARS-CoV-2 wave. Data were weighted to represent the target population and analyzed using descriptive statistics as well as chi-square testing and CHAID analyses.

Results

Overall, residents reported increased anxiety (28.5%), depression (23.9%), and less social connectedness (20.0%). Increasing anxiety and depression were more prevalent in formal township dwellings and high-density apartments and less prevalent in informal settlements. Financial concerns; worries about isolation, crime, and community violence; and fear of COVID-19 infection and stigma were mostly associated with increased mental health concerns.

Conclusions

Our findings suggest that residents from different urban typologies were affected differently by the COVID-19 pandemic. This could be related to the nature of the built environment and the apparent derangement of community structures. This research demonstrates the impact of environmental disasters on mental health in urban communities, mediated by social and economic problems.

Abstract 2: Household crowding and mortality before and during the COVID-19 pandemic among adults: Findings from longitudinal population surveillance data in rural and peri-urban settings in Limpopo, South Africa.

Authors: Kagiso Peace Seakamela, Jean Juste Harrisson Bashingwa, Joseph Tlouyamma, Cairo Bruce Ntimana, Modupi Peter Mphekgwana, Reneilwe Given Mashaba, Katlego Mothapo, Chodziwadziwa Whiteson Kabudula, Eric Maimela

Background

Household overcrowding is a public health concern linked to increased morbidity and mortality. There is limited data available on the effects of COVID-19 on age-specific mortality in the context of household crowding in rural and peri-urban settings in Africa. Here we assess age-specific excess mortality in densely inhabited households before and during COVID-19.

Methods

We used data collected three times annually between 2019 and 2021 in the health and demographic surveillance project in DIMAMO, South Africa. Data inaccuracies or inconsistencies were identified and corrected using data validation rules or algorithms implemented at both application and database levels. The number of persons-per-room was used to determine the degree of crowding or household crowding index (HCI). HCI tertiles were categorized as low, medium, and high density.

Results

Throughout the study, people aged 70 years and above had the highest mortality rates compared to other age groups (40-54 and 55-69), with the highest mortality rates observed in overcrowded households (highest crowding index). Multigenerational households were observed as a risk factor for mortality during COVID-19. Individuals aged 70 years and older had the highest hazard ratios before and during COVID-19, where the risk increased during COVID-19 for densely populated households.

Conclusion

Overcrowding at the household level was associated with increased mortality during COVID-19 for individuals aged 70 years and older. Public health interventions in the case of future pandemics should consider how to address this risk factor.

Abstract 3: Using routinely collected health data to develop community profiles that support community oriented primary care services.

Authors: Hussey H , von Delft A , Beneke E , Hwinya C , Boulle A

Background

The Provincial Health Data Centre collates all available electronic health data in the Western Cape public sector. Address data was previously not useable at scale and burden of disease trends could only be assessed at facility level. As individuals may use facilities, particularly hospitals, some distance from where they live, this does not reflect the true community level disease burden, which is needed to inform community oriented primary care (COPC) services.

Methods

This cross-sectional study used address data from patient registrations systems in 2022-2023 to now geocode individuals to the C-SHARP surveillance area (Bishop Lavis and Nomzamo COPC nodes). Age, sex, date of death and known health conditions (HIV, tuberculosis, non-communicable diseases [NCDs - diabetes, hypertension, chronic kidney disease, asthma/COPD]) were collected.

Results

37,721 individuals were included: 54.9% female; 66.2% from Nomzamo. The median age was 27 in both nodes, but 11.8% were ≥60 years in Bishop Lavis, compared to 3% in Nomzamo. The median age of death was 62 (IQR 44-73) in Bishop Lavis and 37 (IQR 2-51) in Nomzamo. 27% of Nomzamo individuals were HIV positive (33.2% females; 18.9% males), compared to 5.9% in Bishop Lavis. 3.5% of individuals in both sites had tuberculosis in 2022-2023. 24.5% of Bishop Lavis tuberculosis patients were HIV positive, compared to 50.6% in Nomzamo. NCDs increased with age, with 75.1% of those aged ≥60 years in Bishop Lavis having one or more NCD, compared to 60.3% in Nomzamo. 38.3% of Nomzamo hypertension patients had HIV, compared to 5.3% in Bishop Lavis.

Conclusion

Routinely collected health data can be used to develop community health profiles to support COPC, but are limited as only those accessing facilities have information at the PHDC. C-SHARP data, once available, will address this gap. The population structure and disease burden differed markedly between Bishop Lavis and Nomzamo.

