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RESEARCH REPORT

COVERAGE AND PREDICTORS OF MEDICAL AID OWNERSHIP AMONG HOUSEHOLDS IN POOR URBAN COMMUNITIES IN JOHANNESBURG IN 2012

RESEARCH REPORT SUBMITTED TO THE SCHOOL OF PUBLIC HEALTH, UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN EPIDEMIOLOGY AND BIOSTATISTICS

TARIRO JAYSON BASERA

STUDENT NUMBER: 1225726

SUPERVISORS: DR. LATIFAT IBISOMI

DR. NISHA NAICKER

26 OCTOBER 2018

DECLARATION

I, ***Tariro Jayson Basera***, declare that this is my own work, submitted for the degree of Master of Science in Epidemiology and Biostatistics at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

Signature:

Date: 26/10/2018

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List of acronyms

AOR	Adjusted Odds Ratio
CI	Confidence Interval
HEAD	Health Environment and Development
IQR	Interquartile range
NCDs	Non-communicable diseases
NHI	National Health Insurance
OR	Odds Ratio
PHC	Primary Health Care
SES	Socio-economic status
Statistics SA	Statistics South Africa
UOR	Unadjusted Odds Ratio
WHO	World Health Organization

ABSTRACT

Background: The trend in health spending and medical aid coverage in South Africa relative to the populations served reflects huge gaps in equitable and universal coverage of healthcare. Medical aid ownership in South Africa is predicated on income and wealth.

Objectives: To estimate the coverage of medical aid ownership and to identify predictors of medical aid ownership among households in poor urban communities in Johannesburg in 2012.

Methods: This was a cross sectional analysis of the 2012 Health Environment and Development (HEAD) survey data for 543 households in five poor settlements in Johannesburg. Univariable and multivariable logistic regression modelling were used to estimate the odds ratio (OR) and 95% confidence interval (CI) of the association between household ownership of medical aid with socio-economic factors and other health related factors.

Results: The coverage of household ownership of medical aid was 10.9% (n=59) among the 543 households surveyed in the five settlements in 2012. In multivariable analysis, the odds of household ownership of medical aid was associated with a single increase in the number of people employed in the household (AOR 3.42; 95% CI 1.12-10.44) and those aged 18 years and above (AOR 1.84; 95% CI 1.06-3.21), households with middle SES (AOR 3.40; 95% CI 1.48-7.81) and high SES (AOR 9.37; 95% CI 3.93-22.33), households that use the services of a private doctor to access healthcare (AOR 4.87; 95% CI 2.26-10.53) and those who rated their overall health as good (AOR 5.96; 95% CI 1.11-32.10).

Conclusion: In these poor urban communities, ownership of medical aid is low. Given the role of poor access in perpetuating poverty and inequality, and its effect on morbidity and mortality, it is imperative to tackle these profound social disparities through innovative healthcare financing and policies such as the National Health Insurance to reduce inequalities in access to healthcare particularly across different socio-economic strata in South Africa.

CHAPTER ONE

1.0 INTRODUCTION

In this chapter the coverage of medical aid ownership in South Africa relative to other countries in sub-Saharan Africa is covered. The problem statement is stated and the justification for the study is provided. A literature review is undertaken on predictors of medical aid ownership particularly among low income populations. Lastly, the research question and objectives of the study are described in this chapter.

1.1 Background

The demand for health services in the public health sector has gradually increased over the past years. The increase is attributed to a quadruple burden of disease which increases demand for treatment and prevention services for non-communicable diseases (NCDs), HIV and AIDS, and tuberculosis along with increasing cost of healthcare in the private sector (Alaba & McIntyre, 2012). Morbidity, mortality and disability profiles in the country reflect changes occurring in South African society. The burden of disease is driven by a range of risk factors including unprotected sex (Scheibe, Richter & Veary, 2016), alcohol abuse and interpersonal violence (Cassidy et al., 2018), poor diet (Thow, Greenberg, Hara, Friel & Sanders, 2018), and maternal and childhood malnutrition (Bamford, 2013; Peer, English, Honikman & Du Plessis, 2016).

South Africa's health system is split into the public sector and the private sector (Ranchod et al., 2017). The private health sector is funded through contributions made to private health insurance also known as medical aid or medical schemes, and out of pocket payments to different health providers (Ataguba & McIntyre, 2012; Council for Medical Schemes, 2017; Goudge, Akazili, Ataguba, Kuwawenaruwa, Borghi, Harris & Mills, 2012). The public health sector is funded by general taxes for nine provincial health departments and the National Department of Health (Carrin, Waelkens & Criel, 2005; van den Heever, 2012). The public health system is three tiered with referrals from primary health care facilities to secondary hospitals and ultimately to specialist tertiary facilities (Verngunst, Swartz, Mji, Kritzinger & Braathen, 2016).

Disparities between the public and private sector mirrors deep inequalities in South Africa. On the one hand, the private health sector is well resourced and provides services mostly to an urban population, who are wealthy and formally employed (Ranchod et al., 2017). These individuals are mostly on medical aid and constitute 16% of South Africa's population (Council for Medical Schemes, 2016; Statistics SA, 2016). Eighty-four percent of people who seek care in South Africa access healthcare in the public sector (Dhai & Mohammed, 2018). According to Statistics South Africa (Statistics SA), in 2016 an estimated 4.7 million (28%) households, depending on their health needs, used both the public and private healthcare sector (Statistics SA, 2016). The public sector is characterised by inadequate health workforce where there are 77.6 doctors per 100 000 population (Mediclinic, 2016) compared to one doctor to less than 300 patients in the private healthcare sector (Skosana, 2018), ageing infrastructure and financial constraints (Ranchod et al., 2017), which undermine the strength and effectiveness of the public health sector (Cleary, Birch, Chimbindi, Silal & McIntyre, 2013).

In June 2018, the health ombudsman indicated that the public healthcare system was on the verge of collapse (ENCA, 2018). South Africa's Minister of Health in 2018 also alluded to the fact that the healthcare system was distressed due to the exponential increase in disease burden, poor management capacity in government facilities, poor financial management, long waiting list for treatment and overcrowding at public health facilities (Mkize, 2018). These factors exacerbate the strain on the public health sector (Kirigia J & Kirigia D, 2011; Scott et al., 2014). This in turn affects the quality and acceptability of public health services by users (Van Rensburg, 2014).

Since attaining independence in 1994, the government's principal focus in its health care plans is that of equity (Verngunst et al., 2016). The quadruple burden of disease has driven the impetus to re-engineer the health system (Naledi, Schneider, Barron, 2011; Mohapi & Basu, 2012). The South African government has made considerable progress on that front in addressing historical inequalities in the health sector through policies and legislation targeting universal access to healthcare. Notable policies aimed at improving access to healthcare include removal of user fees at primary health care (PHC) for children under the age of six years, pregnant and breastfeeding women, as well as upgrading and expanding PHC infrastructure and increasing training of healthcare workers (Gilson, Doherty, Lake, McIntyre, Mwikisa & Thomas, 2003; McIntyre et al., 2008). Other initiatives rolled out by the government to decrease the supply-side barriers include mobile health services, community health visits and subsidised transport for referrals (Ataguba & McIntyre, 2012). The government has also made great strides in managing and controlling NCDs, including putting health promotion and prevention policies and guidelines in place to assist with NCD care (Thow et al., 2018).

Despite policy reforms to increase access to healthcare, the public health sector remains under funded. Healthcare expenditure in the public sector increased to R183 billion in 2017, nonetheless per capita spending on health has remained constant since 2011 (Blecher et al., 2017). In the 2017/2018 financial year, 12% of the total national budget expenditure was allocated to health (National Treasury, 2017). Access to healthcare is still a challenge due to the high cost of healthcare and transport, and long distances to health facilities which leads to delays in seeking healthcare, particularly in rural areas (Verngunst et al., 2016). Private health expenditure represents around 4.2% of Gross Domestic Product which is principally funded through medical schemes (Mediclinic, 2016). Almost five times as much is spent on each person on medical aid than on a person without medical aid using the public health sector (Govender et al., 2014). The trend in health spending and medical aid coverage in South Africa relative to the populations served reflects huge gaps in equitable and universal coverage of healthcare (McIntyre et al., 2012). The distribution of benefits is still unfairly skewed to the wealthiest quintiles that bear the lowest burden of disease (Kiil, 2012). This is particularly concerning when there is a strong drive globally to achieve universal health coverage.

In its quest to improve equity in healthcare by redressing the financing and payment mechanisms, the government enacted the Medical Insurance Schemes Act in 1998 to regulate the medical aid industry more effectively (Kirigia, Sambo, Nganda, Mwabu, Chatora & Mwase, 2005; Govender, Ataguba & Alaba, 2014). More so, according to the principle of 'right to care' stipulated by the World Health Organization [WHO], governments are mandated to ensure that healthcare is provided to those who need it regardless of an individual's ability to pay for healthcare services (WHO, 2010).

To realise the goal of universal coverage in South Africa, there is an urgent need for new health financing mechanisms to cope with increased demand for health services compounded by a growing population who cannot afford the increasing cost of healthcare (McIntyre, Doherty, Ataguba, 2012; WHO, 2010). The government is in the process of rolling out the National Health Insurance (NHI) with the aim to achieve universal coverage (Kiil, 2012). The NHI has the potential to generate additional funding for health, and to improve equity and efficiency through implementing financing, pooling, purchasing and provision reforms (Blecher et al., 2017). While important, the current model of the NHI fails to address the critical issues related to demand for health services and does not resolve institutional responsiveness to health demand (Ogunbawo, 2018; Christian, 2014).

1.1.1 Problem Statement

The initiatives to transform the South African health system have not translated into significant improvements in many health indicators in the country (Van Rensburg, 2014). There are still huge disparities in health and wealth status in South Africa evidenced by a huge income gradient in accessing healthcare (Christian, 2014). The Gini co-efficient, a measure of inequality is among the highest in the world and it currently stands at 0.65 (World Bank, 2017). In 2016, more than 50% of South Africans were living in poverty while the rate of unemployment was 27.3% (World Bank, 2017). According to Goudge and colleagues, removal of access fees at public health facilities alone is not sufficient to increase access to public healthcare but needs to be complemented with broader interventions (Goudge, Gilson, Gumede & Mills, 2009). For instance, despite public health services offering free or affordable services, users can be dissuaded to access healthcare by perceptions of poor-quality services at public sector health facilities (Hasumi & Jacobsen, 2014; Perumal-Pillay & Suleman, 2017).

