

Cross-sectional comparisons of violence and injuries in an urban community, South Africa

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ABSTRACT

Urbanisation has brought different challenges in terms of violence and injuries in South Africa (SA). Injuries related to violence have contributed to a high disease burden in SA as compared to other parts of the world. Apartheid made the problems of urbanisation more complex particularly for black people. For generations, urbanisation of black people was difficult because they were forced to live in townships far from the main cities. Poverty and socio-economic disparities in these townships are risk factors for violence and injuries. There is paucity in literature of information on the trends of violence and injuries among this urban population. It was therefore imperative to explore the different forms of violence and injuries in an urban area over a long period of time and to foster a transdisciplinary collaboration to address the problem.

The aim of this research was to give a description of violence and injuries among a sample of adults aged 35 to 70 years at the time of enrolment into a study, living in an urban area within North-West Province, SA over a period of 10 years. The Prospective Urban and Rural Epidemiological (PURE) study, designed as a prospective, observational, cohort study was used.

A significant decrease was observed in the occurrence of serious injuries over the 10- year period, except in 2010 where a significant increase was observed for injuries related to physical assault and domestic violence. Urban characteristics like employment status and alcohol use were significantly associated with domestic violence and sustaining a serious injury respectively. Despite a significant decrease observed in the occurrence of violence and injuries over the 10-year period, violence and injuries remained endemic and they were triggered by socio-economic factors in the urban context. Failure to address socio-economic inequalities implies violence and injuries will perpetually contribute to the quadruple burden of diseases in SA.

Traditional mono-disciplinary or sector-based approaches have proved limited when it comes to addressing the complexity of violence and injuries in SA. Moreover, the activities of different stakeholders are determined more by particular interests, which can be economic, political, etc., and less need to build a system that is equitable and sustainable. A transdisciplinary approach is therefore indispensable for the development of sustainable and equitable violence and injuries prevention interventions within urban context.

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CONTRIBUTION OF THE AUTHORS

The following researchers contributed to this dissertation:

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Provided recommendations on writing up of the manuscript and also assisted with evaluation of the study.

This is a statement from the authors confirming their contribution to the study and their permission that the manuscript may form part of this dissertation.

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LIST OF ABBREVIATIONS

AUTHeR	African Unit for Transdisciplinary Health Research
CDC	Centers for Disease Control and Prevention
CII	Council of International Investigators
DOH	Department of Health
HIV	Human immunodeficiency virus
IDPs	Internally displaced persons
IPV	Intimate partner violence
LMIC	Low and/or middle income countries
NCD	Non-communicable diseases
NGO	Non-governmental organisation
PURE	Prospective Urban and Rural Epidemiologic
RTI	Road traffic injuries
SA	South Africa
SACE	South African Council of Educators
SA Stats	South African Statistics
SSA	Sub-Saharan Africa
UN-HABITAT	United Nations Human Settlement Programme
UNODC	United Nations Office on Drugs and Crime
WHO	World Health Organisation

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CHAPTER 1: BACKGROUND AND MOTIVATION

1.1 INTRODUCTION AND BACKGROUND

Urban areas all over the world are the hub of different forms of violence (Harroff-Tavel, 2010:329). Violence is a complex phenomenon, its causes are multifaceted and its consequences go beyond the immediate perpetrators and victims (Fanslow & Robinson, 2011: 37). Violence in urban areas is embedded in the social and physical contexts and related to problems such as poverty, unemployment, poor housing, gender inequalities and erosion of family life (Schwartz & Gertseva, 2010:392). These environmental characteristics in turn influence individual behaviours (Setlalentoa *et al.*, 2015:87). Adverse changes in behaviour can lead to the development of behavioural risk factors like smoking and alcohol abuse which are risk factors violence and injuries (Gass *et al.*, 2010:582). In SA, during Apartheid, black people were evicted from their properties and forced to move to townships (Viljoen & Sekhampu, 2013: 731). Over the years there has been a massive growth of informal settlements in these townships (Hunter & Posel, 2012:290). Approximately half of South Africa's urban population lives in townships (World Bank, 2014:2). The ineptitude of the state to govern effectively and to provide basic services particularly in the townships has caused widespread protests and violence in SA (Muller, 2013:45; Jürgens *et al.*, 2013:258). Where there is violence and injuries, people's health is affected (Imbusch *et al.*, 2011:87). The ability to create effective policies and programmes for the prevention of diseases depends on understanding their risk factors in a specific social context (Beaglehole *et al.*, 2011:1440); hence the study described the different forms of violence and injuries in an urban area in the North West Province of SA.

The role of the environment (social, political built and economic) as a predisposing factor for violence and injuries has received little attention from researchers (Carpenter & Nevin, 2010:260; Mohamed, 2013:1). Urban areas provide people with greater mobility, employment opportunities, more access to educational facilities and more liberty than their rural counterparts, but at the same time they may also provide prospects for occurrence of violence and injuries (Vauqueline, 2013:246). Urban violence and injuries are increasingly becoming some of the most crucial threats to development on a local, national and international scale (Kunkeler & Peters, 2011:279). Many of the fastest growing cities are also realising a sharp increase in the incidence and severity of various forms of violence (Muggah, 2012: vi). The most observable manifestations of urban violence include physical and psychological harm against persons due to homicide and other forms of victimisation (Vilalta & Muggah, 2014:162). Yet, violence has long-term effects which are far reaching and usually distressing for victims (Lagdon *et al.*, 2014:1). In addition to physical

harm, the consequences of violence include sexual and reproductive health problems, chronic illnesses, mental health and social problems (WHO, 2014:15).

In urban areas of Brazil, violence and injuries have become an “endemic” phenomenon that affects daily life, especially of poor populations (Reichenheim *et al.*, 2011:1962; Lopes *et al.*, 2015:1). Mortality rates from violence in Brazil have been showing a constantly increasing trend ever since the 80's (Reichenheim *et al.*, 2011:1962). According to Murray *et al.* (2013:471), there were 1 million homicides between the years 1980 and 2010. There has also been an increasing trend in road traffic fatalities especially in less developed regions in Brazil (Chandran *et al.*, 2012:11). In a recent study by Santos *et al.* (2016:130), it was found that the mortality rate for elderly pedestrians is high (57.3%) and the large proportion of the accidents were in urban areas. Violence and injuries are a significant public health problem in Brazil, with domestic violence being the third leading cause of all hospitalisation (Reichenheim *et al.*, 2011:1962). The high mortality and morbidity rate from violence and injuries in Brazil is due to a combination of increased inequality and unplanned urban growth (de Oliveira *et al.*, 2014:1189; Murray *et al.*, 2013:471). In Brazil's capital (Rio Janeiro), lack of public policies on accommodation, health and sanitation facilitated growth of informal settlements (Xavier & Magalhães, 2003:2). There is heightened risk of violence and injuries in these informal settlements due to poverty and social inequalities (de Paula Silva *et al.*, 2015:7).

According to Nuisl and Heinrichs (2013:105), the majority of the 1 billion people living in slums (informal settlements in urban areas) worldwide are from low-income countries. China and India alone host more than one third of the world's slums (Muggah, 2012:15). Continuous rural to urban migration has put forth a large challenge for the housing planners leading to slum sprawl (Mahadevia *et al.*, 2012:143). Residents of slums are exposed to heightened risk of gang violence, drugs and alcohol of which the later constitute potent determinants of violence (McIlwaine, 2013:3). In China collective violence has become a major social problem (Pun & Xu, 2015:9). Rapid rate of urbanisation in China resulted in the creation of employment for more than 40 million people in the construction industry (Ngai & Huilin, 2010:144). However, construction workers are poorly protected regarding physical and financial risks, compared with other workers in China (Friedman & Lee, 2010:513).

The realities of violence and injuries are also present in Africa. Sub-Saharan Africa (SSA) holds just over 10% of the world's population and in 2014 approximately two-thirds of the people in this region were living in urban informal settlements (United Nations-Human Settlement Program, 2014). The high rate of urbanisation in SSA has outstripped economic growth and urban planning efforts resulting in the unrestrained growth of slums that accommodate the majority of the urban

population (Greif *et al.*, 2010:1). Poorly planned cities, poor state of roads amidst rapidly increasing traffic volumes contribute to the increasing burden of Road Traffic Injuries (RTIs) in the region (Pirie, 2013:1). In addition, socio-economic pressures brought about by lack of opportunities and high levels of unemployment in the slums push many young people into violent activities to generate income (Ziraba *et al.*, 2011:257). Violence, among other factors, in the Sub-Saharan region encourages population movements, hinders access to health care services, limits access to food and safe drinking water and leaves people vulnerable to infections (Iqbal & Zorn, 2010:149).

South Africa has attracted millions of migrants fleeing political and economic turmoil in their home countries (Rwodzi, 2011:2). People are migrating to South Africa because of the country's international image of democracy and freedom (Neocosmos, 2010:4). Yet, the wrath of gang-related activities in urban areas of South Africa is clearly visible (Breetzke, 2010:476), as was the xenophobic violence that shocked the world in 2008 (Abrahams, 2010:495). Furthermore, the 2015 wave of xenophobic attacks also tarnished the country's international image (Chinomona & Maziriri, 2015:20). Migrants coming to South Africa for economic survival are accused of stealing jobs, and blamed for high levels of unemployment and crime in the urban areas (Neocosmos, 2010:2). It is clear that many years of apartheid, political violence and oppression led to a situation in which for many people, violence is the best strategy to resolve conflict (Norman *et al.*, 2010:1). Sadly, the consequences of violence have complications far beyond the immediate perpetrators and victims (Fanslow & Robinson, 2011:37). In most circumstances the vast majority of victims have been innocent civilians, especially women and children witnessing horrific acts of violence (Cavanaugh *et al.*, 2011:372).

According to Norman *et al.* (2010:2), injuries related to violence have contributed to a high disease burden in South Africa as compared to other parts of the world. South Africa's injury mortality rate is nearly twice the global average (Garrib *et al.*, 2011:439). RTIs, self-inflicted injuries, and unintentional injuries arising from fires, drowning, and falls also contribute to this high injury morbidity and mortality rate (Schuurman *et al.*, 2011:875). According to Pillay-van Wyk *et al.* (2016:477) South Africa confronts a quadruple burden of disease consisting of HIV/AIDS; violence and injuries, communicable and non-communicable diseases. The quadruple disease burden can be attributed to various factors such as the demographic transition aforementioned. While urbanisation continues to increase (Buhaug & Urdal, 2013:3), infrastructure, environmental conditions, social, economic, cultural and political characteristics of a community influence violence and crime particularly in urban areas of SA (Cotte Poveda, 2011:1).

However, it appears there are particular localities where violence and injuries occur more frequently in the urban areas of South Africa (Muggah, 2012: vi). For example, where sanitation facilities are located far from people's homes, women and girls face risks of violence if they walk alone, especially at night (Chant, 2013:11). Certain open public spaces in urban areas, and especially in slums, are also identified with the perpetration of, or fear of, violence against women in particular (McIlwaine, 2013:3). One study indicated that 31% of rapes were perpetrated in open spaces such as rough grounds in urban areas (Tacoli, 2012:26). Places where alcohol is bought and consumed are also associated with the high incidence of violence (Setlalentoa *et al.*, 2010:11). Bars, taverns and shebeens (an unlicensed or illegally operated drinking establishment [Merriam Webster Dictionary, 2012]) are concentrated in urban areas (Charman *et al.*, 2014:33). With alcohol acknowledged as a major risk factor in the perpetration of violence (Pitpitan *et al.*, 2013:295), these places are considered dangerous especially for women to visit often or even to pass by (Watt *et al.*, 2012:271).