Abstract 4: Risk factors associated with neonatal, post-neonatal, infant, child, and under-five mortality in the Soweto and Thembelihle Health and Demographic Surveillance System from 2018 to 2022.

Authors: Takwanisa Machemedze, Megan Dempster, Siobhan Johnstone, Ziyaad Dangor

Background

South Africa observed a steady decline in national under-five mortality between 2010 and 2018 from 52.9 to 29.7 per 1000 livebirths. However, there remains a gap in our knowledge regarding under-five mortality trends at the community level. This study explores determinants of neonatal, post-neonatal, infant, child, and under-five mortality in the Soweto and Thembelihle Health and Demographic Surveillance System (SaT-HDSS) from 2018 to 2022.

Methods

The study used the SaT-HDSS data collected over the period 2018-2022. During this five-year period, there were 5995 live births and 168 under-five deaths of local born children. Among the deaths, 76 had their underlying cause of death determined through minimally invasive tissue sampling (MITS). We calculated age-specific mortality rates and assessed potential determinants of neonatal, post-neonatal, infant, child, and under-five mortality using Cox regression models. We assessed determinants of the most frequent underlying cause of death (low birth weight and perinatal asphyxia-hypoxia) using logistic regression models.

Results

Overall under-five mortality per 1000 person-years was 26.5 (22.4-31.4), driven mostly by neonatal mortality, 25.4 (21.8-29.7). Neonatal, infant and under-five mortality were disproportionately high among multiple births compared to singletons and among children born at home compared to a health facility. Multiple births (uOR = 18.3, 95%CI: 2.0-169.1) and normal vaginal births (uOR=6, 95%CI: 1.9-19.0) were associated with increased risk of dying from low birth weight. None of the potential predictors were associated with a risk of dying from perinatal asphyxia-hypoxia.

Conclusion

Our study suggests that under-five mortality of children born in the study site was within range of national estimates and most deaths among children under-five occur during the first year of life were mainly due to pregnancy and delivery related complications. Understanding risk factors for childhood deaths is important for implementing targeted interventions.

Abstract 5: Changes in Chronic Disease Mortality and Multimorbidity clusters in Rural South Africa (2012-2022).

Authors: Cyril Chironda, Chodziwadziwa Kabudula, F Gomez-Olive Casas, Daniel Ohene Kwofie, Jean Basingwa

Introduction

Chronic conditions and their multimorbidity are increasingly prevalent worldwide, posing significant challenges for patients and healthcare systems, especially in the poor communities of rural South Africa. To ensure that care remains patient-centred, it is crucial to follow trends and identify which conditions frequently occur together.

Objective

The aim of this study was to track trends in chronic conditions deaths and identify and characterise related multimorbidity clusters from 2012 to 2022.

Methods

Events in the Agincourt population have been updated annually through surveys conducted since 1992, with all deaths recorded and followed by verbal autopsy interviews whose responses were processed in a standardised manner. We used this VA data to model trends and clusters of chronic conditions reported to have led to death. R was used to model the trends, as well as the cluster analysis (using Gower distance and Partitioning Around Medoids) which was employed to identify groups of patients with similar conditions.

Results

Results show a total of 5,880 deaths associated with one or more of 12 chronic conditions. Trends indicate an increase in deaths reporting hypertension, diabetes, and dementia (in the older population), while TB-related deaths have decreased across all age groups and genders. The proportion of deaths reporting HIV and cancer has remained constant over the 11-year period. Additionally, there has been a rise in deaths involving two, three, or more chronic conditions, peaking in 2016 for both males and females, particularly among those of age over 54. The predominant chronic condition clusters have shifted from TB and HIV to hypertension and diabetes, with most clusters including hypertension.

Conclusion

Following these trends and identifying condition clusters is essential for targeting patient-centred care to those with unmet needs. Our findings emphasise the importance of addressing not only individual chronic conditions but also their related comorbidities.

Abstract 6: Prevalence of frailty and associated factors in elderly participants residing in the DIMAMO HDSS, Limpopo province, South Africa.

Author: Cairo Bruce Ntimana

Background

Frailty is a common syndrome amongst the elderly characterized by a progressive long-term loss of physical and or cognitive resilience. Frailty is reported to complicated and involves various systems making older adults gradually lose their physical strength and resilience, making them more prone to health problems. To the best of the authors' knowledge, this is the first study to investigate frailty amongst elderly individuals in the Limpopo province, South Africa. Given the high prevalence and chronic conditions and the lack of literature on frailty among rural elderly in Africa, the present study aimed to investigate the prevalence of frailty and its associated factors in elderly individuals residing in Limpopo province.