South African studies report that poor, uninsured, black Africans especially in under-developed communities have poor access to healthcare (Alaba & McIntyre, 2012; Ataguba, Akazili, & McIntyre, 2011). The population of people without medical aid has been growing since 2008 at an average rate of 1.52% per year (Blecher et al., 2017). The number of medical aid beneficiaries and medical aid coverage within South African households is declining due to high costs of medical aid premiums (Cleary et al., 2013; Omotoso & Koch, 2017).

Non-ownership of medical aid is associated with increased risk of mortality and poor health outcomes because of limited access to healthcare (Ayanian, Weissman, Schneider, Ginsburg & Zaslavsky, 2000; Shi, 2000). People without medical aid are less likely to utilise health services due to concerns about the high cost of medical services (Dhai & Mohammed, 2018). They are also unable to pay for medicines or go for routine preventive care, and they are at risk of premature death because they present late for care (Barrett & Conlon, 2003; Kiil, 2012). Studies have shown that poor urban communities could experience high morbidity and mortality due to lack of basic services and limited access to health services relative to rural communities which historically have limited access to healthcare (Van Rie et al., 2018). Additionally, the poor, who rely on the public sector for healthcare are subjected to a system failing due to poor leadership and governance, incompetent management and frequent strikes among health workers, which forces them to bear the associated burdens of morbidity and mortality (Dhai & Mohamed, 2018). It is therefore important to establish the uptake of medical aid in households in impoverished urban communities and factors that predict medical aid ownership.

1.2 Study Aims and Objectives

1.2.1 Research Question

What is the coverage and predictors of medical aid ownership among households in poor urban communities in Johannesburg in 2012?

1.2.2 Aim of the study

To estimate the coverage and predictors of medical aid ownership among households in poor urban communities in Johannesburg.

1.2.3 Study Objectives:

1. To estimate the coverage of medical aid ownership among households in poor urban communities in Johannesburg in 2012.

2. To identify predictors of medical aid ownership among households in poor urban communities in Johannesburg in 2012.

1.3 Justification of the study

Large information gaps remain on medical aid coverage in poor urban communities (Govender et al., 2014). Many studies have found that the likelihood of experiencing unmet healthcare needs is higher among people without medical aid (Ayanian et al., 2000; Shi, 2000). Non-ownership of medical aid also increases the probability of not meeting healthcare needs because people without medical aid may not be able to pay for medical expenses due to high cost (Goudge et al., 2012; Ataguba & McIntyre, 2012), and they may experience poor health because of lack of access (Dhai & Mohammed, 2018). Goudge and colleagues report that those with lower socio-economic status (SES) in South Africa were less likely to have medical aid and have four-fold higher levels of poorer health than the overall population (Goudge et al., 2018). Identifying predictors of medical aid ownership will help to inform interventions aimed at improving healthcare coverage in South Africa given the important role of poor access in perpetuating poverty and inequality. Even with the introduction of the NHI, medical aid can be supplementary, offering access to services that are partially covered or excluded from government insurance and allowing patients the choice of service provider or faster access to services (McIntyre et al., 2009).

1.4 Literature review

1.4.1 Definition of medical aid

Medical aid is defined as medical cover or health insurance taken up voluntarily and paid for privately, either by individuals or by employers on behalf of individuals (WHO, 2010). In South Africa, private health insurance is known as medical schemes or medical aid (Govender et al., 2014). Medical aid provides direct payment or reimbursement for expenses incurred for injuries and illnesses (Yellaiah & Ramakrishma, 2012). The WHO considers medical aid a promising means for achieving universal healthcare (WHO, 2010). There are 83 medical aid schemes in South Africa that cover health service related expenses for people who are formally employed and in some instances their dependants (Council of Medical Schemes, 2017).

1.4.2 Coverage of ownership of medical aid in African countries

Across Africa, rates of medical aid coverage range from 20% in Kenya (Maina, Kithuka & Tororei, 2016), 15.7% in Tanzania (Bultman & Mushy, 2013) to as low as 1.7% in Malawi (FinScope, 2014). Currently about 16% of South Africa's population has medical aid (Council of Medical Schemes, 2017). People without medical aid mainly rely on tax-funded public-sector health services (Goudge et al., 2012; Ataguba & McIntyre, 2012). In South Africa, employment status and wealth are important predictors of medical aid ownership (Booysen, 2003). Consequentially medical aid ownership is concentrated among wealthier households. The poorest quintiles of households account for 1% of medical aid membership while the wealthier households constitute 51% of medical aid membership (Surender, 2014).

Medical aid membership is also racially differentiated with only 9% of the black South African population belonging to some medical aid compared to about 70% of white South Africans (Statistics SA, 2016). A study assessing utilisation of preventive dental care in South Africa alludes to racial disparities in medical aid membership as 70% of clients with medical aid were white compared to 10% who were black South Africans (Ayo-Yusuf I, Ayo-Yusuf O & Olutola, 2013).

1.4.3 Importance of medical aid

Among other factors, medical aid is set up to provide protection from financial risk and to mobilise resources to avert impoverishment that may arise from out-of-pocket payments for healthcare (Ataguba & McIntyre, 2012). Through medical aid, risks are shared, and financial inputs pooled by way of contributions, for example, from salaries or tax (McIntyre, Doherty, Ataguba, 2012). Health service utilisation has been shown to be higher among individuals with medical aid compared with those without medical aid (Goudge et al., 2018). Owning medical aid has been shown to increase the odds of using preventive dental services (Ayo-Yusuf et al., 2013). Patients with medical aid have a lower likelihood of having unmet health needs due to financial constraints (Kim et al., 2015, 2015).

The past decade has seen an upward spiral in the cost of healthcare driven largely by escalating hospital and pharmaceutical costs, resulting in patients incurring high out-of-pocket expenses (Marten et al., 2014). As medical expenses continue to increase, the ability of most households without medical aid to access and pay for healthcare becomes lower and most face financial hardships due to high cost of care in the private sector (Cleary et al., 2013; Goudge et al., 2009).

Costs incurred because of seeking healthcare can perpetuate the cycle of poverty among households without medical aid (Omotoso & Koch, 2017). These households may end up drawing on their savings and selling their assets, thus affecting their ability to buy other essential items required for their daily functioning (Koch & Alaba, 2008).

Due to escalating contributions required by medical schemes, there is an increasing concern that the poor cannot afford to purchase medical aid, while on the other hand, they cannot utilise private health services due to high medical costs (Kim et al., 2015). The poor bear a greater burden of disease than the rich and have a relatively greater need for healthcare (Ziraba et al., 2009; Ataguba et al., 2011; Benatar, 2013). Yet medical aid covers high-middle income, formal sector workers and sometimes their dependants (Kirigia et al., 2005; Alaba & McIntyre, 2012; Govender et al., 2014), and less likely to cover lower skilled workers (Goudge et al., 2018). The recourse for most people without medical aid is the public health sector, putting pressure on service delivery, which in turn leads to bypassing of the public sector health services by health seekers without medical aid for better quality, more expensive private sector health services (Koch & Alaba, 2008). There is currently a gap in the quality of services between the public and private healthcare services. It is however difficult to enumerate this difference quantitatively. A study assessing the experiences of healthcare users at South African public-sector health facilities revealed that the facilities are characterised by long waiting hours, shortage of medicines and unfriendly staff (Hasumi & Jacobsen, 2014; Perumal-Pillay & Suleman, 2017).

Non-ownership of medical aid is associated with increased risk of mortality and poor health outcomes which are attributed to lack of access to healthcare (Ayanian et al., 2000; Shi, 2000). Those who do not own medical aid are less likely to utilise health services and preventative care, and more likely to die prematurely due to late diagnosis or delays in seeking care because of concerns about high costs of healthcare (Goudge et al., 2009). Studies have found that the likelihood of experiencing unmet health care needs is higher among people without medical aid (Saksena et al., 2010; Goudge et al., 2012). Moreover, lack of medical aid also increases the probability that these needs may be unmet because of high medical costs (Evans & Etienne, 2010; Xu et al., 2006). A study conducted in South Africa reported that people with medical aid were 70% less likely to have an outpatient visit and to be admitted in hospital (Goudge et al., 2018).

1.4.4 Barriers and facilitators of ownership of medical aid

Various determinants of medical aid ownership as well as theories underpinning decisions to purchase medical aid are discussed in the literature. Literature indicates that those with medical aid are found to be wealthier and healthier compared to those without medical aid (Govander et al., 2014; Ayanian et al., 2000). This is a public health concern since utilisation of health services is lower among the poor (Kiil, 2012) despite bearing a disproportionately higher burden of disease (Benatar, 2013). According to the financial loss hypothesis, the SES of the household determines its assessment of health risk and hence uptake of medical aid (Schneider, 2004). A Ghanaian study found that households with a high SES had an increased likelihood of enrolling for medical aid in contrast to low SES households (Sarpong et al., 2010). The economic theory posits that the likelihood of owning medical aid increases with income (Morris, Devlin and Porklin, 2007; Chatterjee & Nielsen, 2010).

Higher income increases the affordability of medical aid premium since the opportunity cost of purchasing medical aid reduces at higher income (Duku, 2018). In China, medical aid coverage increased as income increased (Liu, Meng & Khan, 2012). Those who are employed either formally or in the informal sector (Maina, Kithuka & Tororei, 2016) and households with high income and higher health expenditure have a higher likelihood of owning medical aid (Bhat & Jain, 2007). Low income earners and people with irregular income face challenges related to paying medical aid premiums due to other competing demands on their limited income coupled with increasing cost of medical aid premiums (Elsenhaur, 2006; Perry & Rosen, 2001). In this context, purchasing medical aid is a luxury (Mutinda, 2015).

The expected utility theory states that perceptions of increased risk of falling sick increase the likelihood of purchasing medical aid to avert or minimise that risk (Carrin, 2003). Conversely, medical schemes tend to adopt practices that seek to minimise their risk to avoid losses, including denial of coverage for applicants who have pre-existing health conditions (Cenfri/FinMark Trust, 2009). In contrast, other studies have reported a positive association between having a chronic disease or condition and medical aid ownership (Kazungu & Barasa, 2017; Xu, Cai, Li, Cao, Goudge et al., 2018). Uptake of medical aid is attributed to the occurrence of a chronic illness to avoid high out-of-pocket expenditure when paying for medical care (Atinga, Abiiro & Kuganab-Lem, 2015).

Studies have also shown that the likelihood of medical aid ownership is influenced by level of education. Having a secondary or tertiary qualification increases the probability of having medical aid (Maina et al., 2016; Mulenga, Bwalya & Gebremeskel, 2016). Knowledge of medical aid and different premiums offered also increase uptake of medical aid (Maina et al., 2016).