Another important location for the perpetration of violence in urban areas is schools (Burton & Leoschut, 2012:1). Violence in schools has been shown to be perpetrated mainly by male students in mixed-gender schools as well as by teachers (South Africa Council of Educators, [SACE], 2011:6). Violence within schools is usually sexual in nature, and in the case of teachers being perpetrators it shows serious abuse of power and trust (McIlwaine, 2013:6). An example is a recent South African Broadcasting Corporation (SABC) coverage of shameless acts of abuse, where a male teacher asked pupils to strip naked for trivial issues like soiling his (teacher) clothes (SABC, 2016). School violence in SA is increasing at a disturbing rate (Burton & Leoschut, 2012:2) and there is need to come up with new interventions to address the problem or strengthen the existing ones. According to Widom and Wilson (2015:28), children who experience or witness acts of violence are at heightened risk of becoming a perpetrator of violence in adulthood.

The realities of urban settings conducive to violence and injuries object the international conference on health promotion's (Ottawa Charter) fundamental principle of creating supportive environments for health (WHO, 1986:1). Even though several programmes and acts on violence have been instituted in SA (Ward *et al.*, 2012), it is evident from literature that violence prevention strategies including the criminal justice systems seem to have failed (Ratele *et al.*, 2010:421). There is also paucity in literature of the trends of different forms of adult violence and injuries in an urban context. Therefore, in addition to the social sphere of violence and injuries, this research gives a description of the different forms of violence and injuries among a sample of adults aged 35 to 70 years in an urban area within the North-West Province over a period of 10 years. A discussion on the way forward and the role of different partnerships at all levels to develop effective responses to violence and injuries is also given.

1.2 MOTIVATION AND PROBLEM STATEMENT

Urbanisation has brought new challenges in terms of violence and injuries in South Africa (McIlwaine, 2013:7). There is a relatively wide ranging engagement with issues of urbanisation by social scientists (Ernstson *et al.*, 2014:1565). Certainly, much has been written on the scale and distribution of urban growth as well as the nature of urban poverty and inequality (Muggah, 2012:18). There also appears to be significant research on the real and perceived costs and consequences of violence and injuries across South Africa but much of the research continues to be segmented and embedded within certain disciplines and geographic settings (Ratele *et al.*, 2010:421).

In 2013 the Tlokwe Municipality in the North West Province, one of the nine provinces in South Africa, highlighted in an annual report that violence against women and the elderly is among the major social problems within the urban areas (Tlokwe City Council, 2013:17). According to Mokwena and Adeoti (2014:313), the North West Province also indicated a high prevalence of physical abuse (39%) and (37%) sexual abuse within the urban areas. This shows that despite government and non-governmental organisations' (NGOs) efforts, violence and injuries remain major social and developmental problems within urban areas. Yet, there is a gap in literature regarding the trends of adult violence and injuries in urban areas over a long period of time. It is in this context therefore, that the study described the occurrence of violence and injuries over a period of 10 years within a sample of adults living in Tlokwe with a view of understanding the occurrence of violence and injuries in urban areas to foster a transdisciplinary approach to the problem.

1.3 AIM

The aim of this research was to give a description of violence and injuries among a sample of adults aged 35 to 70 years at the time of enrolment into a study in an urban area within the North-West Province over a period of 10 years. The description will enable transdisciplinary collaboration to address the problems associated with violence and injuries in urban contexts.

1.4 OBJECTIVES

To determine the types and frequencies of violence and injuries in an urban area as baseline and five-year follow-ups (2005, 2010 and 2015).

To investigate possible changes in the type and frequencies of violence and injuries in an urban area over ten years.

1.5 CONTEXTUALISATION WITHIN THE PURE STUDY

One of the main objectives of the PURE study is to examine the relationship between societal determinants and incidence of chronic non-communicable diseases (NCDs) and on changes in rates of selected risk factors (Leong *et al.*, 2015:267). Therefore, this sub-study described the forms of violence and injuries presented in an urban area, as they are among other risk factors for the development of NCDs (Norman *et al.*, 2010:2). Figure 1.1 shows the PURE study's causal pathway for the development of NCDs and how it is adapted to suit this sub-study.

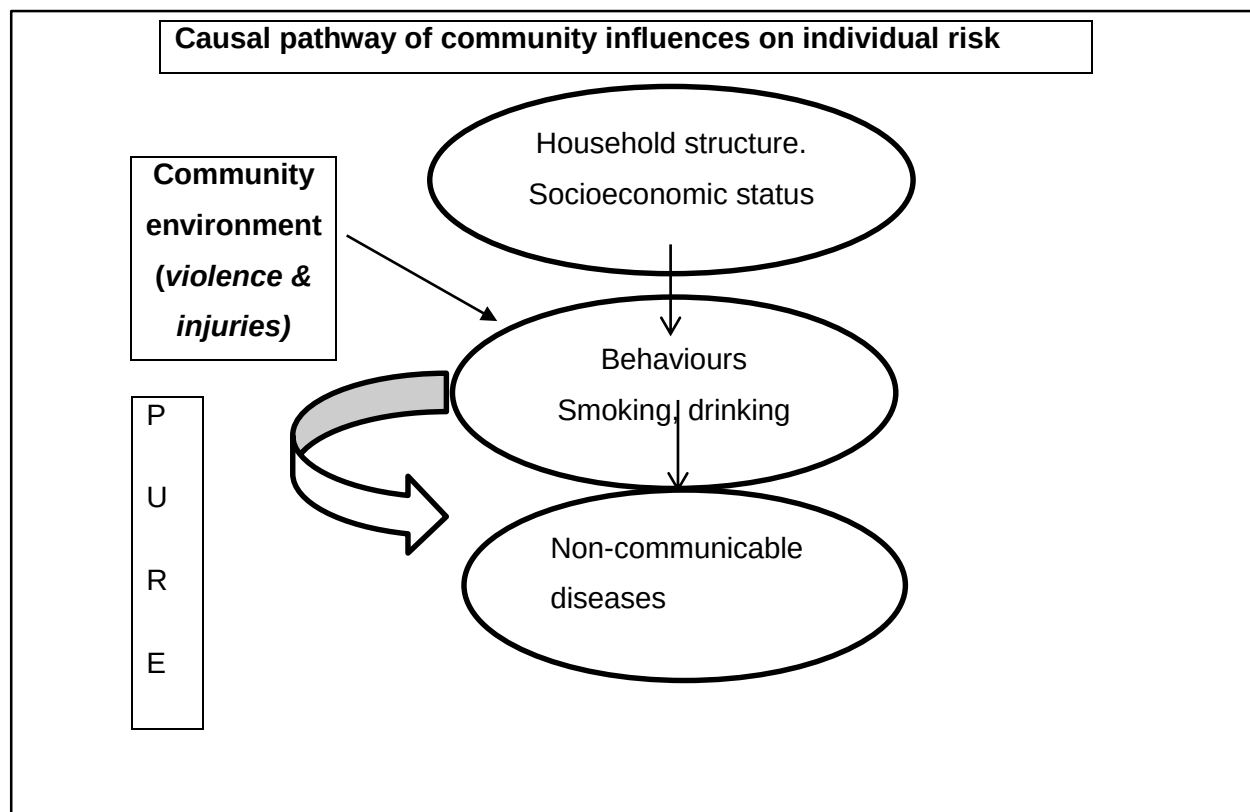


Figure 1.1: Causal pathway for NCDs (adapted from Teo *et al.*, 2009)

1.6 RESEARCH METHODOLOGY

The research methodology described below refers to the research design and research methods, and entails the way in which the research problem was approached and systematically investigated (Kothari, 2011:8).

1.6.1 Study design

The Prospective Urban and Rural Epidemiological (PURE) study was designed as a prospective, observational, cohort study which is quantitative in nature. In observational studies, the researcher observes what happens to people under exposure conditions that have been self-selected or have been determined by influences outside the control of the researcher (Song & Chung, 2010:2). In this case the exposure was measured in the recruitment phase and the

outcome was recorded in the follow-up phase. Exposure in this study was defined as the degree of urbanisation. This study design was appropriate because of the following motivation:

Descriptive data obtained through this cohort study will serve as basis for transdisciplinary collaborations to address the problems associated with violence and injuries. Recommendations for future studies were developed (Sedgwick, 2013:2). For example, further research can be done to find out if there is an association between violence and the development of chronic illnesses.

1.6.2 Sampling and sample size

The PURE study aimed to achieve a representative sample of adults from the selected communities. The urban communities (hereafter referred to a community C and D) were chosen in close proximity to the research team due to financial constraints. Community C was selected from the established part of a Township and D from the informal settlements surrounded by community C. The PURE study included sites at which investigators were committed to collect high quality data (Yusuf *et al.*, 2011:2). In 2005, a household census of number of people, their ages and health profile was done on the 6 000 households, starting from a randomly selected address in the communities. The head of each household gave signed consent to fill out the questionnaire. If a person refused or was not at home, the next house randomly selected was taken and a non-complier questionnaire was filled out (Teo *et al.*, 2009:4). From the data obtained, a selection of possible subjects older than 35 years of age with no reported chronic diseases of lifestyle, Tuberculosis (TB) or known HIV was made (n = 1004).

1 004 participants were initially recruited and some were lost due to mortality, frailty, discontinued participation (withdrawal), lack of success in re-contacting the participant for a follow-up survey (no contact) or by non-return of a survey by a participant (non-return). In 2005, 2010 and 2015 the number of participants was 1 004, 580 and 387, respectively.

1.6.3 Study setting

The study was conducted in two urban communities (communities C and D) which are under the Tlokwe Municipality of the Dr Kenneth Kaunda District in the North West Province. According to the 2011 census, the total population of the communities was 87 701 (females 51.47% and males 48.58%) in a density of 5 000/km² (South African Statistics [SA stats, 2014]). Racial makeup is black African (98%), coloured (1.2%), Indian/Asian (0.2%) white (0.2%) and other (0.3%). The major languages spoken in the area are Setswana, Afrikaans and English (Tlokwe City Council, 2013:6). The political dispensation in SA allows the global trends of rural to urban migration (geographic transition) and this resulted in the population being predominantly black people.

1.6.4 Target population

Participants were males and females within specific urban communities (referred to as C and D) which are under a Municipality of the Dr Kenneth Kaunda District in the North West Province. The population had no existing non-communicable diseases at baseline. Number of participants (N) = 1 004.

Inclusion criteria at baseline were:

- ≥ 35 years of age.
- ≤ 70 years of age.
- Males and females.
- Eligible participants have to reside in the households.
- No pre-existing chronic illnesses.

1.6.5 Data collection tool

The sub-study made use of the Adult Questionnaire (see Addendum A) to obtain information regarding participants' exposure to violence and injuries. Interviewers administered the questionnaires in Afrikaans, English or Tswana. The same questionnaires are used globally within each country participating in the PURE study. To enable cross-country comparison, it is essential that each country use the same questionnaire. Hence the content of the questionnaire could not be adapted in any way.

1.6.5.1 Development of data collection tool

The data collection tool was developed by the Population Health Research Institute (PHRI, Hamilton, Ontario, Canada) 2005 and was revised in 2015.

1.6.6 Rigour

The prospective, observational, cohort study was quantitative in nature and therefore validity and reliability ensured that the knowledge generated was scientific. Validity and reliability are rooted in positivism. In positivistic studies the role of the researcher is limited to data collection and interpretation through objective approach and the research findings are usually observable and quantifiable (Botma *et al.*, 2010:42). In the PURE study the data collection tools were standardised for all the countries participating of the PURE study. The principle investigator (PI) and research assistants received extensive training prior data collection.

1.6.7 Data collection process

Data collection for the PURE study was cross-sectional and occurred at five year intervals. The initial collection was in 2005, followed by 2010 and finally 2015. A minimum follow-up of 10 years was done (Yusuf *et al.*, 2011:2) and completed in November 2015.