Methods

This was cross-sectional study, the present study comprised of 1284 participants of which 42.3% were male and 57.7% were female. The participants were selected using purposive sampling. The data was analyzed using Statistical Package for Social Sciences version 27.

Results

In the present study the mean age of the participants was 58.41±9.37. The proportion of frailty was 45.6%. Approximately 52.8% of the participants were married and had secondary school as their highest level of education (51.3%). The frequency of chronic illnesses was as follows: Hypertension (33.6%) and diabetes (11.0%). In multivariate regression, age, gender, obesity, diabetes and dyslipidemia were more likely to be associated with frailty in the present study.

Conclusion

Frailty is common among the elderly in rural Africans and is determined by age, gender, obesity by BMI, diabetes mellitus type 2 and dyslipidemia. Based on the findings of the present study, the authors recommend that Implementation screening programs, for frailty in healthcare settings, especially targeting older adults and individuals with comorbidities such as, diabetes type 2, and dyslipidemia.

Abstract 7: High endemicity of hepatitis B virus and low vaccine-mediated immunity in rural KwaZulu-Natal, South Africa.

Authors: Motswedi Anderson , Lusanda Mazibuko , Tongai Maponga, Gregory OrdingJesperson , Janine Upton , Dickman Gareta, Lulama Mthethwa , Sontaga Manyana , Elizabeth Waddilove , Stephen Olivier , Jacob Busang , Gloria Sukali , Marion Delphin , Resign Gunda , Emily B Wong, Mark J Siedner, Thandeka Khoza1 , Thumbi Ndung'u, Kathy Baisley, Nokukhanya Msomi , Theresa Smit , Collins Iwuji, Philippa C Matthews

Introduction/Background

Sparse data exist on hepatitis B virus (HBV) epidemiology in Africa, particularly in rural areas.

Aim/Objectives

To determine the prevalence of HBV infection, immunity and exposure stratified by age, sex and HIV in rural KwaZulu-Natal (KZN), South Africa.

Methods

In the EVOLVE-HBV ('Evaluation of Vukuzazi LiVEr disease') study, we screened 2,135 archived plasma samples from participants aged ≥15 collected between 2018 and 2020 as part of the Vukuzazi study, nested within the AHRI HDSS, in KZN. We estimated prevalence of: (I) active HBV

infection (HBV surface antigen (HBsAg)- positive); (II) vaccine-mediated immunity (HBV surface antibody (anti-HBs) positive and other markers negative); (III) HBV exposure and clearance (HBV core antibody (Anti-HBc) positive, HBsAg-negative). Estimates were stratified by sex, HIV-status and age (pre-vaccine roll-out: born before 1995, peri-vaccine roll-out: born 1995-2000, and post-vaccine roll-out: born 2000-2005) and both sampling weights and nonresponse weights used to make population-level inferences.

Results

Of the 2,135 individuals tested (58.6% female, mean age 37.6 years (SD = 8.3)), prevalence of active HBV infection, vaccine-mediated immunity and HBV exposure and clearance were 10.5% (95%-CI: 9.1%-12.2%), 8.9% (95%-CI 7.5%-10.5%) and 34.8% (95%-CI 32.2%-37.2%) respectively. Females had a significantly higher prevalence of HBV exposure and clearance, [38.0% vs. 30.3%, p=0.003]. For those born after 2000 (receiving routine infant vaccination), HBV prevalence decreased significantly [12.1% vs 6.8%, p=0.004]. Vaccine-mediated immunity decreased with older age (p less than 0.001), while exposure and clearance increased (p less than 0.001). People living with HIV had a higher prevalence of active HBV infection [13.2% vs. 9.2%, p=0.016] and HBV exposure and clearance [44.3% vs 29.9%, p less than 0.001] than those who were HIV negative, whilst vaccine mediated immunity was higher in HIV-negative individuals [10.0% vs. 6.6%, p=0.023].

Conclusion

Despite WHO vaccination roll out, the population prevalence of active HBV in rural KZN is high, highlighting the need for further interventions.

Abstract 8: Exploring Age and Sex as Determinants of Internal Migration in South Africa: A Life-Course.

Author: Sadson Harawa

Perspective Introduction

Internal migration is a vital demographic phenomenon, exhibiting diverse patterns globally. Extensive research has elucidated the intricate connection between mobility patterns and life course transitions across various countries and regions, often employing event history analysis methodologies. However, a notable gap exists in life-course country-level perspectives, necessitating a focused examination of age and sex as determinants of internal migration within the context of South Africa. Understanding these determinants is not only pivotal for providing nuanced insights into migration dynamics but also holds significant implications for socio-demographic research. Furthermore, it plays a crucial role in accurately estimating mortality rates and informing policy interventions.