A study undertaken in Kenya reported an association of low uptake of medical aid with low levels of knowledge of medical aid premiums or options available for low income earners (Mutinda, 2015). Education is important in enlightening individuals about the importance of medical aid and makes them better understand and appreciate the insurance concept and its benefits to the household (Duku, 2018). As a result, people make informed choices about various health matters including the need to lower the risk of catastrophic expenditure associated with lack of medical aid when one gets sick (Mulenga et al., 2016). Uptake of medical aid is also determined by the characteristics of the medical aid plan and the quality of service delivery (Abiiro, Torbica, Kwalamasa & De Allegri, 2016).

A qualitative study investigating attitudes and perceptions towards medical aid indicates that the unemployed were of the view that medical aid is for individuals who are formally employed (Mathauer, Schmidt & Wenyaa, 2008). Individuals who perceive to be of poor health or increased risk of illness are also more likely to own medical aid (Carrin, 2003). In another study, participants had reservations about enrolling for medical aid because they feared they may not get the health services paid for when needed due to misappropriation of medical aid funds (Arhin-Tenkorang, 2001).

Sex is an important predictor of ownership of medical aid. Women, who are generally heavy consumers of healthcare, are more likely to own medical aid compared to men (Nketiah, 2009; Kirigia et al., 2005). In other studies, the rates of medical aid ownership have been shown to increase with age (Kazungu & Barasa, 2017; Xu, Cai, Li, Cao, Goudge et al., 2018). This may be attributed to increasing purchasing power as one gets older (Kimani, Ettarh, Warren & Bellows, 2014). Younger people are risk takers and make decisions to own medical aid based on assessment of the risks and gains (Atinga et al., 2015).

Young people generally enrol for medical aid when they become ill (Saleh, 2012). Other factors that influence medical aid ownership include being married (Bourne & Kerr-Campbell, 2010; Maina et al., 2016), smaller household size typically with 1 to 3 household members (Kazungu & Barasa, 2017). Perceptions related to quality of care at public healthcare facilities and attributes such as health beliefs and attitudes, are negatively associated with uptake of medical aid (Goudge et al., 2009; Jehu-Appiah et al., 2011). Access to media also positively influences medical aid ownership. This is because information about the importance and different service providers of medical aid is usually found in newspapers, on radio and television (Kazungu & Barasa, 2017; Mulenga et al., 2016).

1.5.5. Conceptual Framework

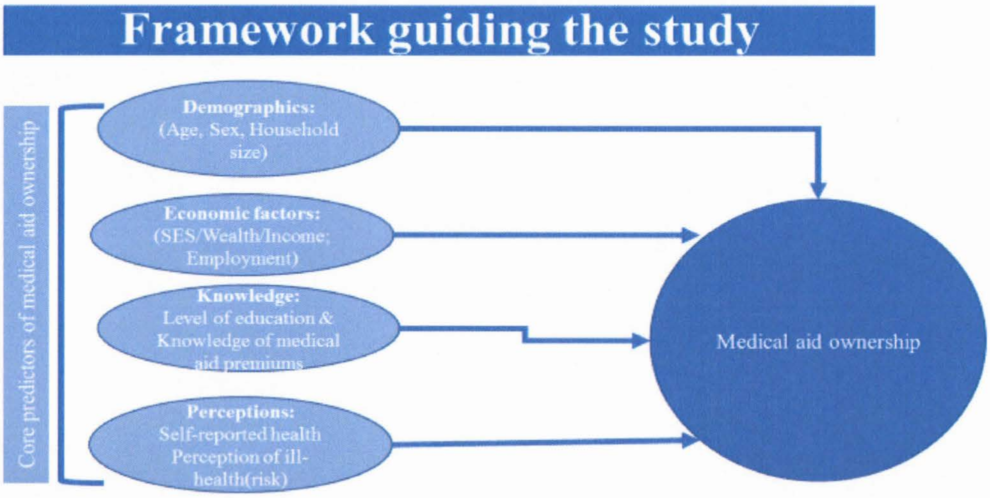

Figure 1: Framework for predictors of medical aid ownership

Figure 1 summarises the concepts guiding the study. As highlighted in the literature, demographic factors such as age and sex; economic factors such as SES and employment status; level of education and knowledge of medical aid premiums; and self-reported health and perceptions of ill-health are core predictors of medical aid ownership.

CHAPTER TWO

2.0 METHODS

This chapter gives an overview of the methods used to analyse the data, details of the study design, background of the primary study, the study setting, population and variables used. Details of how the variables were categorised and renamed in this study are provided, as well as the data analysis approach per objective.

2.1 Study design

The Health Environment and Development (HEAD) study is a cross sectional panel study which observed changes in health status and living conditions in five settlements in Johannesburg over a 10-year period from 2006 to 2015. This study was a cross sectional, secondary analysis of the 2012 HEAD survey data. Only 2012 data was available at the time of the study.

2.2 Study setting and background of the HEAD study

The HEAD study is conducted each year in Hospital Hill, Riverlea, Hillbrow, Braamfischerville and Bertrams. The five settlements are in Johannesburg, Gauteng Province. Primary health care utilisation rate in the province is the lowest among people without medical aid at 2.3 visits per person per year (Day, Barron, Massyn, Padarath & English, 2017). Trained Environmental Health students from the University of Johannesburg administered structured questionnaires to respondents who were 18 years or older from the main or primary household, who were able to know about the health of household members following their written consent.

The HEAD study was conducted by the University of Johannesburg in collaboration with the University of Witwatersrand, the Medical Research Council and the City of Johannesburg (Naicker et al., 2017). In the HEAD study, a household was defined as a group of people who live together and share a common source of food (Mathee et al., 2014; Teare, Kootbodien, Naicker, & Mathee, 2015). The analysis focused on household level data. Data that is collected annually include socio-demographic status and expenditure patterns, migration patterns, perceptions of housing and neighbourhood conditions, hygiene behaviour, quality of life and social cohesion, food procurement and insecurity, exposure to violence and fear of crime, physical activity and health status.

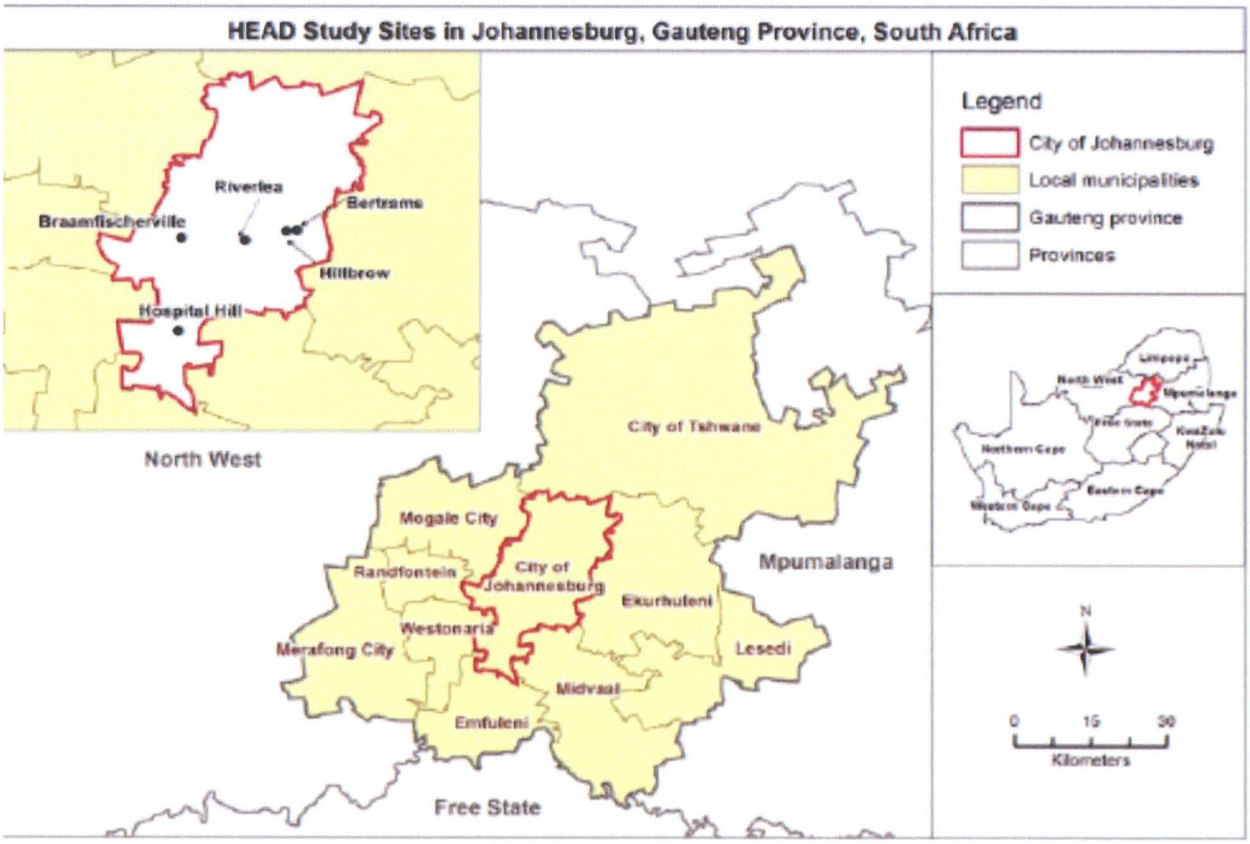

Figure 2: Location of the five study sites in the City of Johannesburg, South Africa (Source: Naicker et al., 2017).

This study utilised data from all the five study sites namely Hospital Hill, Riverlea, Hillbrow, Braamfischerville and Bertrams.

The five study sites represent the housing types in poor settlements in Johannesburg. Braamfischerville and Riverlea have stable populations with less out-migration or relocations. Braamfischerville is in Soweto, south of Johannesburg. It is a large-scale low-cost housing settlement built in the early 1990s, following the transition from apartheid to a democratic government in South Africa, with most of its residents being relatively older. Riverlea is an apartheid era, low cost housing development constructed in the early 1960s specifically for the coloured population, and it generally has an older population. Hospital Hill is an informal settlement located in the west of Johannesburg and the population is very mobile (Naicker et al., 2017); while Hillbrow is a high-rise densely populated cosmopolitan suburb located in the central part of Johannesburg. Hillbrow is mainly populated by foreign nationals; and Bertrams is a rundown suburb with mostly unemployed and transient inhabitants. It is in the east of Johannesburg and part of the settlement consists of light industries (Mathee & Naicker, 2016).