1.6.8 Statistical analyses

Completed questionnaires were captured into REDcap™ (Research Electronic Data Capture), a web-based database. A retrospective analysis was done of the 2005 - 2015 data. It involved looking backwards in time and describing violence and injuries over a long period of time. SPSS (Statistical package for social scientists) (International Business Machines Corporation [IBM], 2012) was used to calculate the proportions of the occurrence of violence and injuries. A chi-squared test was performed to determine associations between demographic characteristics such as employment status, gender, education level and alcohol use with the occurrence of violence and injuries. A comparison of the proportions of different forms of violence/injuries over time, e.g. what proportion of females experienced an assault in the three different time intervals 2005, 2010 and 2015 was done. A Z-score test for two population sample was used to determine whether there was any significant difference in the proportions. A p-value ≤ 0.05 was considered significant for all tests performed.

1.7 ETHICAL CONSIDERATIONS

1.7.1 Permission and informed consent

Legal authorisation: The PURE study gained permission from the North-West Department of Health. Ethical approval was obtained from the Health Research Ethics Committee of the North-West University (Potchefstroom Campus) for the period January 2005 to December 2009 (ethical number 04M10) as well as for the period 2010 to December 2015 (ethical number NWU-00016-10-A1). Extension on the ethical approval was obtained until January 2020 (NWU-00016-10-A1).

Goodwill permission: The PI of PURE made appointments with the mayor of Potchefstroom. During the meetings, the PI fully informed the mayor about the aims of the study and what the possible outcomes and benefits of the study were. The research procedures were also explained and permission was verbally granted to proceed with the planned study. This was done again prior to the 2015 follow-up study as an act of respect.

Participant written informed consent: Informed consent is legally and ethically required before proceeding with any research to determine patients' capacity to understand the risks and benefits of participation in research (Schenker, 2010:1). According to Ployhart (2010:96) a longitudinal study is on-going. To show respect to the participants, the fieldworkers obtained consent from all

current active participants prior to the study. The fieldworkers (mediators) did house visits to each individual at least three (3) months prior to the start of the study. During these visits they informed the participants about the upcoming follow-up study. All of the measurements that were performed on the study day were discussed and explained in full to each individual by the fieldworker; participants were also given an opportunity to ask questions. This process was done in the participant's preferred language (Tswana, English or Afrikaans).

A follow-up visit was done one month prior to the start of data collection. During this visit, the fieldworkers again fully informed the participant about the study and gave them opportunity to ask questions. The participants were given one (1) week to consider further participation within the study. In cases where the participants were illiterate, the process was verbally explained to them and their thumb print taken as substitute for a signature. The fieldworkers then scheduled an appointment for data gathering, that suited the participant, and logistical arrangements were made. At the day of the study, upon arrival, the lead researcher of the day, as appointed by the PI, collected the signed written informed consent forms. Participation was voluntarily and one could withdraw at any time without being penalised (Ray *et al.*, 2010:88).

Anonymity: Each participant was assigned a unique participant number during the initial baseline data collection in 2005. This unique number was used in all stages of data gathering and analyses.

Confidentiality: can be defined as a clear or implied guarantee by a researcher to a respondent in research whereby the participant is confident that any information provided to the researcher cannot be attributed back to that respondent (Stirrat *et al.*, 2010:58). Retrospective analysis of de-identified information was done and data was kept on a password protected computer. De-identified information is information that has been changed to remove certain data elements linked with an individual (Rothstein, 2010:3). Each participant was assigned a unique participant number during the initial baseline data collection in 2005. This unique number was used in all stages of data gathering and analyses.

Direct benefits: There were no direct benefits in this study.

Indirect benefits: Through participating in the PURE study, participants assisted by providing South Africa with a direct estimate of the health or disease burden attributable to established and emerging risk factors for non-communicable diseases.

Anticipated risks to the participants and precautions taken: Risk is defined as the potential physical or psychological harm, discomfort or stress to human participants that a research project may cause (Düvell *et al.*, 2010:229). As with any research involving human participants, there is always some form of risk involved. Concluding all of the measurements during data collection

usually took approximately the whole day, which might have been very exhaustive for some participants. In order to minimize their discomfort participants were provided with a lunch as well as tea / coffee / juice / water throughout the duration of the day at the seating / waiting area.

Expertise, skills and legal competencies: High quality research depends on researcher's competence, skills and expertise (Schrader & Shiri, 2011:3). All of the researchers and assistants (nurses, anthropometrics, counsellors and postgraduate students) that were part of this study were all experienced in their fields and all staff members were standardised in terms of data collection and completion of questionnaires prior to the study. Key staff (PI, coordinator, and nutritionists) attended initial training and they in turn trained local staff. The fieldworkers were re-trained intensively every time prior to any form of data collection, inter alia on all the procedures of the study, in order to give the participants a comprehensive overview of what will be expected of them on the day of the study.

Reimbursement of study participants: Individuals from resource-constrained settings are marginalized in deciding their fate and desires for their participation in research studies (Mduluzi, 2013:2). Therefore, participants were conveyed by transport provided by the research study (North-West University) and there were no travelling expenses. Breakfast was provided to the participants. Furthermore, in order to complete all of the measurements and questionnaires, participants were supposed to be at the research facility approximately the whole day, thus, lunch was also provided. Tea / coffee / juice / water were available throughout the day. Participants were financially remunerated with the amount of R50.00 (fifty rand) per day for any expenses or loss of income incurred due to their attendance at the study.

1.7.2 Data management

Storage and archiving of data: Properly storing data is a way to safeguard research investment (Langer, 2011:203).

Hard copy data: All hard copies were stored in a locked office within the Africa Unit for Transdisciplinary Health Research (AUTHeR) at the North-West University (Potchefstroom Campus). Since the hard copies contain identifiable data (personal information) of each individual participant, strict access to and control over the hard copies is applied. Hence, only the supervisors had access to the hard copies. The hard copies will be securely stored for five (5) years after the last publication. After five (5) years it will be destroyed according to the North-West University's rules and regulation for data / record management.

Electronic data: Electronic data was stored on a central computer and is password protected. The data set is only accessible to the PI. For research and dissemination purposes, data was

made available to other team members (researchers) via the PI and only upon request. Data was handed to them in a format that contained no personal information regarding the participants (de-identified data set) and thus researchers were unable to identify any participants based upon the data received. All electronic data was backed-up on an external hard drive which is locked up in a cupboard within a locked office at AUTHeR. The building is also access controlled.

1.8 PROPOSED OUTLINE OF CHAPTERS

Chapter 1 Overview of research.

Chapter 2 Literature review.

Chapter 3 Manuscript.

Chapter 4 Evaluation and recommendations.

1.9 SUMMARY

Urbanisation has brought new challenges in terms of violence and injuries in South Africa (McIlwaine, 2013:7). According to Norman *et al.* (2010:2) injuries related to violence have contributed to a high disease burden in South Africa as compared to other parts of the world. There appears to be significant research on the real and perceived costs and consequences of violence and injuries across South Africa but much of the research continues to be segmented and embedded within certain disciplines and geographic settings. There is a gap in literature regarding violence and injuries in urban areas. This sub-study of a Prospective Urban and Rural Epidemiological (PURE) study explored the different forms of violence and injuries in an urban area in the North-West Province over a 10-year period. A discussion on the way forward and the role of different partnerships at all levels to develop effective responses summed up the issues raised.

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CHAPTER 2: LITERATURE STUDY

2.1 INTRODUCTION

Urban-related violence and injuries have hitherto been an important concern for local governments and policy makers (World Bank, 2011:1). With the increased urbanisation of the last decade, this issue has become even more pressing. Today more than half of the world's population now lives in urban areas (Zhang, 2015:241). Urbanisation implies considerable changes in people's lifestyle, their sources of income, the food which they eat, and the wide range of environmental factors to which they are exposed (Reardon *et al.*, 2014:2). There is an underlying assumption that urban residents have healthier lifestyles than their rural counterparts (Gu *et al.*, 2015:500). However, this is not always true. Research has shown that in the urban areas violence and injuries have become endemic phenomena with a negative impact on people's health (Imbusch *et al.*, 2011:87). There is a need for public health practitioners to identify and document the different forms of violence and injuries that exist in urban communities, especially the hidden forms of violence like, intimate partner violence (Folami, 2013:2), child abuse (Annerbäck *et al.*, 2012:590) and elder abuse (Thomson *et al.*, 2011:2). Identifying the risk factors of these patterns and establishing the scope for intervention is very important.

2.2 DEFINING 'URBAN'

There is no standard definition of 'urban' worldwide (Ramalho & Hobbs, 2012:2), and most countries define urban according to criteria pertaining to some characteristic of a region's population, economy or built infrastructure (Seto *et al.*, 2011:2). There are however, some elements which most countries apply in defining 'urban' which often include demarcated geographic zones of dense human settlement and an occupational element which recognizes the concentration of employment in secondary and tertiary industries (Goodall, 2013:20). In the Prospective Urban and Rural Epidemiology (PURE) study an urban area is characterised by large and medium sized cities (>300,000 individuals), employment in secondary industries, geographically defined middle class housing areas, and defined township dwellers (Teo *et al.*, 2009:5). In South Africa (SA), a township is defined as a segregated residential settlement for blacks, located outside a city or town (McConnachie & Shackleton, 2010:245).

In SA, Apartheid made the problems of urbanisation more complex (Nhlapo *et al.*, 2011:49). For generations, urbanisation of black people was difficult because they were forced to live far from the main cities (Todes *et al.*, 2010:332). As employment opportunities remained in the "white" cities, many black men, moved to the cities in search of work, leaving their families behind (Camlin *et al.*, 2014:529). In addition, pass laws made it illegal for black people to live in the "white" cities

(Setswe, 2010:7). Their illegal status prohibited them from getting decent accommodation so they often lived in townships (Lorraine & Molapo, 2014:900). With the lifting of racial boundaries on where people may live and work, many people migrated to major cities in search of employment, bringing their families with them (Reed, 2013:74). The shortage of accommodation in cities forced them to live in townships (Viljoen & Sekhampu, 2013:732). Separation of families created many social and economic problems. The socio-economic and political changes led to a situation where for many people violence is the first strategy for resolving conflict or expressing their discontent (Norman *et al.*, 2010:1).

2.3 RISK FACTORS FOR VIOLENCE AND INJURIES IN URBAN AREAS

Identifying factors that increase the likelihood of the occurrence of violence and injuries in urban settings is paramount when it comes to establishing the scope for interventions. Some of the identified risk factors for violence and injuries in urban areas include:

2.3.1 Competition for resources

Urbanisation increases competition for scarce resources, particularly land, water and housing. In various cities conflict over land has ascended into violent unrest (Connell, 2011:121). Rapid growth of cities is contributing to the disorganised development of slums, in which overcrowding and competition for scarce resources combine with weak state security promote criminality and violence (World Bank, 2010:15). According to the United Nations Environmental Program (UNEP) (2009:8), the continued global increase in population growth and rise in demand for resources will lead to intensified conflict over natural resources in the coming decades. In Brazil, organised unlawful land grabs are occurring between ethnic groups and political parties who are competing for land control (Toohey, 2012:73). In Asia, India had a population of 1.19 billion people in 2010, with 30% of this population living on less than \$0.56 per day in urban areas. Yet, in 2012, there were 48 Indians on Forbes' list of billionaires (Mohan & Sahni, 2012:11). This Income inequality is a leading indicator for social unrest in India (Mohan & Sahni, 2012:11).

2.3.2 Deprivation and non-accessibility

In urban settings, deprivation (which in itself is a form of violence) encompasses lack of access to basic social services and lack of universal state security protection (Sutherland *et al.*, 2013:5). It also includes severe corruption, inefficiency of governments, differences in income and brutality that normally affect the poor the most is a major risk factor for violence (Sutherland *et al.*, 2013:5). According to Pinchevsky and Wright (2012:113), living in neighborhoods with relative deprivation or concentrated poverty increases the likelihood of committing or being the victim of violence. In Cape Town, SA, the highest prevalence of homicide was recorded in the relatively poor sub-districts of Nyanga (132 per 100,000 population) and Khayelitsha (120 per 100,000 population).