Methods

This study utilises longitudinal data from three of SAPRIN's Health and Demographic Surveillance Systems (HDSS) in South Africa, namely: Agincourt, Africa Health Research Institute (AHRI), and DIMAMO. The study population comprises individuals aged 15 and above, encompassing significant migratory decisions. Event history analysis is employed to model age and sex as determinants of migration, treating time as a continuous variable to capture repeat migration events. Survival analysis techniques are utilised to investigate migration trends from age 15 onwards.

Results

Preliminary findings indicate that internal migration in rural South Africa is predominantly age-selective, with a notable peak during early adulthood. Gender-specific patterns are evident, with young females frequently migrating for marriage and employment, while males predominantly migrate for economic opportunities. Consistent trends across the HDSSs underscore the importance of life-course transitions in shaping migration dynamics.

Conclusion

This study contributes to our understanding of internal migration dynamics in South Africa, highlighting age and sex as key determinants within a life-course framework. The findings offer valuable insights for demographic research and policy formulation, particularly in the context of socio-economic development and mortality rate estimations.

3. Other abstracts submitted for the Annual SAPRIN Conference

Abstract 9: Tracking movement in an informal settlement, Melusi through image classification/analysis using remote sensing and GIS.

Author: Sinalo Kamva Nobheqwa

Abstract

In developing countries, informal settlements account for 30-60% of urban areas. The number of people living in informal settlements is growing worldwide, and these areas continuously evolve over space and time. Reliable and precise data about informal settlements and their residents is seldom available due to their informal and changing nature. Melusi is no different, it is a growing informal settlement located in the West of Pretoria, South Africa and is a GRT-Inspired site.

Researchers face significant challenges in studying the patterns that exist in informal settlements due to their dynamic nature, which complicates the collection and management of data, information, and resources. One of the crucial reasons for movement is the establishment of settlements on land unsuitable for development, leading to vulnerability of shacks in environmentally sensitive areas. This movement results in the displacement of people, which tends to occur in the same settlement away from the problematic areas, at least until new occupants come to occupy the same area. Monitoring change in informal settlements is crucial not only for academic pursuits but also as a primary data source for strategic planning and urban analysis. There is a pressing need to formalise informal settlements and to exercise greater control over their spatial development, it is therefore essential to establish reliable methods for detecting and monitoring the spatial dynamics of informal settlements.

The potential of remote-sensed data to identify and track changes in informal settlements has been extensively documented. One possible solution is utilizing this data to show the movements that occur in an informal settlement. The main source of data for this research will be annual drone images for Melusi. By analysing and comparing these for the years 2022-2024, we will be able to track movement. ArcGIS Pro Esri software will be used to classify and interpret the images. Essentially, this paper highlights the importance of understanding the dynamic nature of informal settlements and to highlight how the built environment can be dynamic and ever-changing over time, the growth, depletion, the temporary and permanent shifts that occur. This challenges the traditional idea of settlements it being fixed and unalterable.

Abstract 10: Legionella pneumophila in Urban Water Systems: A Case Study from Johannesburg's High-Rise Buildings.

Authors: Singh A., Buthane KE, Delair Z and Barnard TG

Abstract

Legionella pneumophila, the primary cause of legionellosis, manifests as mild Pontiac fever or more severely as Legionnaires' disease, a form of pneumonia. In South Africa, despite being a category 2 notifiable disease requiring notification within seven days of diagnosis, legionellosis remains underreported due to limited awareness and diagnostic capabilities. The stagnation of water in building plumbing systems, exacerbated by water shortages, creates conducive conditions for *L. pneumophila* growth, complicating disease detection and public health responses. Moreover, prevalent low-income conditions and diseases like tuberculosis and HIV may skew diagnostics away from detecting legionellosis.

This study focused on the presence of *Legionella* in high-rise buildings in Hillbrow, Johannesburg, following ethical protocols for sample collection from 2022 to 2023. Water samples and swabs underwent testing using IDEXX Legiolert, ISO 11731:2017, and amoebal enrichment methods to identify Legionella species, which were further analyzed using quantitative Real-Time PCR. Additionally, a building risk assessment classified these buildings according to SANS 10400A:2022, and water quality was assessed per SANS 241 standards.