2.3 Study population and sampling

Study units are households interviewed in Hospital Hill, Riverlea, Hillbrow, Braamfischerville and Bertrams that participated in the HEAD study in 2012. All surveyed 543 households who provided responses about medical aid ownership (72 in Bertrams, 138 in Hospital Hill, 123 in Riverlea, 64 in Hillbrow, and 146 in Braamfischerville) were included in the study. In the HEAD study, houses were randomly selected using a table of random numbers and town planning maps of the study areas in Bertrams, Riverlea and Braamfischerville, and systematic sampling was used to select buildings, followed by floors and then apartments in Hillbrow, while households were conveniently selected in Hospital Hill where town planning maps were unavailable due to it being an informal settlement (Mathee & Naicker, 2016). In each neighbourhood around 50% of dwellings were targeted for inclusion in the study.

No sampling was done in this study since it involved secondary analysis of survey data. However, we calculated the sample size required to detect the proportion of households owning medical aid and differences in coverage of household ownership of medical aid and the effect of different predictors on household ownership of medical aid using the following formula: $N = (z_{\alpha}/E)^2 P(1-P)$; where P is the expected proportion of households who have medical aid (16%, based on the national estimates), $z_{\alpha} = 1.96$ and E is the margin of error (±5%) to give a sample size of 207. Therefore, our sample size of 543 is adequate to detect any differences with 5% margin of error.

Household level information was used in analyses of coverage and predictors of household ownership of medical aid across Hospital Hill, Hillbrow, Braamfischerville, Riverlea and Bertrams. Data on household ownership of medical aid was available for 543 households and these constituted the analysis sample.

2.4 Variables and their descriptions

Questions relevant to this study were in all versions of the HEAD questionnaire and included the following characteristics: age, sex, ethnicity, employment status, level of education and source of healthcare. Choice of the explanatory variables was influenced by variables included in the HEAD dataset and previous studies that found these variables to be important socio-economic variables influencing medical aid ownership (Amu et al., 2018; Babikir et al., 2017; Dalinjong et al., 2017; Duku et al., 2018; Gustafsson-Wright et al., 2010). For sex, employment and education, the proportion variable was generated by dividing the total number of female household members, employed household members and number of household members with at least primary education, by the total number of people in the household respectively.

2.4.1 Outcome variable

In the HEAD study the question on medical aid ownership was posed as *"Does anyone in this household have medical aid?"* The response categories were "Yes or No." In this study the outcome, household ownership of medical aid, was operationalised as Yes (1) or No (0).

2.4.2 Explanatory variables

Race; Age; Sex; Level of education; Household size; Employment status; Study site; Socio-economic status; Presence of a chronic medical condition in the household; Source of healthcare and Self-rated health status, were all fit in the regression model. The variables used in the study and how they were coded are shown in Table 1.

Race: In the HEAD study the question on race was posed as *"What is the main population in this household."* The responses were "Black African"; "White"; "Coloured"; "Indian"; and "Other". White, Coloured and Indian were re-categorised to "Other" to give two response categories "Black African" and "Other."

Study site: The variable study site was derived from the place of residence of the respondents at the time of the survey. The responses were coded as 1 = Hospital Hill; 2 = Riverlea; 3 = Hillbrow; 4 = Braamfischerville; and 5 = Bertrams.

Braamfischerville was made the reference category in the analysis because it has a stable population with less out-migration as well as more balanced population distribution of young and old people relative to other settlements.

Age, sex, level of education and employment status were derived from the following question: *"Please state the first name, age, sex, educational qualification and main activity during weekdays for each member of the household."*

In this study, age was categorised into two groups <18 years and ≥18 years. This was used to generate a variable for the percentage of household members who are aged 18 and above. This was informed by literature showing that number of adults in the household influences uptake of medical aid.

Household size was derived from the following question: "How many people, including yourself, make up this (main) household." The numeric responses were also categorised into "1-3" and "≥4."

Education: The responses were "None"; "Primary"; "High"; and "Tertiary." Due to the lower number of respondents with high school and tertiary education, the variable percentage of household members with at least primary education was generated with the following categories: percentage with no education "< primary education" and percentage with at least primary education."

Employment status: The variable was generated from responses for the main daily activity of the respondent from the following: "Full time"; "Part-time"; "Unemployed"; "House person"; "Informal job"; "Tertiary education"; "School"; "Crèche" and "Other."

Full time, informal job, and part-time were re-grouped to "Employed" while unemployed, house person, school, tertiary education, crèche and others were re-grouped to "Unemployed." This was used to generate a variable for the percentage of household members who were employed.

Source of healthcare: The variable source of healthcare was derived from the question: *"When someone gets sick, where do you usually go for treatment?"* The responses were "Private Doctor (GP)"; "Clinic"; "Hospital"; Spiritual healer"; "Traditional healer"; "Homeopath" and "Other." Clinic and Hospital were grouped into "Public health facility" and spiritual healer, homeopath, traditional healers and others were grouped into "Traditional/spiritual healers/others" while "Private Doctor" was unchanged.

Presence of a chronic medical condition in the household: This variable was assessed in the HEAD study by posing the question *"Does anyone in this household have any of the following conditions?"* The response option included the following conditions: cancer, diabetes, hypertension, heart disease, high cholesterol, stroke, HIV/AIDS and obesity. A new variable presence of chronic medical condition in the household was generated with 0 "no presence of a chronic health condition"; 1 "presence of at least one chronic health condition."

Socio-economic status of household: Ownership of the following assets: television; satellite television; refrigerator; washing machine; video/DVD machine; microwave; car; computer; and telephone (landline or cellular), were used to generate weights by principal component analysis using a correlation matrix. Using the weights from the first principal component, a value for each household was obtained, which increased with increasing SES. Based on the per cent rank derived from these values, we categorised the households into three categories namely low, middle and high SES.

Self-reported health: The question on self-rated health was posed as "How satisfied are you with your health?" The responses were scored from 0 to 10 on a Likert scale representing highly dissatisfied to highly satisfied. The scores were regrouped to "Poor" for a score of 0 to 5 and "Good" for a score of 6 to 10.

Table 1: Definition of variables

Variable	Operational definition
Household ownership of medical aid	1 = if anyone in the household has medical aid; 0 = no medical aid
Study site	1 = if the household is in Hospital Hill; 2 = Riverlea; 3 = Hillbrow; 4 = Braamfischerville; and 5 = Bertrams
Sex	0 = Male, 1 = Female A new variable was created for sex (percentage of females in the household)
Education	Educational level of household members: 1 = None, 2 = Primary/Secondary/Tertiary. The variables were used to generate a new variable: percentage of individuals in the household with at least primary education
Age	Age of the respondent. A new variable was generated for percentage of household members aged 18 years and over
Race	1 = if the household member is a Black African, 2 = Other (Coloured/White/Indian/Asian)
Household size	Total number of people in the household. The numerical responses were categorised into: 1 = 1-3; 0= ≥4
Socio-economic status of household	1 = Low; 2 = Middle; 3 = High
Employment status	1 = if employed; 0 = unemployed The variables were used to generate a new variable: percentage of individuals in the household who were employed
Source of healthcare	1 = Public Clinic/Hospital; 2 = Private doctor; 3 = Spiritual/traditional Healer/Other
Self-reported health status	Likert scale from 0 “Highly dissatisfied” to 10 “Highly satisfied.” The scores were used to generate categorical variable of satisfaction with own health, 1 = Poor; 2 = Good

Presence of a chronic medical condition in the household	1 = if there is a household member with at least one chronic health condition; 0 = None (Chronic illnesses include cancer, obesity, diabetes, hypertension, high cholesterol, cardiovascular diseases (heart disease and stroke) and HIV/AIDS

2.5. Data Management

The original data from the HEAD study was first extracted using Microsoft Excel then converted to STATA 14 format in which data cleaning, coding and analysis was done. STATA 14 was also used for categorising variables and statistical analysis. Initial checking of the data was made using descriptive commands and data fields were examined separately for errors and missing values. Data was cleaned, and variables were re-coded and re-categorised as appropriate as illustrated in Table 1.

2.6. Data analysis

2.6.1 Objective 1: To estimate the coverage of medical aid ownership among households in poor urban communities in Johannesburg in 2012.

The distribution of socio-demographic and clinical characteristics of households was expressed as frequencies with corresponding percentages. For the variables age, sex, household size, level of education and employment, both frequencies and percentages as well as median and interquartile range (IQR) are presented.

For each study site, the percentage of households with medical aid was estimated. The percentage of households that owned medical aid in 2012 was compared across study sites in the form of a bar graph (Figure 3).

2.6.2 Objective 2: To identify predictors of medical aid ownership among households in poor urban communities in Johannesburg in 2012.

The association of each predictor variable with medical aid ownership was assessed by fitting logistic regression models for one variable at a time to obtain unadjusted odds ratios (UORs) and corresponding confidence intervals. Age, sex, household size, level of education and employment were operationalised as continuous variables. Since the continuous variables were not normally distributed, the median and interquartile range (IQR) are reported. SES, source of healthcare, self-rated health and presence of chronic medical conditions were operationalised as categorical variables. At the second level, a logistic regression model was fitted to identify predictors of medical aid ownership adjusting for all selected variables. Adjusted Odds ratios (AOR), 95% confidence intervals and a corresponding p-value were estimated in the logistic regression model. All variables were included in the multivariable model.

2.7. Limitations of the study

The main limitation of the study is the definition of "household." This definition reduces household size; underestimate assets, education level and number of men working in the household; and overestimates poverty (Leone, Coast & Randall, 2011). A more conservative definition of household includes information on who slept there the night before, who ate and possibly on contributions to the household economy, relationship to household head and relationship to each other (Satiroglu & Choi, 2015; Leone et al., 2011). The analysis is based on secondary data which lacked information on important predictors of medical aid ownership e.g. characteristics and type of medical aid, knowledge of medical aid premiums, quality of services and information sources for medical aid among others.

2.8. Ethical considerations

Ethics approval for this study was granted by University of the Witwatersrand Human Research Ethics Committee, number: M160113; appendix 1. Permission to use the data was granted by the HEAD study researchers. Informed consent from individual participants was obtained at the time of primary data collection. Confidentiality was maintained by not displaying participant's names and their medical history in this secondary analysis.