This is twice the citywide average of 66 per 100,000 and three times the city centre prevalence (Groenewald *et al.*, 2010:2). These areas are characterised by inadequate housing and poverty conditions that increase the risk of violence and injuries (Todes *et al.*, 2010:332). Rapid urbanisation forced many people to live in townships, on the periphery of cities in SA (Turok, 2014:7).

2.3.4 Urban infrastructure and governance

Urban infrastructure and governance are also among contributory factors to urban violence and injuries (Fox & Beall, 2012:974). In Sub-Saharan Africa, this rapid urbanisation is not correlating with economic growth and transformation (Hove *et al.*, 2013:2). Urban infrastructure, particularly in South Africa, is inadequate to meet the growing demands of urbanisation (Okeke, 2014:4) and has produced conditions conducive to social unrest and violence (Buhaug & Urdal, 2013:3). The available infrastructure is overburdened, creating unsubstantiated living conditions for people who do not have stable accommodation and incomes (Okeke, 2014:4). Protests and riots motivated by basic commodities price hikes, and general frustration with corrupt and incompetent governments have become routine in the country (Mbazira, 2013:252). Corruption is endemic in South Africa, and the poor have to bear the consequences because they do not have the means to compete with those who can afford to pay bribes for services (Pillay, 2014:31). Corruption has tightened the shackles of poverty and caused underdevelopment particularly in SA townships (Jürgens *et al.*, 2013:258). This has kept SA in circles of violence and crime.

2.3.5 Politics

Present-day political violence is part of everyday urban violence (Moncada, 2013:220). Urban violence has a perverse political and policy impact (World Bank, 2010:1). Political violence in urban areas can be perpetrated by gangs of armed people acting with the aim of challenging the authority of a government to control legitimate use of violence within its borders (Fox & Hoelscher, 2012:443). Urban areas offer the opportunity for political and economic actors to mobilise groups for violent acts (World Bank, 2010:24). People who finance violence are based in urban areas for the visibility and for easy access to recruits in urban areas (Rankin, 2012).

2.3.6 Change of ethnic composition due to migration

The changing ethnic composition of cities due to migration contributes ethno-political violence (Hinds, 2014:2). Intensifying conflict between political opponents, coupled with the migration of radical groups are key determinants of violence in urban areas (Raleigh, 2014:254). Ethno-political violence is a deliberate political strategy by distressed groups intending to effect change in the political system that deprives them (Hadi, 2013:7). Ethno-political violence results from

unequal distribution of land and state resources, corruption, extreme poverty in townships, unemployment, and irresponsible leadership (Tarimo, 2010:298). In SA the ethnic tensions that had lingered for so long during apartheid exploded into widespread violence (Huber, 2013:2). During apartheid black people were systematically excluded from political, social, and economic development as a result of perceptions of superiority on the part of the whites (Mhlauli and Mokotedi, 2015:205). For generations, urbanisation of black people was difficult because they were forced to move to townships where they lived as people of different ethnicity (Todes *et al.*, 2010:332). The resulting influx of black people of different ethnicity residing in the same townships led to violence (Abrahams, 2010:500).

2.3.7 Weak social ties

Social ties (people's connections that enable sharing of experiences, information, feelings, and knowledge) (Tilly, 2015:13) may also help transmit cultural values which approve or disapprove of violence between residents in a given community (Lee & Ousey, 2011:40). Cultural norms reflect a common set of rules and values that govern a community (Ostrom, 2014:15). These values may either increase or decrease the acceptance of violence within neighbourhoods and may consequently mediate the influence of ethnic diversity, and residential instability on violence (Pinchevsky & Wright, 2012:113). Research has shown that violence in neighbourhoods can stem from social cultural isolation whereby residents living in relatively deprived neighbourhoods have limited contact with others from mainstream society, and this weakens the community's antagonism to violence (Wright & Benson, 2010:483). In SA, urbanisation played a key role in social change. Social ties between individuals and groups, particularly the connections between migrants and their families were affected (Reed, 2013:74). Ubuntu, the traditional African philosophy of having a sense of humanity and sharing and the comfort and dignity they need was affected by urbanisation (Kamwangamalu, 2013:14). Absence of strong social ties is among the other risk factors for violence in SA townships (Langa *et al.*, 2016:42).

2.3.8 Lack of legal status and documentation

Lack of legal status and documentation, mainly for refugees and internally displaced persons (IDPs), leaves them vulnerable to violence (Hinds, 2014:2). IDPs experience specific forms of deprivation, such as loss of shelter, and often face particular protection risks (Ferris & Winthrop, 2010:9). These risks may encompass armed attack and family separation while fleeing in search of safety, heightened risk of sexual and gender-based violence (Powell, 2015:143). Since the end of Apartheid, South Africa has attracted millions of migrants fleeing political and economic turmoil in their home countries (Rwodzi, 2011:2). For many people, crossing a border can be a sign of hope and opportunity and an escape from oppression and hopelessness (Neocosmos, 2010:4).

In the process of crossing borders, defining and claiming rights, there are social and political struggles over the occupation of migrant spaces (Dodson, 2010:7). Attaining citizenship is not always definite, and inevitably there is race or ethnic discrimination (Nyamnjoh, 2010:67).

2.3.9 Power struggles

Power struggles and participation in institutional violence is one of the most major aspects of urban violence and consequently injuries (World Bank, 2010:24). Some state, private, community and criminal groups and institutions in many cities in SA are involved in fighting for social and economic power within communities also at times uniting in the commission of certain violent acts (Alexander, 2010:25). For example, the case at Marikana mine in August 2012 when 10 mine workers were murdered in intra-union violence, followed by the massacre of 35 striking mine workers by state police (Holdt, 2014:130). There have also been a significant number of civic protesters shot dead by police forces over the past several years (Dixon, 2015:1131).

2.3.10 Mass media

Mass media plays a significant role in reflecting, shaping, and possibly distorting public opinions of the use of violence (Murambiwa, 2011:7). Mass media sensationalises insecurity in a community (Easteal *et al.*, 2015:104). A climate of fear and a strong feeling of vulnerability can be created in the community (Okoro & Chukwuma, 2012:48). Increased fear or insecurity can lead to a growing disposition to carry weapons, violent police behaviour and support killing of human beings and therefore can contribute to the persistence of violence in communities (Martinez, 2014:12). On 26 November 2008, terrorists attacked an urban area in India (Mumbai). The attack is now popularly known as 26/11 (Neelamalar *et al.*, 2009:95). In an effort to give full coverage of the terrorist attack, the media freely advertised the needs of terrorists and this sensationalised fear in the minds of people (Neelamalar *et al.*, 2009:104). Inevitably the media satisfied the terrorist's needs, this could encourage them to continue with the attacks in the future. In another recent study conducted in India on the association between mass media and violence, it was reported that exposure to mass media is associated with abusive behaviour towards one's spouse (Bhattacharya, 2016:1).

2.4 FORMS OF VIOLENCE IN URBAN SETTINGS

Urban areas exhibit multiple forms of violence and injuries because they are centres of social, political, and economic power (World Bank, 2010:23). Urban violence, ranges from gender based violence, abuse, intimate partner violence, common violence which encompass stranger assault or small-group violence within the community; to violence perpetrated by an organized armed group with a criminal or political agenda (Urdal & Hoelscher, 2012:524). Violence and injuries are

a major public health problem in urban areas, yet a lack of understanding of their serious lifelong consequences and of the cost and burden on society has hampered investment in prevention policies and programs (Imbusch *et al.*, 2011:87). It has therefore paramount to understand the dynamics of violence and injuries urban settings.

The World Health Organisation (WHO) defines violence as “*The intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community that either results in or has a high likelihood of resulting in injury, death, psychological harm, mal-development, or deprivation.*” (WHO, 2012:5). This definition encompasses a wide range of outcomes including psychological harm, deprivation and mal-development (Sajid *et al.*, 2010:98). Researchers and practitioners are recognising that violence does not always result in injury or death, but that it still puts a significant burden on individuals, families, communities and health care systems globally (Chandran *et al.*, 2011:121). Normally violence is classified into three broad categories: self-directed violence; interpersonal violence and collective violence (WHO, 2014:1). This is to differentiate between violence a person inflicts upon themselves, violence inflicted by another person or by a small group of people, and violence inflicted by bigger groups such organised political groups, militia groups, terrorist organisations and states (Merson *et al.*, 2011:407). The three categories are divided further to show more specific types of violence.

2.4.1 Self-directed violence

According to the Centre of Disease Control (CDC) (2014a:11) self-directed violence (SDV) covers a range of violent behaviours, including acts of fatal and nonfatal suicidal behaviour, and non-suicidal behaviour intentional self-harm (behaviour's where the intention is not to kill oneself). A myriad of stressful circumstances in life can heighten people's risk of harming themselves (Shek & Yu, 2012:2). This can be loss of loved ones, scarce food supply, conflicts within families and adverse health outcomes (Swahn *et al.*, 2012:597). However, suicidal ideation and behaviour can be precipitated by the factors mentioned though; they must happen to someone who is predisposed. Predisposing factors include: alcohol abuse (Conner *et al.*, 2014:173), history of physical or sexual abuse in childhood (Hawton *et al.*, 2012:2375), social isolation (Rasmussen & Wingate, 2011:137), psychiatric problems such as schizophrenia (Carlborg *et al.*, 2010:1153) and a general sense of hopelessness (Rasmussen & Wingate, 2011:137). In Brazil, self-directed violence is common in societies where there is a low degree of social integration and these societies are more often than not informal settlements in urban areas (Bando & Lester, 2014:1180). Self-directed violence is also a prevalent and complex problem among adolescents and young adults in the United States of America (Swahn *et al.*, 2012a:179).

2.4.2 Interpersonal violence

Interpersonal violence is defined as “the intentional use of physical force or power, threatened or actual, against another person or against a group or community that results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment, or deprivation” (Stoddard *et al.*, 2015:10). There are different types of interpersonal violence which include:

Bullying: is aggressive intimidation that can either be verbal or physical, or both. It can also take the form of coercion where someone is threatened by another person and as a result of those threats, the victim feels intimidated and forced into acting a certain way (Sawyer *et al.*, 2011:1795). Bullying can occur in different settings for instance in schools (Vaillancourt *et al.*, 2010:41), work places (Rhodes *et al.*, 2010:97), home and neighbourhoods (Arseneault *et al.*, 2010:719). Bullying has become a serious problem experienced by many school children and victims of bullying are at risk of psychological and behavioural problems (Waseem *et al.*, 2013:605). Some studies conducted in America indicated that African-American youth living in low income, urban areas experience a fairly high prevalence rate (49%) of physical peer victimisation (Taylor *et al.*, 2013:179). In South America, particularly Brazil, bullying experiences at work are reflected in family life because they intrude into the home (Barreto, 2012:211). A new standard of behaviour is imposed on the whole family, harassing, threatening them and such conditions damage their safety and wellbeing (Azeredo *et al.*, 2015:2).

Abuse: is any incident or pattern of controlling that is physically violent or emotional, or both by person in a position of authority, intimate partner or family member (Sarkis, 2012:1122). Abuse can either be child or elder abuse.