Results revealed the absence of air-conditioning systems and decorative water features in the buildings. Despite the absence of documented building water distribution plans, 60% of buildings utilize a system where water is pumped from the ground to rooftop tanks, then distributed to apartments, raising concerns especially as some tanks are not fully covered. Water heating inconsistency varied across buildings, with some relying on centralized geysers and others on individual apartment units. Despite acceptable water quality, 31/ 67 drinking water samples tested

positive for *Legionella pneumophila,* in cold water, indicating a risk even without water heating. The presence of amoeba-resistant bacteria in some samples highlights concerns about antimicrobial resistance.

The study underscores the need for regular monitoring to mitigate potential health risks.

Abstract 11: Prevalence and Associated factors of depression amongst pregnant and parenting young females: a comparison of adolescents and young adults in rural South Africa.

Authors: Seakamela KP, Mashaba RG, Ntimana CB, Mbombi MO, Tlouyamma J, Mphekgwana P, Nemuramba R, Mothapo K, Mphekgwane P, Muthelo L, Mabila LN, Dhau I, Maimela E

Background

Depression is at the forefront of public health concerns affecting approximately 280 million people worldwide. Pregnant teenagers are more likely to experience depression than older pregnant mothers and their non-pregnant peers. There is little research on the risk factors for depression in rural Black adolescents and young adults. Therefore, the current study sought to identify the frequency and contributing variables of depression among young adults and adolescents who were pregnant or breastfeeding in the Limpopo area of South Africa.

Patients and methods

Data was collected from pregnant and parenting adolescents aged 14 to 22 in the primary health care clinics (PHCs) in the DIMAMO HDSS. The study used the Edinburgh Postnatal Depression Scale (EPDS) to identify pregnant women who would have prenatal or postpartum depression. Data were analysed using Statistical Package for Social Sciences (SPSS), version 27.0.

Results

The study found a relationship between alcohol consumption, lack of financial support, unplanned pregnancy, and depression in pregnant and parenting adolescents. The prevalence of unplanned pregnancy in the present study was 81.8%. Furthermore, the present study indicated that participants from low socio-economic status families and those that were HIV positive were depressed in both the adolescent and young adult groups.

Conclusion

The study found social issues associated with depression among black adolescents and young adults living in the rural areas of Limpopo province, South Africa. Overall, 42.8% of our participants were depressed. Therefore, we recommend that measures be put in place for early detection and treatment of depression and that social support be given to adolescent mothers.

Abstract 12: Community Engagement to develop HBV care pathways in a rural South African population to inform interventions for diagnosis, treatment, and prevention.

Author: Nondumiso Mpanza

Introduction/Background

Chronic Hepatitis B virus (HBV) infection affects 300 million people and causes 800,000 deaths worldwide each year. The World Health Organisation has set targets for the elimination of HBV, which include preventing new infections and reducing deaths. Currently, only 10% of people living with HBV are aware of their diagnosis, and this percentage is less than 1% in Africa. More effective care pathways are urgently needed.

Aim/Objectives

To create effective HBV care pathways inductively and collaboratively by ascertaining local knowledge, attitudes, behaviours, and care barriers.

Methods

The EVOLVE-HBV study ('Evaluation of Vukuzazi LiVEr disease'), nested within the Health and Demographic Surveillance Systems, adopted a multidisciplinary approach involving colleagues from clinical research, social science, and public engagement to conduct a community discussion with Africa Health Research Institution's Community Advisory Board within the uMkhanyakude district, KwaZulu-Natal, South Africa. Public engagement colleagues used isiZulu-language topic guides developed by clinical colleagues. Social Science team members observed and took notes on the discussion.

Results

There is a lack of knowledge regarding HBV, which is understood broadly as liver disease. HBV is conflated with non-infectious causes of liver disease which the community identified as alcohol and HIV. HBV is associated with stigmatization and traditional beliefs about causation and treatment. There are multiple barriers to clinical services including discrimination, financial difficulties, lack of community-based interventions and low awareness.

Conclusion

We successfully developed an effective multidisciplinary programme to engage with a rural community in South Africa. We engaged and assessed community knowledge around HBV and identified key points to tackle for better linkage to care, early diagnosis, and prevention. HBV is a neglected and poorly understood disease in this community. There is a need for awareness and

facilitated diagnosis and treatment, as well as the development of research and clinical care pathways for HBV care.

Abstract 13: The impact of hygiene on stored water quality in Melusi and Atteridgeville.