CHAPTER THREE

3.0 RESULTS

This chapter provides the findings of a study to determine coverage and predictors of medical aid ownership in five settlements in Johannesburg, South Africa. The results are sequenced according to the study objectives. The first section provides a descriptive summary of household characteristics. This is followed by presentation of the coverage of household ownership of medical aid in the five settlements. The final part consists of findings from the adjusted and unadjusted regression model of predictors of household ownership of medical aid in the five settlements and a summary of the findings.

3.1.1 Characteristics of study households

Medical aid coverage in the households was 10.9% (n=59), in all the five settlements. The predominant race in the households was Black African (74.6%) and this was the trend in four settlements except for Riverlea where 90.3% (n=112) of the population is non-Black. The characteristics of households in the five settlements are shown in Table 2. The overall median percentage of household members aged 18 years and above across all the settlements was 75% (IQR 60%-100%). Most households had small household size with a median household size of 1.00(IQR 1.00-3.00). The percentage of females in the households was generally low with a median percentage of female household members of 33% (IQR 20%-50%).

Generally, the percentage of household members who were employed in all five settlements was low with a median percentage of employed household members of 33% (IQR 0%-50%). Hillbrow had the highest percentage of household members who were employed with a median of 67% (IQR 50%-100%). Most households had a high percentage of household members with at least primary education (Median 67%; IQR 40%-100%). Hospital Hill had the lowest median percentage of household members with at least primary education with a median percentage of 50% (IQR 0%-67%).

About 67.1% (n = 353) of the households were in the low SES category in all the five settlements, and the majority of these were in Hospital Hill (n = 114) followed by Braamfischerville (n = 94). Most households (n= 393, 72.4%) reported that there was no chronic medical condition affecting a household member. Of the households that reported that there was at least one chronic medical condition affecting a household member, Riverlea and Hospital Hill had the highest number of reported cases of chronic medical conditions with 51 and 40 cases respectively. Most households sought care at government clinics and hospitals (n = 431, 80.7%), and 13.3% (n = 71) used a private doctor. Overall, 82.3% (n = 445) of surveyed households rated their health as good.

1.1.2 Coverage of household ownership of medical aid

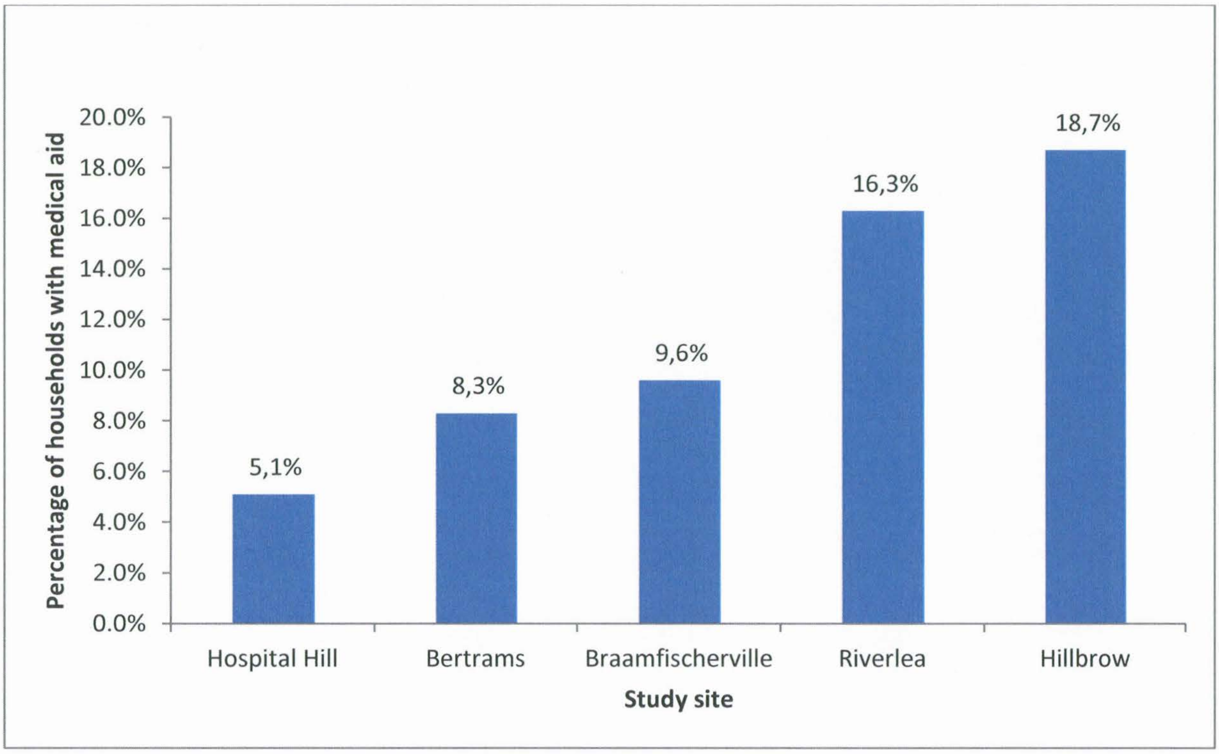

Figure 3: Percentage of households with medical aid by area of residence

A total of 59 (10.9%) households had medical aid out of the 543 households that provided responses for medical aid ownership. Of these, 18.7% of households with medical aid were in Hillbrow, 16.3% in Riverlea, 9.6% in Braamfischerville, 8.3% in Bertrams and 5.1% in Hospital Hill (Figure 3).

Table 2: Distribution of selected characteristics of households

Characteristics	Categories	Total n(%)	Study sites: Braamfischerville n(%)	Riverlea n(%)	Hospital Hill n(%)	Bertrams n(%)	Hillbrow n(%)
Household ownership of medical aid	Yes	59(10.9)	14(9.6)	20(16.3)	7(5.1)	6(8.3)	12(18.7)
	No	484(89.1)	132(90.4)	103(83.7)	131(94.9)	66(91.7)	52(81.3)
Percentage of household members ≥18 years	*Median (IQR)*	75%(60%-100%)	67%(60%-100%)	75%(50%-100%)	67%(50%-100%)	100%(67%-100%)	100%(67%-100%)
	25%-49%	63(11.9)	19(13.2)	20(17.0)	20(14.7)	3(4.2)	1(1.5)
	50%-74.9%	187(35.2)	58(40.3)	36(30.5)	50(36.8)	20(27.8)	24(36.4)
	≥75%	281(52.9)	67(46.5)	62(54.5)	66(48.5)	49(68.1)	41(62.1)
Percentage of females in household	*Median (IQR)*	33%(20%-50%)	43%(33%-50%)	33%(20%-50%)	33%(17%-50%)	33%(17%-50%)	33%(20%-50%)
	<25%	143(26.3)	27(18.4)	13(11.1)	40(29.6)	8(11.6)	4(6.1)
	25%-49%	197(36.3)	55(37.4)	16(13.7)	24(17.8)	8(11.6)	0(0.0)
	50%-74.9%	186(34.3)	61(41.5)	40(34.2)	40(29.6)	16(23.2)	23(34.8)
	≥75%	17(3.1)	4(2.7)	48(41.0)	31(23.0)	37(53.6)	39(59.1)
Race	Black African	405(74.6)	146(99.3)	12(9.7)	138(100)	47(64.4)	65(94.5)
	Other	138(25.4)	1(0.7)	112(90.3)	0(0.0)	26(35.6)	1(5.5)
Household size	*Median (IQR)*	1.00(1.00-3.00)	1.00(1.00-2.00)	2.00(1.00-3.00)	1.00(1.00-2.00)	2.00(1.00-4.00)	1.00(1.00-2.00)
	1-3	450(84.1)	126(86.9)	98(80.3)	125(90.6)	46(63.9)	60(95.2)
	≥4	85(15.9)	19(13.1)	24(19.7)	13(9.4)	26(36.1)	3(4.8)
Percentage of household members with primary education or higher	*Median (IQR)*	67%(40%-100%)	75%(50%-100%)	67%(50%-100%)	50%(0%-67%)	75%(50%-100%)	100%(67%-100%)
	<25%	74(14.0)	9 (6.2)	13(11.1)	40(29.6)	8(11.6)	4(6.1)
	25%-49%	69(13.1)	21(14.4)	16(13.7)	24(17.8)	8(11.6)	0(0.0)
	50%-74.9%	159(30.1)	42(28.8)	40(34.2)	40(29.6)	16(23.2)	23(34.8)
	≥75%	226(42.8)	74(50.7)	48(41.0)	31(23.0)	37(53.6)	39(59.1)
Percentage of household members who are employed	*Median (IQR)*	33%(0%-50%)	33%(0%-50%)	33%(0%-50%)	33%(0%-50%)	43%(20%-67%)	67%(50%-100%)
	<25%	196(36.3)	60(40.8)	53(43.2)	59(43.4)	21(28.8)	3(4.5)
	25%-49%	119(22.0)	35(23.8)	33(26.8)	25(18.4)	16(21.9)	11(16.7)
	50%-74.9%	136(25.2)	36(24.5)	26(21.1)	34(25.0)	20(27.4)	22(33.3)
	≥75%	89(16.5)	16(10.9)	11(8.9)	18(13.2)	16(21.9)	30(45.5)
Socio-economic status	Low	353(67.1)	94(64.9)	68(59.1)	114(84.4)	37(52.9)	40(62.5)
	Middle	106(20.2)	37(25.2)	26(22.6)	16(11.9)	15(21.4)	14(21.9)
	High	67(12.7)	16(10.9)	21(18.3)	5(3.7)	18(25.7)	10(15.6)
Source of health care	Public health facility	431(80.7)	114(79.7)	102(82.9)	127(92.0)	49(71.0)	42(63.6)
	Private doctor	71(13.3)	19(13.3)	16(13.0)	3(2.2)	16(23.2)	17(25.8)
	Other	32(6.0)	10(7.0)	5(4.1)	8(5.8)	4(5.8)	7(10.6)

Self-rated health status	*Poor*	96(17.7)	26(17.9)	21(16.9)	35(25.4)	13(17.8)	1(1.5)
	Good	445(82.3)	119(82.1)	103(83.1)	103(74.6)	60(82.2)	65(98.5)
Presence of chronic medical condition in the household	**None**	393(72.4)	115(78.2)	73(58.9)	98(71.0)	49(67.1)	62(93.9)
	At least one	150(27.6)	32(21.8)	51(41.1)	40(29.0)	24(32.9)	2(6.1)

3.1.3 Sample characteristics by household ownership of medical aid

The characteristics of households by household ownership of medical aid are shown in Table 3. The percentage of household members with medical aid generally increased with an increase in the proportion of household members aged 18 years and over, ranging from 9.5% - 11.2%. The percentage of households owning medical aid was 9.6% among Black-African households and 14.5% among other races. As shown in Table 3, medical aid ownership among households with relatively fewer members i.e. 1 to 3 household members was 11.6% compared with those with 4 or more household members (7.1%).