Elder abuse: globally, awareness of the realities of elder abuse is developing (Cadmus & Owoaje, 2012:974). Elder abuse may be intentional or unintentional and just like any other forms of abuse; it may be physical, psychological, and sexual or involve neglect (Bond & Butler, 2013:257). Elder abuse is defined as “a single or repeated act, or lack of appropriate action, occurring within any relationship where there is an expectation of trust which causes harm or distress to an older person” (International Network for the Prevention of Elder Abuse [INPEA], 2009). China has the biggest population of elderly people when compared to the rest of the world and is experiencing a rapid growth in the population of older people living alone in urban areas (Tong *et al.*, 2011:350). Studies have shown that social exclusion is among the social determinants of health (Walton & Cohen, 2011:1447). This is reflected by depressive symptoms which are more common among older people living alone than those who do not live alone (Tong *et al.*, 2011:351).

Child abuse: refers to all forms of physical and/or emotional “*ill-treatment, sexual abuse, neglect or negligent treatment or commercial or other exploitation, resulting in actual or potential harm to the child's health, survival, development or dignity in the context of a relationship of responsibility, trust or power*” (WHO,1999:15). Between 500 million and 1.5 billion children are estimated to experience abuse every year (Gray, 2013:8). Child abuse is a persistent problem in the United States responsible for substantial morbidity and mortality (Mattingly & Walsh, 2010:1). In 2013, approximately 1,520 children died of abuse and neglect at a rate of 2.04 children per 100,000 children in the national population (United States Department of Health & Human Services [USDHHS], 2013).

Sexual violence: is any type of sexual activity that a person does not consent to (Hossain *et al.*, 2010:2442). Sexual violence also includes non-contact acts which are sexual in nature, such as voyeurism and sexual harassment (Schönbucher *et al.*, 2011:1). For an act to qualify as sexual violence it has to be committed against someone who is unable to consent or refuse, for instance because of age, disability, misuse of authority, threats of violence or incapacitation due to drugs or alcohol (CDC, 2014b:1). Sexual violence is a public health problem known to have a negative impact on a significant number of people in the United States each year (Breiding *et al.*, 2015:1), not only by way of immediate injuries but also through negative long-term health impact (Santaularia *et al.*, 2014:1).

Intimate partner violence (IPV): refers to physical, sexual or psychological harm by a current or former partner or spouse (Ouellet-Morin *et al.*, 2015:2). This type of violence can occur among heterosexual or same-sex couples and does not require sexual intimacy. According to Argento *et al.* (2014:1) approximately 60% of women worldwide will experience physical and/or sexual violence in their lifetime, most commonly from their intimate partners. It has been realised that there are some aspects of the urban environment which appear to be linked to the incidence of intimate violence intimate partner violence (Cunradi *et al.*, 2011:192). Some of the aspects include neighbourhood social disadvantage, such as proportion of households living below the poverty datum line, high levels of unemployment in an area and high concentration of bars, taverns, shebeens increase the likelihood of IPV risk (Charman *et al.*, 2014:33). High concentration of alcohol outlets within a neighbourhood may indicate loosened regulating constraints against violence, promote alcohol abuse among at-risk couples; and provide environments where groups of individuals at risk for IPV may form and mutually reinforce IPV-related attitudes and problem behaviours (Pitpitan *et al.*, 2013:295).

Gender based violence (GBV): is one type of behaviour considered to be rooted to some extent in dysfunctional social norms pertaining to relationships among men and women (Paluck *et al.*,

2010:3). For instance, norms governing violence against women portray typical or expedient ways to treat women (Igbellina-Igbokwe, 2013:1). Gender-based violence occurs within the context of women's subordinate status in community, and serves to maintain this unequal balance of power (Wamue-ngare & Njoroge, 2011:1). Gender-based violence can also be referred to "violence against women" although the latter is a more limited concept (Paluck *et al.*, 2010:3). Acts of gender-based violence may result in physical, sexual or psychological harm or suffering to women, including women who are members of a society where the norms applies (Logie *et al.*, 2011:2).

2.4.3 Collective violence

Collective violence refers to probable motives for violence committed by people who identify themselves as members of a group against another group or set of individuals, in order to achieve political, economic or social goals (Durrant, 2011:429). Collective violence can be committed by states in order to achieve political, economic or social goals (Goodwin, 2012:1). In this case, it encompasses war, terrorism and violent political conflict between or within states, genocide, torture, systematic abuses of human rights and organised violent crime such as gang warfare (Durrant, 2011:429). It may include all categories of violence, be these physical, sexual, psychological, or characterised by neglect or discrimination (WHO, 2012:5).

Collective violence has become a major problem in China (Lin, 2010:81). Rapid urbanisation in China has made the construction industry to consume half of the world's concrete and a third of its steel and creating employment for more than 40 million people, most of them rural being workers coming from all over the country (Ngai & Huilin, 2010:144). Despite the huge profits and output value of the construction industry, construction workers are poorly protected as regards physical and financial risks, compared some other workers (Friedman & Lee, 2010:513). The lives of construction workers are also extremely affected and collective violence is now a common (Pun & Xu, 2015:9).

Gang violence: refers to acts of aggression, violence and criminal activity committed by a group of peers where the group normally has an identity for example a name; a sign or neighbourhood (Wood & Alleyne, 2010:101). In some neighbourhoods, the pressure to join a gang occurs early and can be very difficult to resist (De La R   & Espelage, 2014:253). Members often join to feel a sense of belonging and to achieve power and respect (Wood, 2014:1). On the other side, members may get concerned about their own safety and fears of being abused by others within the gang (Owen & Greeff, 2015:1). Gang related violence is also a reality in Russia. In a study that was conducted by Stickley and Razvodovsky (2012:257), it was revealed that consumption of distilled spirits was associated with gang related homicide. In order to reduce such violence,

they recommended that alcohol policy should focus on shifting the beverage preference from distilled spirits and reducing consumption in general (Stickley & Razvodovsky, 2012:261).

2.5 LINK BETWEEN VIOLENCE AND INJURIES

Injuries are usually grouped according to two broad categories: intentional and unintentional (Muriu *et al.*, 2015:1076). Conventionally, intentional injuries encompass interpersonal violence (spousal abuse, child abuse, other assaults), self-inflicted injuries (attempted and completed suicides), as well as collective violence and war-related injuries (Mendes *et al.*, 2011:835). Road traffic injuries, burns, falls, drowning, and other injury classifications in which intentionality is understood to be absent make up the broad unintentional injuries category (Juillard *et al.*, 2011:2). However recent studies point to a cluster of shared risks across intentional and unintentional injuries (Rockett *et al.*, 2012:e84). Furthermore, intentionality cannot always be determined in particular situations and violence may indirectly contribute to the prevalence of unintentional injuries (Norton *et al.*, 2011:407).

2.6 FORMS OF INJURIES

Several studies examining different types of injuries provide some information regarding urban disparities (Kim *et al.*, 2012:264; Joseph *et al.*, 2015:296, Sherriff *et al.*, 2015:75). An analysis of data from a multi-national study by Williams *et al.* (2015:9) which included low and middle income Countries (LMIC), (China Russia, India and South Africa), confirmed that people in urban areas experience a higher rate of injuries than their rural counterparts. To ensure the long-term development of the injury prevention, programmes in urban areas focus should be on developing systems that record the magnitude of the different forms of injuries. Some of the different forms identified include:

2.6.1 Unintentional injuries

Generally, injuries are a serious epidemic, resulting in more than 5 million deaths worldwide every year and equalling the fatalities from HIV, malaria and tuberculosis combined (Sverdlik, 2011:138). The global rate of unintentional injuries is 61 per 100,000 population per year (Chandran *et al.*, 2010:1) and road traffic injuries make up the largest proportion of unintentional injury deaths 33%. Road traffic injuries (RTIs) are a major cause of morbidity and mortality in low and middle income countries where their burden may only increase unless appropriate action is taken (Bidgoli *et al.*, 2011:879). Unintentional injuries are common in low and middle income countries' informal settlements, mainly due to the physical hazards concentrated there (Sverdlik, 2011:138). Ironically in the urban areas of USA injury from self-directed violence is a major public health problem (Swahn *et al.*, 2012b:179).

In Sub-Saharan Africa road traffic injuries are a leading and increasing contributor to regional and global disease and injury burden (Chisholm *et al.*, 2012:1). Road traffic deaths are severely underreported in most sub-Saharan countries (World Bank, 2014:7). A study conducted in South Africa of pedestrian involvement in collisions in urban areas found that more than half (56.7%) of the people involved were mostly males in their prime age, between 20 and 44 years of age (Chen, 2010:249). Pedestrians comprise 44% of road deaths in sub-Saharan Africa, significantly more than the global average of 35% (World Bank, 2014:7). The rate of pedestrian mortality in Western Sub-Saharan Africa (SSA) only is 8 times the rate in Western Europe (WHO, 2012). The long term consequences of the crashes include the funeral expenses, the cost for medical treatment, rehabilitation, and the loss of family breadwinner which is devastating and may push family into poverty (Negash, 2015:24).

2.6.2 Intentional injuries

The 2010 Global Burden of Disease study reported that self-inflicted intentional injuries have increased by 23.8% between 1990 and 2010 in all ages (Seattle, 2013:1). Intentional injuries are injuries resulting from interpersonal or self-inflicted violence. In SSA intentional injuries are a growing but neglected epidemic which contributes significantly to the global injury burden (Juillard *et al.*, 2011:2). A study that was conducted in an urban area in Tanzania reported that majority of intentional injuries comprised of interpersonal violence whereas self-inflicted injuries (attempted and completed suicides) occurred in 2.3% of the cases (Chalya & Gilyoma, 2012:4). Alcohol was found to be a risk factor for in all the reported cases. In the USA, Self-harm is a prevalent and multifaceted problem that mainly affects adolescents and young adults. Approximately 70% of adolescents involved in repetitive self-harm also attempt suicide (Swahn *et al.*, 2012a:179).

2.7 VIOLENCE AND INJURIES IN URBAN SOUTH AFRICA

In SA violence has become the normative and accepted strategy for resolving conflict (Norman *et al.*, 2010:1). This is the result of many decades of social injustice and political violence including state-sponsored violence (Shabangu, 2011:8). The political transition has seen a decrease in political conflict but exceedingly high levels of interpersonal violence remain, fuelled by rapid urbanisation and on-going economic disparities (Makanga *et al.*, 2015:3). Injuries directly related to interpersonal violence are also increasing, causing approximately 27 563 deaths in the country (Bola *et al.*, 2015:1). SA has a high homicide rate which is more than seven times the global average, placing SA among the most violent countries in the world (United Nations Office on Drugs and Crime [UNDOC], 2013:1). Homicide is the leading cause of fatal injury in males in urban areas of SA (Suffla, 2015:47). According to Matzopoulos *et al.* (2015:304) approximately half of all injury-related deaths in SA are intentionally inflicted. In another study by Schuurman *et*

al. (2015:4), a high prevalence (51%) of violence-related injury particularly in males was recorded and alcohol was found to be the main risk factor in both the victim and perpetrator of violence.

Injuries are truly a health issue in SA, where unintentional injuries are a leading cause of disability and mortality among children (Pretorius & Van Niekerk, 2015:35) and adult people in SA (Van Niekerk *et al.*, 2010:A272). The two groups are susceptible to unintentional injuries like burns, falls and drowning and pedestrian injuries (Swart *et al.*, 2015:34). People living particularly in South African townships generally experience high rates of mortality and morbidity due to injuries (Swart *et al.*, 2015:29). The risk of injuries is increased by their exposure to adverse environmental circumstances, and individual capacities which can be affected by age (Beard & Montawi, 2015:6).

Collective violence is also a reality in urban areas of SA (Abrahams, 2010:500). Communities are with increasing frequency mobilising and engaging in protest to raise demands for jobs, social services and consultation (Mbazira, 2013:265). Violence acts include setting up burning barricades and engaging in running battles with police, burning down symbols of governmental authority, attacking homes of targeted local councillors, and looting shops owned by foreign nationals (Von Holdt, 2013:599). The growing presence of foreign nationals in the informal sector has created various tensions in SA, including in government circles (Charman & Piper, 2012:83). South African competitors have gradually adopted a strategy of using collective violence to intimidate and drive migrant entrepreneurs out of SA (Von Holdt, 2013:599).