Author: Barnard TG, Delair Z, Hoorzook KB and Singh A

Abstract

Access to safe and potable drinking water is a human right in South Africa, although access is defined as to having a tap in the house, or yard, or being near a water source. This results in people using containers to collect and store water in the household with the risk that water can be contaminated due to poor hygiene practises. The current study looked at water quality, water storage and hygiene practise in Melusi and Atteridgeville to determine if hygiene does have an impact on water storage and the water quality.

The study collected tap (n=120) and container water (n=110) from Melusi (n=67) and Atteridgeville (n=110) and tested the water using the tests recommended by the South African National Standards for drinking water (SANS241:2015). Additionally, adenosine triphosphate (ATP) testing was used to determine the microbial levels on kitchen and toilet surfaces, and dishcloths (n=176) were tested for the presence of *Escherichia coli* (*E. coli*) as an indicator of faecal pollution. If *E. coli* was present, samples were tested with polymerase chain reactions (PCR) targeting specific virulence genes for the presence of diarrhoeagenic *E. coli*.

The water quality results showed that 72.5% of the tap water samples had no *E. coli* or total coliforms, with only 16.4% of the container water not having any total coliforms or *E. coli* present. A variety of pathogenic *E. coli* types were detected in the *E. coli* positive water and dishcloth (7.4%) samples. The ATP tests showed that on average the kitchen tables and toilet seats had similar ATP readings but that the reading ranged from extremely clean to extremely dirty when compared to published ATP readings.

The data shows that hygiene does play a role on the water quality of stored water and that educational interventions are needed to assist the communities.

Abstract 14: Record Linkage and System Deployment for Rural Public Health Research in Africa: A Junior Data Scientist's Perspective

Author: Nkosinathi Masilela on behalf of the MADIVA Research Hub

Background

Record linkage systems play a pivotal role in enhancing public health research by integrating data from multiple sources to gain far-reaching insights into population health trends and enhance disease surveillance. Developing and deploying such systems involve navigation of complex challenges of data processing and validating variables required for record linkage. This abstract presents lessons learned from the development and deployment of a record linkage system in a limited-resource setting in Africa with the aim of strengthening public health research and data-driven interventions.

Methods

The record linkage system was developed in collaboration with key stakeholders, including public health agencies, researchers, and data custodians. The system employed a probabilistic and deterministic linkage methodology, considering data quality, standardization, and privacy.

Results

Several valuable lessons were learnt from the development and deployment process. Firstly, data quality and standardization were critical factors for accurate linkage, which includes standardization of identifiers required for linkage. Encryption of the database that hold identifiers with their medical records was another important factor. The implementation of robust encryption safeguards sensitive information. Establishing collaboration with Health department officials enable easy data collection at health facilities. Clear governance structures and ethical approval were also important for building trust among stakeholders and adhering to ethical guidelines. In addition, stakeholder engagement with health officials played a pivotal role in identifying and addressing user needs, concerns, and requirements, and ensuring relevance to public health research. Discussion: The record linkage system's successful deployment relied on continuous evaluation and improvement, especially when deployed in another research setting. The system's methodologies and findings fostered trust and support among stakeholders and the public.

Conclusion

Developing and deploying a record linkage system to enhance public health research demands cautious attention to data quality, privacy, governance, and stakeholder engagement. This abstract offers valuable insights into navigating the ramifications of record linkage systems, which can serve

as a blueprint for future endeavours, enabling impactful public health research and data-driven interventions.

Abstract 15: Adaptation of the Biowipe for the collection of surface samples to study the occurrence of pathogenic bacteria in households.

Author: Barnard TG, Heine L, Sanasi K, Gaebee L, Kondiah K and Singh A

Abstract

The collection of surface samples is typically done using a cotton swab with a pre-defined surface area that is sampled. Although this method allows for the standardization of the method to compare surface hygiene and quantify the microbial contamination, it may not offer a true picture of the surface contamination. To overcome this, we propose using the Biowipe collection kit, previously developed for the collection of stool samples in resource limiting settings. The samples can be taken and stored at room temperature for 21 days and have been shown that virus, bacteria, and fungi can be detected using molecular biology methods, or isolated using microbiological methods.

The aim of this study was to test the use of the Biowipe collection kit for the collection of surface swabs in Hillbrow to test for the presence of bacterial pathogens. Surface swabs were collected from 62 households in different buildings in Hillbrow and included hand-, toilet seat and kitchen table swabs. The sample was collected from the Biowipes and used for the direct detection of the World Health Organization ESKAPE pathogens (Enterococcus faecalis, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa and Enterobacter species) and Escherichia coli (E. coli).