The percentage of households with medical aid increased as the percentage of household members with primary education or higher increased from 25% to over 75%, ranging from 5.4% to 11.5%. Similarly, the percentage of households with medical aid increased with an increase in the percentage of employed household members (25% to 75%) from 5.1% to 14.6% respectively. Coverage of medical aid ownership increased with household socio-economic status (SES), increasing from 4.3% for low SES households to 16% for middle SES households, peaking at 37.3% for high SES households. Most households with medical aid reported that they used either a public health facility (6.7%) or a private doctor (35.2%). Most households owning medical aid rated their health as good (12.8%). Coverage of medical aid ownership was 10.2% among households that did not have a household member with a chronic medical condition and 12.7% where at least one household member reported a chronic medical condition.

Table 3: Coverage of household medical aid ownership by selected household characteristics

		Household ownership of medical aid	
Characteristic	**Level**	**Yes, n(%)**	**No, n(%)**
Percentage of household members ≥18 years	***25%-49%***	6(9.5)	57(90.5)
	50%-74.9%	21(11.2)	166(88.8)
	≥75%	30(10.7)	251(89.3)
Percentage of females in household	***<25%***	14(9.8)	129(90.2)
	25%-49%	23(11.7)	174(88.3)
	50%-74.9%	21(11.3)	165(88.7)
	≥75%	1(5.9)	16(94.1)
Race			
	Black African	39(9.6)	366(90.4)
	Other	20(14.5)	118(85.5)
Household size			
	1-3	52(11.6)	398(88.4)
	≥4	6(7.1)	79(92.9)
Percentage of household members with primary education or higher	***<25%***	4(5.4)	70(94.6)
	25%-49%	3(4.4)	66(95.6)
	50%-74.9%	24(15.1)	135(84.9)
	≥75%	26(11.5)	200(88.5)
Percentage of household members who are employed	***<25%***	10(5.1)	186(94.9)
	25%-49%	17(14.3)	102(85.7)
	50%-74.9%	19(14.0)	117(86.0)
	≥75%	13(14.6)	76(85.4)
Socio-economic status			
	Low	15(4.3)	338(95.7)
	Middle	17(16.0)	89(84.0)
	High	25(37.3)	42(62.7)
Source of health care			
	Public Health Facility	29(6.7)	402(93.3)
	Private doctor	25(35.2)	46(64.8)
	Other	4(12.5)	28(87.5)
Self-rated health status			
	Poor	2(2.1)	94(97.9)
	Good	57(12.8)	388(87.2)
Presence of chronic medical condition in the household	***None***	40(10.2)	353(89.8)
	At least one	19(12.7)	131(87.3)

3.2 Predictors of medical aid ownership

The crude and adjusted associations between household ownership of medical aid and each predictor variable derived from multivariate regression models are shown in Table 4.

3.2.1 Unadjusted regression models

Table 4 presents results of the adjusted and unadjusted odds ratios (ORs) for association between household ownership of medical aid and predictor variables. The factors explored in this study included age; sex; race; study site; household size; level of education; employment status; SES of household; source of health care; self-rated health status; and presence of a chronic medical condition in the household. In bivariate analysis, employment status, SES, source of health care and self-rated health status were independently associated with household ownership of medical aid. The odds of medical aid ownership in households with middle and higher SES were 4.30 and 13.41 times the odds of medical aid ownership in households with a low SES respectively. The odds of household ownership of medical aid increased with each additional employed member in the household. There was a strong positive association between households with members who generally rated their health as good with ownership of medical aid. Households that used a private doctor were also more likely to own medical aid.

Age, sex, race, household size, study site, level of education and presence of a chronic medical condition in the household, were not independently associated with medical aid ownership. Nonetheless, the odds of household ownership of medical aid increased with each additional member of the household aged 18 years and over, and with each additional female household member.

Table 4: Adjusted and unadjusted ORs for association between household ownership of medical aid and predictor variables

		Household ownership of medical aid			
Characteristic	**Level**	**UOR**	**95% CI**	**AOR**	**95% CI**
Percentage of household members ≥18 years		1.34	0.79-2.30	1.84*	1.06-3.21
Percentage of females in household		1.41	0.42-4.73	3.00	0.60-15.00
Race	*Black African* **(Ref)**	1.00	-	1.00	-
	Other	1.59	0.89-2.83	0.55	0.14-2.20
Study site	*Braamfischerville* **(Ref)**	1.00	-	1.00	-
	Riverlea	1.83	0.88-3.80	2.82	0.64-12.52
	Bertrams	0.50	0.20-1.29	1.04	0.34-3.23
	Hospital Hill	0.86	0.32-2.33	0.26	0.06-1.14
	Hillbrow	2.18	0.94-5.02	1.43	0.51-4.04
Number of household members		0.90	0.76-1.06	1.05	0.91-1.20
Percentage of household members with primary education or higher		1.75	0.75-4.10	0.72	0.22-2.36
Percentage of household members who are employed		3.25*	1.47-7.17	3.42*	1.12-10.44
Socio-economic status	*Low* **(Ref)**	1.00	-	1.00	-
	Middle	4.30*	2.07-8.95	3.40*	1.48-7.81
	High	13.41*	6.56-27.44	9.37*	3.93-22.33
Source of health care	*Public health facility* **(Ref)**	1.00	-	1.00	-
	Private doctor	7.53*	4.07-13.95	4.87*	2.26-10.53
	Other	1.98	0.65-6.03	2.29	0.68-7.73

Self-rated health status	*Poor* **(Ref)**	1.00	-	1.00	-
	Good	6.90*	1.66-28.79	5.96*	1.11-32.10
Presence of chronic medical condition in the household	*None* **(Ref)**	1.00	-	1.00	-
	At least one	1.27	0.71-2.29	2.08	0.96-4.51

*significant at $p<0.05$

3.2.2 Adjusted regression model

The odds of household ownership of medical aid increased with each additional member of the household aged 18 years and over (AOR 1.84, 95% CI 1.06-3.21). The positive relationship of employment with household ownership of medical aid observed in the unadjusted model was also observed in the adjusted model. The odds of household ownership of medical aid increased with every additional employed household member (AOR 3.42, 95% CI 1.12-10.44). There is a positive association between the household's SES and household ownership of medical aid. The odds of household ownership of medical aid in middle and high SES households were 3.40 (95% CI 1.48-7.81) and 9.37(95% CI 3.93-22.33) times the odds of household ownership of medical aid in low SES households respectively. Examining the effect of the household's source of health care on ownership of medical aid showed that the odds of household ownership of medical aid were 4.87 times greater for households which utilised the services of a private doctor for healthcare (95% CI, 2.26-10.53) than for households that used public health facilities (government clinics and hospitals). The odds of household ownership of medical aid in households which rated their health as good was 5.96(95% CI 1.11-32.10) times the odds of household ownership of medical aid in households that rated their health as poor.

Sex, race, household size, level of education, study site and presence of a chronic medical condition in the household were not associated with medical aid ownership in the adjusted model. The odds of household ownership of medical aid increased with a unit increase in the number of household members (household size) and every additional female household member, but they decreased with every additional member with primary education or higher, though the association was not statistically significant.

3.3 Summary

The study revealed that 10.9% of the household in the study area had medical aid. Ownership of medical aid was influenced by the number of people employed in the household, the number of household members aged 18 years and above, household SES, household use of private doctors and those who rated their health as good.

CHAPTER FOUR

4.0 DISCUSSION

The study aimed to determine the coverage of household ownership of medical aid and the factors that predict household ownership of medical aid in five poor urban communities in Johannesburg in 2012.

4.1 Coverage of household ownership of medical aid

In this study, 10.9% of households had at least one of the individuals with medical aid. A South African study using 2012 household level data also reported low levels of medical ownership of 9.2% among households (Babikir, Satty & Mwambi, 2017). Another study in Nigeria reported very low levels of household ownership of medical aid of 1.1% (Amu et al., 2018). In contrast, Dalinjong et al (2017) reported that 63% of households were covered with medical aid in Ghana, while in another study, 47% of households in Namibia had at least one of the household members with medical aid (Gustafsson-Wright et al., 2010). Low medical aid coverage among the poor urban communities in Johannesburg underscores the slow progress in extending coverage to the population in these settlements. Having at least one household member with medical aid, was reported to be helpful in cushioning the household against the most severe health-related income shocks (Gustafsson-Wright et al., 2010).

Medical aid ownership rates may be lower in the surveyed households because the settlements are predominantly poor but may however reflect low ownership patterns among poor South African households. A South African study reported that the poorest quintile made up 1% of medical aid memberships (Surender, 2014). Studies conducted in similar settings comprising of poor urban communities in Kenya and Zambia reported low medical aid ownership rates of 8.2% (Kazungu et al., 2017) and 3% respectively (Mulenga et al., 2016).

There were no significant differences in ownership of medical aid across different races. Nonetheless, the percentage of households with medical aid among black African households was generally lower compared to the coverage among non-Black households. A study investigating racial disparities highlighted this racial skewness in medical aid ownership and utilisation of health services among people presenting for dental visits in South Africa. The study reported that the percentage of white South Africans who had medical aid was seven times more than that of black South Africans (Ayo-Yusuf et al., 2013). Racial differences in uptake of medical aid may become more pronounced using health service utilisation data for different healthcare services. The small number of respondents with the outcome (medical aid) makes it difficult to detect major differences among groups across different socio-demographic characteristics.

4.2 Predictors of household ownership of medical aid

Age was associated with ownership of medical aid in this study. Household ownership of medical aid increased as the percentage of people aged 18 years and over increased in the household. Similar findings of increased likelihood of ownership of medical aid with increasing age were observed in an African study and a study from China (Kazungu & Barasa, 2017; Xu, Cai, Li, Cao, Goudge et al., 2018). Kimani and colleagues explain that one of the plausible reasons for this trend is that as one gets older, their purchasing power increases and they also become more financially independent (Kimani, Ettarh, Warren & Bellows, 2014). Another plausible reason is that as people get older, they become more mature and are better able to understand the risks of lacking medical aid (Mhere, 2013). The economic theory explains that as people age, their health depreciates, hence they purchase medical aid as an investment in health to avoid catastrophic health expenditure in the event of ill health (Duku, 2018).