2.8 Violence, injuries and health outcomes in urban areas

There is increasing awareness that our health and the environment in which we live, are inextricably linked (Lang & Bird, 2015:110). A wide range of physical, social and economic determinants affect the health of urban dwellers (Alirol *et al.*, 2011:131). This is because health is considered as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1948). The interrelatedness of the physical, social, psychological and environmental factors contribute to the overall health-related quality of a person's life (Edlin & Golanty, 2014:3). The natural and built environment affect the health of urban dwellers through geography, climate, housing quality, sanitation systems, air quality, infrastructure and transportation systems (United Nations Human Settlements Programme [UN-HABITAT], 2014). The social and economic environment including access to economic and educational opportunities, safety and security has a major impact on the health of urban residents (de Snyder *et al.*, 2011:1184). In the urban environment, violence and injuries are, amongst other factors, a growing problem with a negative impact on peoples' health (Imbusch *et al.*, 2011:87).

Where there is violence and injuries, people's participation in matters relating to their health is limited and their well-being damaged (Tol *et al.*, 2010:116).

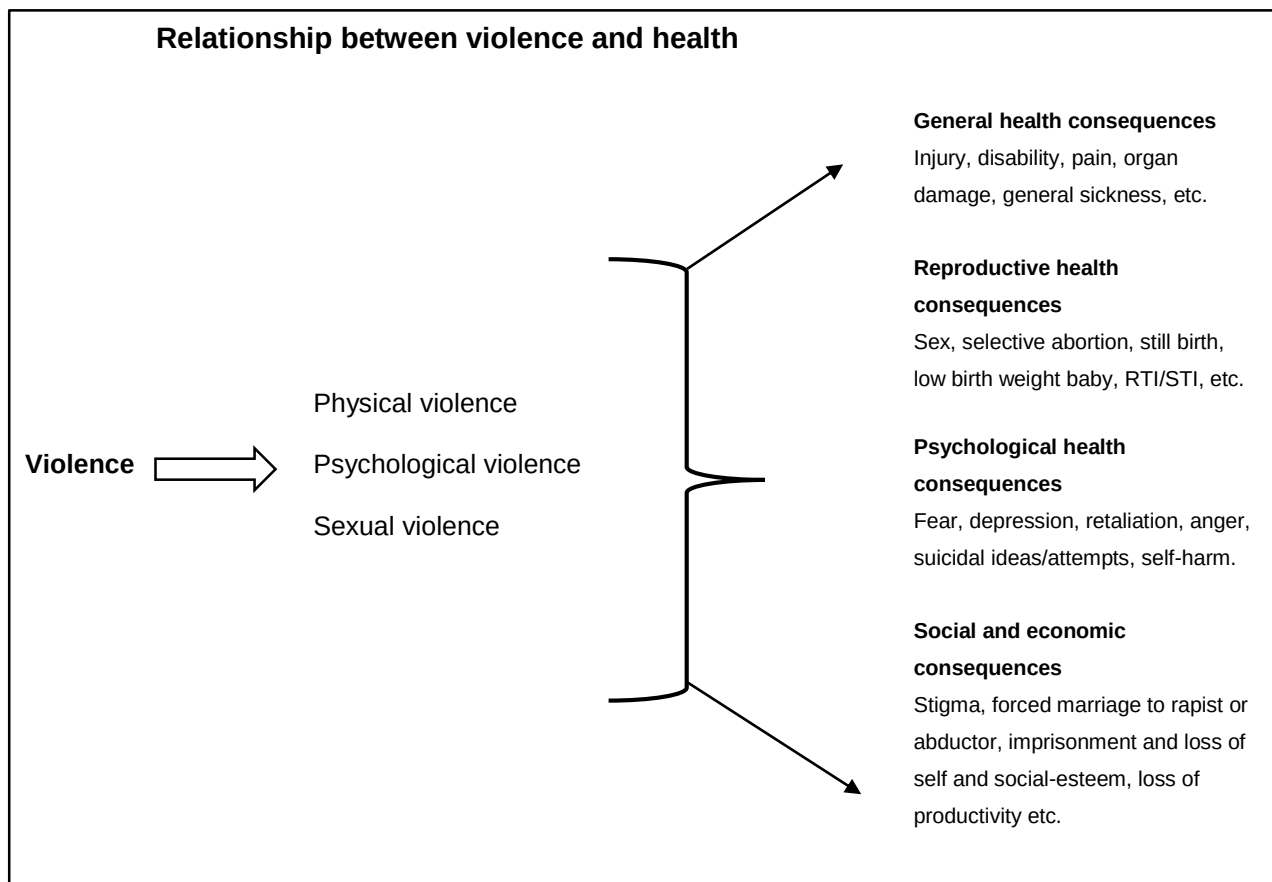


Figure 2.1: The relationship between violence and health (adapted from Mahaptaro, 2015)

2.8.1 General health consequences

Interpersonal violence (sexual, physical and emotional) is recognised as a public health issue which adversely affects mental and physical health (Eriksen *et al.*, 2015:595). Violence can cause significant physical injury to victims, which in the worst cases can be fatal or leave victims with permanent disabilities or deformities (Höllwarth, 2013:4). A study that was conducted in an urban setting in SA revealed high incidence rates of non-fatal injuries due to interpersonal violence. Amongst these were gunshot wounds which accounted for the majority 38.2% followed by motor vehicle accidents 25.5%, falls 21.8%, and lastly burns 1.8% (Bowman *et al.*, 2014:57). This is also true in the United States of America, where millions of people, mostly women, suffer interpersonal violence related injuries every year, ranging from relatively minor injuries to disfigurement, permanent disability and death (Black, 2011:2). Apart from immediate injuries, violence has far reaching consequences (Fanslow & Robinson, 2011: 37). People who leave their abusive partners and believe they can move can still face high rates of chronic health problems affecting: cardiovascular system, gastrointestinal system, musculoskeletal system and

reproductive system in the future (Black, 2011:2). A history of IPV has been reported to be associated with several chronic health conditions which include hypertension, asthma and diabetes (Norman *et al.*, 2010:2). The link is clearly shown in Figure 2.

2.8.2 Psychological health consequences

According to several studies (Hinsberger *et al.*, 2016:5; Atwoli *et al.*, 2013:3; Bach & Louw 2010:29; Calitz *et al.*, 2014:19), more than 50% of people living in urban areas in SA have been victims or have witnessed someone being assaulted. Given the prevalence of urban residents' exposure to violence, researchers have recently attempted to identify the potential consequences of such exposure for peoples' psychological well-being. For example, Tsai *et al.* (2016:2) found that women who had experienced violence (IPV) reported a high level of depression. Zacarias *et al.* (2012:500) conducted a study in Mozambique and reported that women exposed to violence (IPV) had high levels of depression, posttraumatic stress, and somatization. More recent studies indicate a multifaceted relationship between IPV and depression, suicide attempts, and other common mental disorders (Witt *et al.*, 2014:64; Ludermir *et al.*, 2014:29). The WHO (2014) reported an association between sexual abuse and suicidal behaviours in women. This is because traumatised people suffer stress which causes isolation and fear, which might in turn lead to depression and suicidal behaviour (Stevens, 2013:942).

2.8.3 Reproductive health consequences

"Women and men who experienced sexual abuse involving intercourse as children are over twice as likely to attempt suicide than their peers who were not abused" (WHO, 2014).

The International Conference on Population and Development (ICPD) defined reproductive health as: *"a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes. Reproductive health therefore implies that people are able to have a satisfying and safe sex life and that they have the capability to reproduce and the freedom to decide if, when and how often to do so. Implicit in this last condition are the right of men and women to be informed and to have access to safe, effective, affordable and acceptable methods of family planning of their choice, as well as other methods of their choice for regulation of fertility which are not against the law, and the right of access to appropriate health-care services that will enable women to go safely through pregnancy and childbirth and provide couples with the best chance of having a healthy infant"* (United Nations, 1994). The realities of urban settings

conducive to violence and injuries defy one of the five pillars of the ICPD, which is health.

Gender-based violence hinders women's ability to participate in matters concerning their reproductive health, and damages their wellbeing (Tol *et al.*, 2010:116). According to a multi-country study on women's health and domestic violence by Stöckl *et al.* (2014:10), women of reproductive age report higher rates of IPV as compared to women in other age groups. The most reported issues specific to violence and reproductive health, include pregnancy, pregnancy outcome, termination of pregnancy, pregnancy intention and use of contraceptives (Pallitto *et al.*, 2013:5). Intimate partner violence during pregnancy increases the risk of low birth weight, injury to the unborn baby and preterm birth (Hill *et al.*, 2016:270-275). In addition, women who are victims of IPV are more vulnerable to sexually transmitted infections (STIs) compared to women in non-violent relationships (Hess *et al.*, 2012:1). This is because violence limits women's ability to protect themselves from STIs (Johnson *et al.*, 2014:1), and women living with HIV in particular often face stigma and abuse in communities (Grodensky *et al.*, 2015:12). Stigma has penetrated attitudes toward people receiving sexual and reproductive health services, and at times it is the service providers who stigmatise in health care settings (Cook & Dickens, 2014:89). Figure 2.2 shows the potential pathways linking IPV with reproductive health.

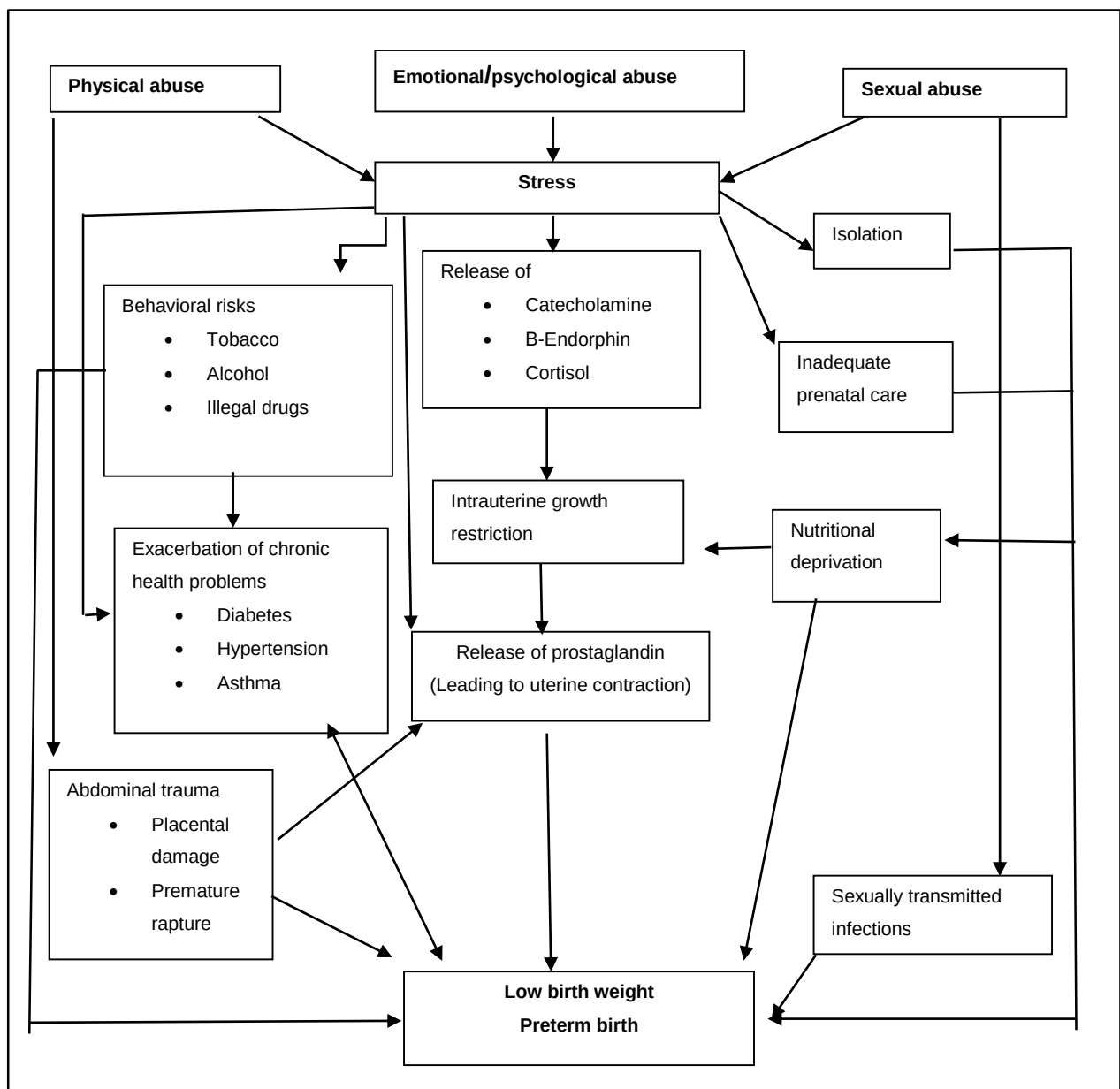


Figure 2.2: Potential pathways linking IPV with reproductive health (adapted from Hill *et al.*, 2016:274)