All seven of the pathogens could be recovered and identified using reference strains in the laboratory phase of the method development. Additionally, we could successfully collect samples from all the surfaces, detect all seven bacteria using the polymerase chain reaction (PCR) targeting species specific genes, indicating that we could use the sample to screen for novel, opportunistic of future pathogens of interest using sequencing-based methods. We could isolate all seven the pathogens from a variety of the samples using microbiology-based methods allowing us to further study the organisms in detail and determine their origin and if they were responsible for healthcare associated infections.

Abstract 16: The association between alcohol use and chronic diseases' treatment outcomes among adults aged 40 years and above in rural South Africa.

Author: Rumbidzai Mupfuti

Background

Chronic diseases including HIV, hypertension and diabetes are significant problems in South Africa. Chronic diseases' treatment outcomes are critical to the reduction of morbidity and mortality. There is limited data in South Africa on alcohol use and treatment outcomes of chronic diseases in older people. We explored the association between alcohol use and chronic diseases (HIV, hypertension, and diabetes mellitus) treatment outcomes among adults aged 40 years and above in a rural South African setting.

Methods

We analysed data from wave 1 of the Health and Ageing in Africa-a longitudinal Study in an INDEPTH community (HAALSI) study conducted among adults aged 40 years and above in rural Mpumalanga, South Africa. Data collection included socioeconomic and clinical data, self-reported alcohol use in the last 30 days, anthropometry, point-of-care blood glucose levels, blood pressure, and HIV viral load levels. Multimorbidity was defined as having 2 or more chronic conditions. We performed descriptive analysis to determine the prevalence of optimal chronic diseases' treatment outcomes (suppressed HIV viral load, normal blood pressure and normal blood sugar) and applied a univariate and multivariate modified Poisson regression to determine the association between alcohol use and chronic diseases' treatment outcomes. A p value <0.05 was considered statistically significant.

Results

The prevalence of optimal treatment outcomes was 87.4% (450/515) for HIV, 42.7% (713/1668) for hypertension, 53.6% (140/261) for diabetes mellitus and 52.4% (475/907) for multimorbidity. Alcohol use did not negatively impact the optimality of treatment outcomes for HIV (aRR = 1.00, 95% CI: 0.93-1.09), hypertension (aRR = 0.88, 95% CI: 0.68-1.14), diabetes mellitus (aRR = 0.73, 95% CI: 0.44-1.22), and multimorbidity (aRR = 1.0, 95% CI: 0.93-1.09).

Conclusion

The optimal treatment outcome was highest for HIV and sub-optimal for hypertension, diabetes and multimorbidity. Alcohol use was not significantly associated with treatment outcomes possibly due to underreporting of alcohol use. There is a need to incorporate objective alcohol measurements in chronic diseases care settings. Furthermore, there is an urgent need to strengthen the

management of hypertension and diabetes, by adopting the strategies deployed for HIV management.

Abstract 17: The mental health burden and its correlates among young people residing in three rural SAPRIN nodes.

Authors: Audrey Moyo, Lovemore Sigwadhi, Stanley Carries , Nokwanda Sithole, Reuben Moyo, Arvin Bhana , Peter Nyasulu, Innocent Maposa, Darshini Govindasamy

Abstract

Mental disorders impact around 20% of young people (YP) annually worldwide. In South Africa, studies show a high prevalence of anxiety and depressive symptoms (5%-46%). This study aimed to identify and compare the prevalence and factors of common mental disorders (CMDs) among YP aged 15-24 in Agincourt (Mpumalanga), DIMAMO (Limpopo), and Africa Health Research Institute (AHRI) (KwaZulu-Natal) SAPRIN nodes. Utilised mental health module data collected between March 2021 and April 2022 at the three nodes. The questionnaire included two-item Patient Health Questionnaire (PHQ-2) and Generalized Anxiety Disorder (GAD-2). CMD was defined as having depressive symptoms (PHQ-2 score ≥ 3), anxiety symptoms (GAD-2 score ≥ 3), or both (combined score ≥ 6). We assessed the correlates of CMD by fitting a Logistic regression modelled, including a penalised regression to avoid overfitting and multicollinearity due to imbalances in outcome distribution. Our model explored multi-level factors: individual (age, sex, living with parents, ever had children), household, and community level factors. Selection of factors were based on group discussions with 17 participants aged 18-30 living with CMDs in eThekwini municipality, KwaZulu-Natal, on 13 October 2022. The CMD prevalence was: Agincourt 1.9% (n=2,472), DIMAMO 6.0% (n=4,076), and AHRI 15.1% (n=4,839). Logistic regression results for Agincourt were inconclusive due to outcome imbalances despite using penalised regression. In DIMAMO, YP who had children had a higher likelihood of having CMDs (OR=1.55, CI=1.11-2.15, p=0.009) compared to those without children. In AHRI, YP living with both parents were less likely to have CMDs (OR=0.76, CI=0.60-0.97, p=0.03) compared to those without parents. YP in AHRI had significantly higher prevalence of CMD, with Agincourt showing the lowest. Having children and not living with both parents were associated with CMDs in DIMAMO and AHRI, respectively. This aligns with YP's discussions on how having children and not having nuclear families impacts their mental health.