There was no association between household ownership of medical aid with percentage of female members in the study. The effect of sex on medical aid ownership has produced inconsistent findings (Duku, 2018). Studies exploring ownership of medical aid among women reported medical aid coverage from 7% in Kenya (Kimani et al., 2014) to 30% in South Africa (Kirigia et al., 2005). In contrast, a Kenyan study reported increased odds of medical aid ownership among males than females (Kazungu et al., 2017). Unlike women, men have a reluctance to seek healthcare compared to their female counterparts (Bourne & Kerr-Campbell, 2010). In keeping with the preventative care approach to health care, it would be expected that women would purchase more medical aid than men.

However, this is not the case in our study as sex was not a predictor of household ownership of medical aid which may reflect that we had a balanced sample of gender distribution between people with medical aid and those without medical aid. Bourne & Kerr-Campbell found that male headed households and being male increases the likelihood of medical aid ownership (Bourne & Kerr-Campbell, 2010).

Conceivably, the odds of medical aid ownership were increased with every additional employed member in the household. Most of the household members worked in the informal sector in our study. International evidence suggests that it is problematic to achieve high levels of coverage among people working in the informal sector using medical aid enrolments which are mainly based on being employed in the formal sector (Mathhauer, Schmidt & Wenyaa, 2008; Kazungu et al., 2017). Similar findings were reported in a systematic review of studies exploring factors influencing enrolment into medical aid in low-middle income countries that reported that low income levels and limited financial resources limit ownership of medical aid (Adebayo et al., 2015). Among others, challenges include unpredictable and logistical difficulties in regularly collecting premium contributions from individuals in the informal sector (Kazungu et al., 2017). Household ownership of medical aid was positively associated with increasing SES of the household. These findings are similar to those of a Ghanaian study that reported increased subscription for medical aid with high SES of the household, where 21% of households classified as low SES were enrolled for medical aid compared to 60% of high SES households (Sarpong et al., 2010). This evidence highlights that the risk associated with medical expenses does indeed influence a variety of household decisions, including the amount of wealth available to households.

Individuals who used the services of a private doctor had increased odds of owning medical aid compared with those who used public health facilities. The observation confirms findings from health systems research in South Africa which indicate that most individuals with medical aid and their beneficiaries utilise private health services (National Department of Health, 2015). Similar trends are also observed in countries with NHI where individuals on private health insurance or medical aid tend to utilise private health care in contrast to public sector health services (Kim et al., 2015).

This implication tends to reinforce findings that the quality of services in the public health sector is poor compared to that in the private health sector, which may explain why people with medical aid use private sector services despite some services being free in the public sector. Households with members who rated their health as good had increased odds of owning medical aid compared with those who rated their health as poor. Similarly, studies have reported that perceptions related to poor health are negatively associated with uptake of medical aid (Goudge et al., 2009; Jehu-Appiah et al., 2011). Other studies have reported that people with poor-self assessed health status are more likely to own medical aid than those with fair and good health status (Duku, 2018).

There was no association between study site and medical aid ownership in this study. Nonetheless ownership of medical aid was lower among households residing in an informal settlement and those in areas where the populations are predominantly migratory. Similarly, a study investigating factors influencing enrolment into health insurance programs among residents of an urban informal settlement in Kenya reported coverage of less than 1% of private health insurance in these poor communities (Kimani et al., 2012).

Having a household member with a chronic medical condition was not a predictor of ownership of medical aid. Nonetheless, medical aid coverage was generally low among households that reported a chronic disease which may reflect how medical aid schemes exclude people with chronic medical conditions from affordable premiums (Govender et al., 2014). Goudge and colleagues reported that the insured were twice as likely to be taking medication for a chronic condition than the uninsured (Goudge et al., 2018). Given the low coverage rates in our study, the role of self-selection into medical aid based on health status and income cannot be refuted.

4.3 Study limitations

The principal weakness of this study rests primarily on the use of secondary data which was not collected for the primary purposes of this study and which relies on the accuracy of written records, thus, making it difficult to control for information bias. As a result, households with medical aid and those without medical aid may systematically be different from each other due to unobserved predictor variables e.g. type of medical aid, service quality of medical aid schemes and perceived benefits of medical aid (Friis & Sellers, 2014). The analysis relied on self-reported measures such as medical aid ownership, health status and utilisation of health services. Therefore, self-reported measures can be subjective and thus prone to reporting bias which could affect the precision of the reported estimates (Szklo & Nieto, 2014). The power to observe statistically significant findings is also limited because the number of households with the outcome was small. The generalizability of the study findings is also limited because participants were all recruited from only these five poor urban communities in Johannesburg which limits valid comparisons. Lastly, the data set is based on data collected in 2012, and hence, the picture could be different in the present day. Therefore, caution should be taken when generalizing the findings to other populations.

4.4 Conclusion and recommendations

Based on the findings of this study, we can conclude that household ownership of medical aid is a function of wealth i.e. SES and employment status, which influence utilisation of private health services. There is low coverage of medical aid among households in the poor urban settlements. Marked disparities in ownership of medical aid across different levels of SES may lead to substantial inequalities in access to healthcare in these poor urban communities. Given the role of poor access in perpetuating poverty and inequality, it is imperative to tackle these profound social disparities through innovative healthcare financing and policies.

We recommend that the government should accelerate implementation of the NHI particularly for high risk groups including the poor to increase access to basic health services by the poor and basically to achieve universal health coverage in South Africa. As the country moves toward implementing the NHI, more studies of this nature should be conducted using nationally representative data to determine the coverage and determinants of medical aid ownership in the country. Such studies are imperative for addressing the reasons for non-ownership of medical aid and thus to inform policy. Based on this study, it is imperative for medical aid schemes to set subscription fees which also cater for low income earners and those who work in the informal sector.

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APPENDICES

Appendix 1: Plagiarism declaration report

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

FACULTY OF HEALTH SCIENCES

PLAGIARISM DECLARATION TO BE SIGNED BY ALL HIGHER DEGREE STUDENTS

SENATE PLAGIARISM POLICY: APPENDIX ONE

I Tariro Jayson Basera (Student number: 1225726) am a student registered for the degree of MSc Epidemiology in the academic year _______.

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.

Signature: ____________ Date: 26/10/2018

Appendix 2: Ethics clearance certificate

R14/49 Mr Tariro Jayson Basera

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M160113

NAME: **(Principal Investigator)**	Mr Tariro Jayson Basera
DEPARTMENT:	School of Public Health
PROJECT TITLE:	Trends and Predictors of Ownership of Medical Aid Among Poor Urban Communities in Johannesburg from 2006 to 2012
DATE CONSIDERED:	29/01/2015
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Dr Latifat Ibisomi
APPROVED BY:	Professor P Cleaton-Jones,Chairperson, HREC (Medical)
DATE OF APPROVAL:	01/02/2016

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 10004, 10th floor, Senate House/2nd Floor, Phillip Tobias Building, Parktown, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report.**

Principal Investigator Signature

Date 19/02/2016

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix 3: Approval for HEAD data

ENVIRONMENTAL & HEALTH RESEARCH UNIT

9 November 2015

To whom it may concern

Re: Permission to use HEAD study data

This letter serves to confirm that Tariro Basera has permission to use the Health, Environment and Development (HEAD) data set applicable to his study.

Please contact me if you have any queries regarding the above.

Regards,

....

Dr Nisha Naicker (PI for the HEAD study)

MBBCh MMed (Com Health) FCPHM PhD
Senior Specialist Scientist: Environment and Health Research Unit, Medical Research Council of South Africa
Honorary Lecturer: School of Public Health, University of Witwatersrand
Cell: 0721173408
Email: nisha.naicker@gmail.com
Nisha.naicker@mrc.ac.za

Appendix 4: HEAD Study Questionnaire

THE JOHANNESBURG HEALTH, ENVIRONMENT AND DEVELOPMENT (HEAD) PROJECT

PARTICIPANT INFORMATION SHEET

Good morning/afternoon,

I am from the University of Johannesburg. We are conducting a study on housing and health in your neighbourhood and would be grateful if you could assist us to fill out a questionnaire. Specifically, we wish to interview you about your housing, access to services and well-being. The interviewer may also ask you to reveal any health problems you or your family have experienced.

This study takes place every year in August. Therefore you may have been interviewed in previous years. The information you provide us with today will be used to assess changes that are occurring in your community. The researchers unfortunately will not be able to change or make improvements to the environment you live in. The information obtained from the study each year will be submitted to the City of Johannesburg and other stakeholders (community leaders) who may be able to assist the community.

The interview should take between 30-45 minutes, but may take longer. This may cause you some inconvenience by taking you away from your normal daily activities. In some of the homes a group of researchers will also like to collect some water from the tap that provides your drinking water. The interviewers will also like to swap your old dish cloth for a new one. This year we will also be giving a rat trap to each home. I will explain how to safely use the rat traps and dispose of the dead rats.

You don't have to participate if you don't want to. Although I will write down your address, no one except the researchers will see this. We will write the results in a report, but no one will know which is yours. By participating in the study, you will be helping us to understand housing and health problems in your area. Would you like to participate? IF NO, thank you for your time! IF YES, is this a good time for you, or can I come back at another time to see you?

If you have any queries, please do not hesitate to contact:Dr Nisha Naicker, Medical Research Council, Environment & Health Research Unit, PO Box 87373, Houghton, 2041, Tel: (011) 274 6060, Fax: (011) 642-6832, Email: Nisha.naicker@mrc.ac.za

CONSENT FORM

I give my consent to participate in the Johannesburg Health, Environment and Development (HEAD) study, as explained to me in the participant information sheet and by the researchers. I agree to participate in the study and understand that I am free to withdraw this consent at any time.

I acknowledge:

- That I have been shown how to use the rat traps and have been given the opportunity to ask any questions that I may have.
- That I am aware of the potential risks, hazards and dangers of using the rat trap.
- That I have also been provided with an information sheet with instructions on how to use the rat trap and dispose of the dead rats.
- That the Medical Research Council will not be responsible for and against any and all claims, demands, actions, suits, losses, costs, charges, expenses, damages and liabilities whatsoever which I may pay, sustain, suffer or incur by reason of or in connection with the use of the rat traps, including, but not limited to, all costs and expenses (including legal expenses) incurred in connection with any such loss or damage.

I understand that any questions I have will be answered, and that my identity will not be revealed.

Signed: ____________ Date:________/______/12

INTERVIEWERS, IF THE RESPONDENT IS UNCOMFORTABLE WITH WRITING, PLEASE OBTAIN VERBAL CONSENT AND SIGN ON THEIR BEHALF BELOW.