2.9 VIOLENCE AND INJURIES PREVENTION IN URBAN AREAS

Violence and injuries prevention entails reducing factors that put people at risk for perpetrating violence, and promoting factors that safeguard people at risk for violence (WHO, 2012:2). For violence and injuries prevention programmes to be effective they should focus on the different forms of violence from an ecological perspective i.e. individual, relationship, community, and society (Haegerich *et al.*, 2014:68).

2.9.1 Socio-ecological model to map the complexities of violence and injuries in urban areas

Bronfenbrenner's social ecological model (Bronfenbrenner, 2009:1) is widely used for developing interventions for the prevention of violence and injuries (Figure 1). The model explores the association between individual and contextual factors and considers violence as the product of multiple levels of influence on behaviour (Boxer *et al.*, 2013:164). According to Kim (2012:396) violence and injuries result from the multifaceted interaction of individual, relationship, social, cultural and environmental influences. Understanding how these influences are related to violence and injuries is paramount from a transdisciplinary health approach when it comes to averting violence and injuries.

Bronfenbrenner's social ecological model provides a means of determining and understanding the complexities involved in the pathways to violence and injuries (Williams & Nelson-Gardell, 2012:54). It is a conceptual framework that includes both the individual and sociological pathways to violence and injuries within a broader and diverse environment (Osulah, 2014:13).

There are four different but relating embedded levels in the model and within each level are factors that shape the individual (Hong & Espelage, 2012:317). The first level focuses on the characteristics of the individual that increase the likelihood of being a victim or a perpetrator of violence (De Wet, 2010:1451). This includes individual experiences such as alcohol use, witnessing violence as a child or being male. The second level explores how proximal social relationships for example, relations with peers, intimate partners and family members increase the risk for violent victimization and perpetration of violence (Chan, 2012:6). The third level examines the community contexts in which social relationships are embedded in such workplaces and neighbourhoods. It also seeks to identify how the characteristics of these settings such as high levels of residential mobility and high population density are associated with violence and injuries (Hong & Espelage, 2012:317). The final level of the social ecological model examines societal factors that influence rates of violence and injuries (Hong *et al.*, 2010:1626). These include cultural norms that support violence as an acceptable way to resolve conflicts (Laisser *et al.*, 2011:1).

The social ecological model describes how to implement health promotion programs and their potential impact, looking at the ways in which factors on multiple levels (individual, community, relationship and societal) influence violence and injuries (Cummings *et al.*, 2010:405). Furthermore, this model can provide a comprehensive framework for incorporating multiple theories, taking into account environment and policy (Golden & Earp, 2012:364). In SA the National Health Promotion Policy and Strategy (NHPPS, 2015-2019) recognises that health

promotion is not only focussed on impacting on individual characteristics, but also upon societal and, community characteristics (DoH [NHPPS], 2015-2019). The NHPPS draws upon one of the principles of the international conference on health promotion (Ottawa Charter), of creating an enabling environment for health (WHO, 1986:1). Health promotion is integrated into all policies, strategies and programmes in order to enable people to have control over the determinants of their health. However, the social and scientific responses to the prevention of violence and injuries remain inadequate.

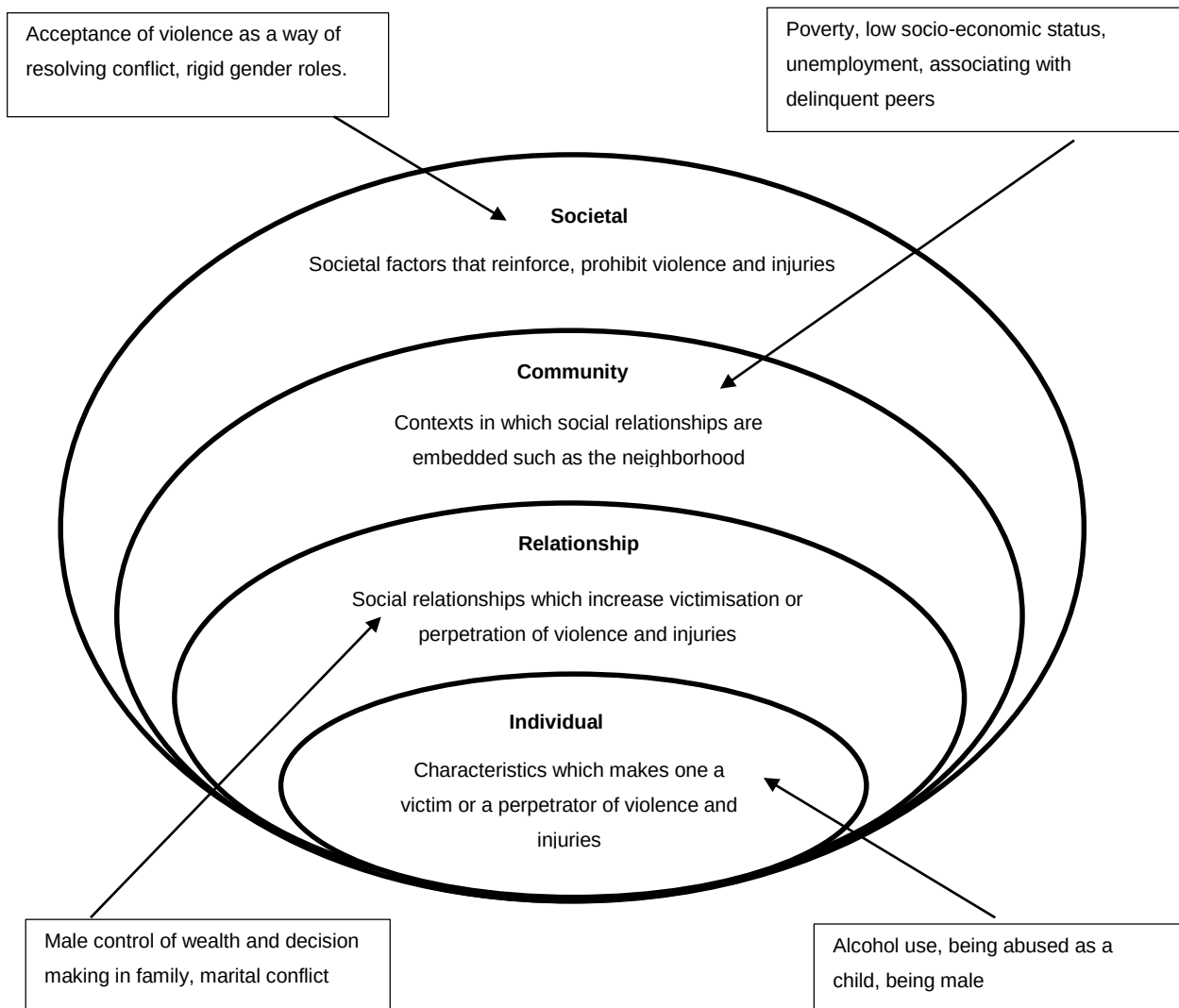


Figure 2.3: Social ecological model applied to violence and injuries (adapted from the WHO, 2012)

The government of South Africa has committed itself to the eradication of violence and violence related injuries by complying with the provisions of the regional and international legislations on violence (Flood, 2014:203). To date in SA a number of legislative reforms have been instituted

which include: Domestic Violence Act No.116 of 1998 (South African Law Commission, 1999), Commission on Gender Equality Act No. 39 of 1996 and Criminal Law Forensic Procedures Amendment Act No. 6 of 2010. The United Nations Office on Drugs and Crime (UNODC) is also complimenting government efforts to stop violence by a project aimed at developing effective law enforcement responses to violence against women and children in South Africa (UNODC, 2011). There are also a number of non-governmental organizations (NGO's) and civic organizations addressing gender-based violence by designing programmes that involve men in the process of achieving gender equality (Flood, 2011:359). These acts and strategies have not been implemented effectively and thus cannot routinely meet the purpose of providing maximum protection to victims of violence (Modiba *et al.*, 2011:873).

2.10 SUMMARY

Urbanisation has brought new challenges in terms of violence and injuries in SA (McIlwaine, 2013:7). According to Norman *et al.* (2010:2) injuries related to violence have contributed to a higher disease burden in South Africa when compared to other parts of the world. There appears to be significant research on the real and perceived costs and consequences of violence and injuries across SA but much of the research continues to be segmented and embedded within certain disciplines and geographic settings, yet the complex problems that violence and injuries present demand transdisciplinary collaborations. In SA apartheid made the problems of urbanisation more complex particularly for black people (Nhlapo *et al.*, 2011:49). For generations, urbanisation of black people was difficult because they were forced to live in townships far from the main cities (Todes *et al.*, 2010:332). Violence and injuries are mainly the result of the socio-economic disparities in the urban areas of SA. There is a gap in literature regarding the occurrence of violence and injuries among this urban population. It was therefore imperative to explore the different forms of violence and injuries in an urban area over a long period of time and to facilitate a transdisciplinary collaboration to address the problem.

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CHAPTER 3: RESEARCH ARTICLE

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**Cross-sectional comparisons of violence and injuries in an urban community, South Africa:
the Prospective Urban Rural Epidemiology (PURE) study.**

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3.2 Abstract

Background: Urbanisation brought different challenges in terms of violence and injuries in South Africa (SA). Injuries related to violence contribute to a high disease burden in SA. Apartheid made urbanisation difficult for black people because they were forced to live in townships. Socio-economic disparities in townships are risk factors for violence and injuries. There is paucity in literature of information on the occurrence of violence and injuries among this urban population.

Aim: To give a description of violence and injuries among a sample of adults aged 35 to 70 years at the time of enrolment into a study, living in an urban area within North-West Province, South Africa over a period of 10 years.

Methods: The Prospective Urban and Rural Epidemiological (PURE) study, designed as a prospective, observational, cohort study was used.

Results: A significant decrease was observed in the occurrence of serious injuries over the 10- year period ($z = 4.605$ and $p\text{-value} = 0.00$), except in 2010 where a significant increase was observed for injuries related to physical assault ($z = -2.15$ and $p = 0.03$) and domestic violence ($z = -2.99$ and $p = 0.00$). Urban characteristics like employment status and alcohol use were significantly associated with domestic violence ($X^2 = 16.86$, $df = 4$, $p = 0.02$) and sustaining a serious injury ($X^2 = 236.539$, $df = 6$, $p = 0.00$) respectively.