Abstract 18: Migrant Health Follow-Up Study (MHFUS) of internal migration in South Africa

Authors: Carren Ginsburg; Mark A Collinson; F Xavier Gómez-Olivé; Sadson Harawa; Michael J White

Abstract

The Migrant Health Follow-Up Study (MHFUS) aims to examine the consequences of migration and urbanisation for individual health in a dynamic socioeconomic transition setting in South Africa. We seek to understand whether internal migration and urbanisation affect non-communicable and infectious disease risk and explore whether migration compromises treatment continuity and utilisation of health services. The cohort is based on a simple random sample of 3800 18–40-year-olds selected from the Agincourt Health and socio-Demographic Surveillance System (HDSS) in 2017. The cohort consists of both highly mobile internal migrants and Agincourt HDSS residents who remain in the rural HDSS area. The cohort has been followed for four study waves between 2018 and 2022 and data collection has taken the form of telephone and face-to-face interviews. Questionnaire modules include education, employment, migration history and current places of residence, household composition, health (including general health, chronic conditions, HIV, sleep), health service use and diet. In the face-to-face waves (1 and 4) we collected biometric and anthropometric measures. The study has achieved exceptional rates of cohort retention with 98% of participants seen in Wave 1 being reinterviewed in Wave 4 (n=3039). Over the four study waves, approximately one third of the cohort lived continuously in the HDSS area, a third live continuously in a migrant destination, and a third circulated more frequently between the HDSS and outside destinations. We find migration to be more likely among men, those with higher levels of education, and those in better physical health (healthy migrant effect). Health service use is found to differ for men and women and by migrant status. The study demonstrates the feasibility of following migrants linked to an HDSS platform. Study findings provide evidence to assist in guiding policies and programmes to be directed more effectively to mobile populations.

Abstract 19: ***Indlela*** **- Building capacity to design and test nudges and other behavioural solutions to improve the effectiveness of health services and achieve better health outcomes in South Africa and regionally.**

Author: **Nomsa Mahlalela**

Background

Insights from behavioural science, particularly behavioural economics offer new ways to enhance health services and outcomes. Human behaviour poses a "last mile" challenge to ensuring the effectiveness of biomedical interventions and maximizing the impact of existing resources.

Approach

In 2020, we established *Indlela*, a first of its kind behavioural science nudge unit in South Africa. Indlela's objectives include enhancing capacity in applying behavioural science to health; co-designing and evaluating behaviourally informed interventions to improve health outcomes; generating evidence for policy shaping; and rapid sharing of knowledge and evidence. We co-design behavioural solutions with key stakeholders, focusing on low-cost, rapid interventions embedded in existing health programmes to address specific behavioural challenges to health care. The *N*arrow, *U*nderstand, *D*iscover *G*enerate and *E*valuate (*NUDGE*) framework guides our intervention design. We have established the Indlela Behavioural Hub (B-Hub) for quick user feedback and intervention prototyping before large-scale implementation, and a behavioural lab to enable field experiments studying human decision-making and related factors such as risk preferences and risk behaviours.

Results

Over the past 4 years, Indlela has conducted workshops and webinars to build capacity in behavioural economics. We have co-designed interventions to increase HIV testing, treatment adherence, re-engagement in HIV care, uptake of medical male circumcision, PrEP persistence, and health literacy. Contextual inquiry activities and participant engagement through the B-Hub provided a platform to rapidly understand perspectives toward the COVID-19 vaccine and inform the design of the Your Choice artificial intelligence app to reduce stigma and improve precision in HIV risk assessment and result reporting.

Conclusion

Behavioural science insights remain underutilised in resource constrained settings. Many of the lessons learned by Indlela offer important insights for nudge units in LMICs and provide a widely applicable model for closing this gap in applying behavioural science to health challenges. Indlela's application of behavioural insights to the co-design of interventions and capacity building holds great promise for designing more effective impact evaluations, and health programs to improve health outcomes.

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