I, _____________________(name of interviewer), certify that I have explained the information sheet to the research participant, who has given verbal approval to participate in the HEAD study.

Signed: ____________ Date:________/______/12

Status	
Completed questionnaire	
Water sample collected	
Water swab collected	
Dish cloth collected	
Rat traps accepted	
Incomplete questionnaire	
Resident not available	
Refused to answer	
Dwelling not found	
Did not get to	

THE HEAD STUDY QUESTIONNAIRE

Year of Study	2	0	1	2

Study ID number: **2003**

Address: 914 A Couga Street

Riverlea

Interview date	D	D	M	M	2	0	1	2

Name of Interviewer	

Respondent's name		
Sex of respondent	Male	Female
Was the respondent interviewed last year for the same study	Yes	No

Guidelines for interviewers:
*All options or comments in italics **MUST NOT BE READ** out to the respondents.*

A. DEMOGRAPHY & SOCIO-ECONOMIC STATUS

1. In which country were you born? *Please tick one.*

COUNTRY	South Africa	
	Other country	

Please specify__________________________________

If born in another country, are you currently a South African citizen?

Yes	No

If born in South Africa, in which **PROVINCE**	Eastern Cape	
	Free State	
	Gauteng	
	KwaZulu Natal	
	Limpopo	
	Mpumalanga	
	Northern Cape	
	North West	
	Western Cape	

2. How many people live on this **site** (within the four walls of the yard or flat)?

3. How many separate households live on this **site**?

(**Definition of a household:** a group of people who usually eat together)

Interviewers: unless otherwise specified, the remaining questions refer to the ***main household***

4. How many people, including yourself, make up this (**main**) household?

5. How many children under five years of age are part of this household?

(If no children, state 0)

6. What is the **main** language spoken in this household?

Please tick one.

Afrikaans	
English	
Ndebele	
Sepedi	
Sesotho	
Setswana	
Swati	
Tsonga	
Venda	
Xhosa	
Zulu	
Other________________	

7. What is the **main** population group in this household? *Interviewers, please explain why we are asking this question. You can say something like: "Previous South African laws labelled people according to their skin colour. In order to compare the current situation with the past we need to identify people according to those categories. This is why we ask you the following question."*

Please tick one.

Black African	
White	
Coloured	
Indian	
Other:	
Refused to answer	

8. How long has this household been living in this dwelling?	:years :months

9. Starting with the **respondent**, followed by the **head of the household**, please state the first name, age, sex, educational qualification & main activity during weekdays, for each member of the household.

Interviewers: after the respondent and/or the head of the household, list residents from <u>oldest to youngest.</u>

Name	Age (years)	Sex		Achieved educational qualification [state 'not applicable- N/A' for children not of school going age]				MAIN Weekday Activity								
		M 0	F 1					1 Full time job	2 Part time job	3 Unemployed	4 Housewife or Househusband	5 Informal Job	6 Tertiary Ed.	7 School	8 Crèche	9 Other (Specify)
Person 1 (Respondent)		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									
Person 2 (Head of Household) *Leave this line blank if the respondent is also the head of the household)*		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									
Person 3		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									
Person 4		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									
Person 5		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									
Person 6		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									
Person 7		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									
Person 8		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									
Person 9		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									

Person 10		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									
Name	**Age (years)**	**Sex**		**Achieved educational qualification [state 'not applicable- N/A' for children not of school going age]**				**MAIN Weekday Activity**								
		M 0	**F** 1					1 Full time job	2 Part time job	3 Unemployed	4 Housewife or Househusband	5 Informal Job	6 Tertiary Ed.	7 School	8 Crèche	9 Other (Specify)
Person 11		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									
Person 12		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									
Person 13		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									
Person 14		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									
Person 15		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									
Person 16		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									
Person 17		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									
Person 18		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									
Person 19		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary									

Person 20		**M**	**F**	1 None	2 Primary	3 High	4 Tertiary										

(Interviewer: Please obtain an additional sheet for households with >20 people)

10. What is the average monthly income for this household - **excluding grants & pensions?** *Please tick one.* ***THE OPTIONS IN ITALICS ARE FOR INTERVIEWERS ONLY AND MUST NOT BE READ OUT TO THE RESPONDENT.***

No income	
< R1000	
R1001- R2000	
R2001- R5000	
R5001-R10000	
>R10 000	
Refused to answer	
Don't know	

11. How many people in the household receive the following grants: *Please fill in appropriate numbers.*

Type of grant	**Number of people**
Old age grant/pension	
Disability grant	
Child support grant	

12. Please state whether members of this household own any of the items **(in working order)** listed below. *Please tick more than one if necessary.*

	Yes	No
Radio/Hi Fi		
Television		
Satellite television (eg DSTV or M-Net)		
Refrigerator		
Washing machine		
Video/DVD machine		
Microwave		
Car		
Computer		
Telephone (landline or cellular)		

13. How much money (in Rands) does this household spend on the following items every month? *Please fill in appropriate amounts. If respondents can only remember annual amounts divide this figure by 12.* ***DO NOT READ OUT OPTIONS IN ITALICS.***

	Rands	***Don't know***	***Refused to answer***	***Not applicable***
Food				
Transport (include taxi fare, petrol, car instalment)				
Housing- rent, bond etc				
Water				
Electricity				
Paraffin				
Coal				
Wood				
Gas				
Other type of fuel. Specify_______________				
Alcohol				
Cigarettes				
Entertainment (such as cinemas, nightclubs, attending sporting events, theatre)				
Telephones & Cellular Telephones				
Medical expenses (include transport to clinics, medication etc)				
Schooling/University (including uniforms, books, fees etc)				
Debt repayments				

14. Does anyone in this household have any money saved in a bank, building society or stokvel?

Please tick one. ***DO NOT READ OUT OPTIONS IN ITALICS***

Yes	
No	
Don't know	
Refused to answer	

15. Does anyone in this household have medical aid?

Please tick one. ***DO NOT READ OUT OPTIONS IN ITALICS***

Yes	
No	
Don't know	
Refused to answer	

B. HOUSING INFRASTRUCTURE

16. **INTERVIEWER:** *Please record the type of dwelling used by the main household. (please tick one)*

Formal House (stand alone, semi-detached, townhouse or cluster)	
Informal dwelling (shack)	
Backyard dwelling - formal	
Backyard dwelling - informal	
Flat	
Business premises used for accommodation	
Other, specify	

17. How many separate rooms are there in this dwelling (including kitchen, bathrooms and toilets)? [ ]

18. How many rooms are used as bedrooms by members of this household? [ ]

19. Is this dwelling (*Please tick one,* ***DO NOT READ OUT OPTIONS IN ITALICS***):

Rented directly from the owner (not living in dwelling)	
Rented from someone living in the unit (not the owner)	
Owned by someone living in the unit	
Do not pay rent or bond	
Other, specify	
Don't know	
Refused to answer	

20. Is the owner of this house a: (*Please tick one).*

Male	Female	Male & Female	N/A

21. Is the person who makes most decisions in this household a: *(Please tick one).*

Male	Female	Male & Female

22. Does anyone regularly do any of the following at home? *Please tick appropriate boxes.*

	Yes	No	***Don't know***	***Refused to answer***
Fix cars				
Spray painting of cars				
Make metal jewellery				
Welding				
Fix electrical appliances				
Scrap metal recycling				
Hairdressing				
Other activity at home to make money (Specify) ____________				

C. ACCESS TO ENVIRONMENTAL SERVICES

23. Where do you mainly get your water from? *Please tick one.*

Tap inside dwelling	
Outdoor on-site tap	
Communal tap	
Vendor/truck/tank	
Borehole	
Rain water tank	
River/stream/dam	
Other (Please specify)	

24. Do you store water for drinking or cooking, in a container? (such as a bucket or 5-litre water container)

Yes	
No	
Don't know	

25a. Do you have access to running **<u>hot</u>** water?

Yes	
No	
Don't know	

Electricity	
Paraffin	
Coal	
Wood	
Gas	

25a1. If no, how do you heat your water for bathing?

Other, specify	

25b. In the **past 6 months** have you had to buy water from a private vendor/ neighbour?

Yes	
No	

25c. In the **past 6 months** has your water supply been disconnected?

Yes	
No	

26. Do you make use of a pre-paid water supply?

Yes	
No	
Don't know	

25d. If yes, please give the reason. ______________________________

____

____

27. What type of toilet do you **mainly** use?
Please tick one.

Flush	
Chemical	
Pit latrine	
Communal toilet	
Bucket	
Other (please specify)	

28a. Do you own a refuse container (bin)?

Yes	
No	

28b. If yes, does your waste/ refuse container have? *Please tick one.*

A lid	
No lid	
No waste container	

29. How often is your waste/refuse collected? *Please tick one.*

Daily	
Weekly	
Monthly	
Never	
Not applicable	
Other (please specify) ________________	

30. What do you use **mainly** for cooking? *Please tick one.*

Electricity	
Paraffin	
Gas	
Wood	
Coal	
Other __________	

30a. What other fuel/s do you use for cooking?

Electricity	
Paraffin	
Gas	
Wood	
Coal	
Other __________	

31. What do you use **mainly** for heating? *Please tick one.*

Electricity	
Paraffin	
Gas	

Wood	
Coal	
Don't usually heat the house	
Other ___________	

31a What other fuel/s do you use for heating?

Electricity	
Paraffin	
Gas	
Wood	
Coal	
None	
Other ___________	

32. Do you make use of pre-paid electricity? *Please tick one.*

Yes	
No	
Don't know	

D. PERSONAL & DOMESTIC HYGIENE

37. Do you have problems with any of the following? *Tick more than one if necessary.*

Rats	
Mice	
Snakes	
Flies	
Fleas	
Cockroaches	
Bed bugs	
Ants	
Other (Please specify)	

If answered ***yes*** *to Rats or Mice, please answer q37a to q37m.*

If you answered ***no*** *move on to q38.*

37a. What do you think has caused the rat problem? ______________________________

____

37b. Has anyone in this household been bitten by a rat or mouse in the past year?

Yes	
No	

37c. Does anyone in the household sleep on the floor?

Yes	
No	

37d. Do you think that rats/ mice can cause disease in people?

Yes	
No	
Don't know	

37e. Over the past year, do you think the number of rats/mice in this area has...

Increased	
Stayed the same	
Decreased	

37f. What are you using or have used to control the rat infestation

Rat Poison Specify :	
Rat trap	
Other, Specify:	

37g. If you have killed rats, how do you dispose of the dead rats? ______________________

____

37h. Did you receive rat traps last year from the study team?

Yes	
No	