Discussion: The results obtained are consistent with other literature on violence and injuries in SA townships. Alcohol use and socio-economic inequalities like high levels of unemployment being risk factors for violence and injuries.

Conclusion: Despite a significant decrease observed in the occurrence of violence and injuries over the 10-year period, violence and injuries remained endemic and they were triggered by socio-economic factors in the urban context.

Implications of study findings: Failure to address socio-economic inequalities implies violence and injuries will perpetually contribute to the quadruple burden of diseases in SA.

Key words: violence, injuries, urban, adult, epidemiology, longitudinal, PURE

3.3 Introduction

The rate of urbanisation in South Africa (SA) has been very rapid since the 1950s (Reed, 2013:71). Today approximately two thirds of its population live in urban areas (Bakker *et al.*, 2016:6). Rapid urbanisation brought about many problems as it places huge demands on infrastructure, transport and employment (Turok *et al.*, 2014:4). Apartheid made these problems of urbanisation even more complex in SA (Nhlapo *et al.*, 2011:49). For generations, urbanisation of black people was difficult because they were forced to live in townships far from the main cities (Bakker *et al.*, 2016:2). The SA government has been unable to provide decent houses, infrastructure and other basic services particularly to people living in townships (Muller, 2013:45; Jürgens *et al.*, 2013:258). Reaction to such socio-economic inequalities particularly in townships has outlasted apartheid itself (Seekings & Thaler, 2014:2014:34). For many people violence has become a legitimate and socially acceptable way of expressing their standards of living's discontent. Violence in urban areas is a complex problem, its causes are multidimensional and its consequences affect not only the direct perpetrators or victims but go beyond (Fanslow & Robinson, 2011: 37).

According to Patel and Taylor (2012:17), defining violence in terms of injuries and/or mortality is not enough, as the impact of violence goes beyond the immediate perpetrators or victims. Violence is defined by the World Health Organisation (WHO, 2014:2) as “*The intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community that either results in or has a high likelihood of resulting in injury, death, psychological harm, mal-development, or deprivation.*” This definition captures different outcomes of violence which include: physical harm, psychological harm and deprivation. It is against this background a lot of researchers are now exploring the impact of violence on health care systems and at different ecological levels i.e. individual, family, community etc. (Chandran *et al.*, 2010:12).

Violence can be grouped into three different categories i.e. self-directed, interpersonal and collective violence (Goebert *et al.*, 2012:189), where self-directed violence entails a number of

violent behaviours towards self like attempting suicide, scratching oneself, starving oneself etc. (Centre of Disease Control and Prevention [CDC], 2014:11). Interpersonal violence refers to the use of power or force to control or manipulate others sexually, physically or emotionally (Stoddard *et al.*, 2015:10). Collective violence is when acts of violence are committed by a group of people in order to achieve a social, political or economic goal (Durrant, 2011:429).

Injuries are normally grouped based on intentionality, where intentional injuries involve interpersonal violence, self-inflicted injuries as well as collective violence and war-related injuries (Mendes *et al.*, 2011:835). Unintentional injuries involve fall related injuries, motor vehicle accidents, being struck by objects etc. (Juillard *et al.*, 2011:2). However, it is difficult to ascertain intentionality because there are situations where violence can contribute to unintentional injuries (Norton *et al.*, 2011:407). Hence violence and injuries were regarded as one concept in this study.

Violence and injuries have a negative impact on people's health (Imbusch *et al.*, 2011:87). The WHO considers health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (Daugherty *et al.*, 2017:404). This cannot be attained in the modern day urban environment characterised by a wide range of socio-economic and political problems (De Snyder *et al.*, 2011:1184). The physical, social, psychological and environmental factors are interrelated and contribute to the overall health-related quality of an individual's life (Edlin & Golanty, 2014:3). People are not free to participate in matters concerning their health when violence and its associated injuries are endemic (Tol *et al.*, 2010:116).

According to Bowman *et al.* (2015:57), interpersonal violence is a public health problem in SA responsible for high prevalence the following non-fatal injuries: gunshot wounds (38.2%), motor vehicle accidents (25.5%), falls (21.8%) and burns (1.8%). The worst affected are the people living in SA townships (Swart *et al.*, 2015:29). Their risk is not only increased by exposure to violence

but also by individual capacities which is also affected by age (Beard & Montawi, 2015:6). Living in such an environment damages the health of individuals in different ways (Tol *et al.*, 2010:116). Several authors have reported that over 50% of people living in the urban areas in SA have been a victim or witnessed a physical assault (Hinsberger *et al.*, 2016:5; Atwoli *et al.*, 2013:3; Bach & Louw 2010:29; Calitz *et al.*, 2014:19). Exposure to violence affects the psychological well-being of an individual. For instance, individuals who have experienced violence are more likely to suffer from depression compared to those who have not (Tsai *et al.*, 2016:2). Depression itself increases the risk of attempting suicide (Ludermir *et al.*, 2014:29). A study by Witt *et al.* (2014:64) also confirmed an association between depression and attempting suicide.

The realities of urban settings favourable for the occurrence violence and injuries object the Ottawa Charter's fundamental principle of creating supportive environments for health (WHO, 1986). Today SA is regarded one of the most violent countries in the world, with a homicide rate seven times the global average (United Nations Office on Drugs and Crime [UNODC], 2013:1). Homicide is the leading cause of fatal injury in urban areas of SA (Suffla, 2015:47). According to Matzopoulos *et al.* (2015:304) approximately half of all injury-related deaths in SA are intentionally inflicted. Schuurman *et al.* (2015:4) adds that alcohol is a major risk factor for a high prevalence (51%) of violence-related injury in SA.

Collective violence is also a reality in urban areas of SA (Abrahams, 2010:500). Communities are often mobilising and engaging in protest for the government to provide jobs and social services (Mbazira, 2013:265). Violence acts include setting up burning barricades and engaging fights with police, burning down state infrastructure and looting shops (Von Holdt, 2013:599).

In response to violence and injuries, the SA government has instituted several policies and programs (Ward *et al.*, 2014). There are also several non-governmental organisations working together with the government to curb violence and injuries. However, because violence and injury remain an endemic public health problem in SA, the assumption was violence prevention strategies including the criminal justice systems have failed (Ratele *et al.*, 2010:421). There is paucity in literature of the trends of different forms of adult violence and injuries in an urban context. In addition to the social sphere of violence and injuries, this research gives a description of the different forms of violence and injuries among a sample of adults aged 35 to 70 years in an urban area within the North-West Province over a period of 10 years. A discussion on the way forward and the role of different partnerships at all levels to develop effective responses to violence and injuries is given.

3.4 Methods

This sub-study formed part of the South African arm of the multinational Prospective Urban and Rural Epidemiological (PURE) study. The overall aim and design of the larger PURE study is discussed by Teo *et al.* (2009:1-6). In observational studies, the researcher observes what happens to people under exposure conditions that have been self-selected or have been determined by influences outside the control of the researcher (Song & Chung, 2010:2). Exposure in this study was defined as the degree of urbanisation (urban or rural). The PURE study aimed to achieve a representative sample of adults from the selected communities. The new political dispensation of South Africa allows the population to follow the global trends of urbanisation and development (demographic transition). This led to a situation where most of the people residing in urban townships being black people; hence the sample was representative of the black adult population. At baseline (2005) the number of participants that was included into the study was 1004. Some participants were lost due to mortality, frailty, discontinued participation, lack of success in re-contacting the participant for a follow-up survey or by non-return of a survey by a participant. In

2010 and 2015 the number of participants was 580 and 387, respectively.

Inclusion criteria at baseline

- ≥ 35 years of age.
- ≤ 70 years of age.
- Males and females.
- Eligible participants have to reside in the households.
- No pre-existing chronic illnesses.

This sub-study made use of the Adult Questionnaire (<http://www.hamiltonhealthsciences.ca/sitemaker/websitefiles/phri532294/pure/home.htm>) to obtain information regarding participants' exposure to violence and injuries. Trained interviewers administered the questionnaires in Afrikaans, English or Setswana. Data collection for the PURE study was cross-sectional and occurred at five year intervals. Baseline data collection occurred in 2005, followed by 2010 and finally 2015. A minimum follow-up of 10 years was done and completed in November 2015.

The study was conducted in two urban communities (Communities C and D) which are under the Municipality of the Dr Kenneth Kaunda District, North-West Province.

Statistical analysis

Completed questionnaires were captured into REDcap™ (Research Electronic Data Capture), a web-based database. A retrospective analysis was done of the 2005 - 2015 data. It involved looking backwards in time and describing violence and injuries over a long period of time. SPSS (Statistical package for social scientists) (International Business Machines Corporation [IBM], 2012) was used to calculate the proportions of the occurrence of violence and injuries. A chi-

squared test was performed to determine associations between demographic characteristics like, employment status gender, education level and alcohol use with the occurrence of violence and injuries. A comparison of the proportions of different forms of violence/ injuries over time, e.g. what proportion of females experienced an assault in the three different time intervals 2005, 2010 and 2015 was done. A Z-score test for two population sample was used to determine whether there was any significant difference in the proportions. A p-value ≤ 0.05 was considered significant for all tests.

3.5 Results

Table 1 reflects the basic demographic characteristics of participants. The mean age of participants at baseline (2005) was 50.55 ± 10.70 . The mean ages for males and females were similar with 50.02 ± 10.28 and 50.03 ± 10.95 for males and female respectively. More females participated in the study with 60.0% enrolled at baseline. Employment level at the time of enrolment was extremely low, with only 17.2% of participants reporting to be employed. Reported current use of alcohol was significantly higher in males (67%) compared to females (37%) (Z-score = 9.19 and p-value = 0.00). Twenty percent of participants had no formal education, with more than half of the female participants (55%) reporting to have reach only up to primary level of education. Thirty-four percent of the participants reported they had never been married before.

[Preferred position for Table1]

Figure 1 portrays how violence and injuries have been changing over time (2005-2015).

[Preferred position for Fig 1]

Cross sectional overview of violence and injuries at individual level 2005.

The highest number of serious injuries was reported at baseline (n = 64), where 7.5% of them were men and 5.6% females. Twenty-three percent of the participants who reported sustaining serious

injuries also reported to be current alcohol consumers. A chi-square test revealed a significant association between current alcohol users and sustaining a serious injury ($X^2 = 236.539$, $df = 6$, $p = 0.00$). Falls were the leading cause of serious injuries reported at baseline, amounting to 43.8% of all injuries (Fig 1). The number of falls related injuries was similar between males (3.0%) and females (2.7%).

Motor vehicle accidents as a pedestrian were the second leading cause of serious injuries ($n=7$), where 57.1% of the victims were male and 42.9% were female. Chi-squared analysis revealed no significant association between gender and sustaining a motor vehicle related injury as a pedestrian ($X^2 = 1.42$, $df = 2$, $p = 0.49$). Physical assaults (interpersonal violence) were the third leading cause of serious injury at baseline ($n=5$). Sixty percent of the participants who sustained serious injuries from physical assault were male while 40% were female. Forty percent of the participants who sustained physical assault related injuries reported having reached only up to primary level of education.

Cross sectional overview of violence and injuries at individual level 2010

Cross-sectional data collected in 2010, revealed that 9.7% of participants reported to have suffered some form of serious injury. Again falls were the leading cause of serious injury ($n=22$), with 59.1% of the victims being female and 40.9% male. Interpersonal violence was the second leading cause of serious injuries amounting to 44.4 % of all serious injuries reported, whereby physical assault and domestic violence accounted for 25.0% and 19.4 % respectively. Most of the participants (71%) who were victims of domestic violence and reached only up to primary level of education and 57.1% of them were unemployed. Chi squared test revealed a significant association between employment status and the occurrence of domestic violence ($X^2 = 16.86$, df

=4, $p=0.02$). Only one person, reported sustaining a serious injury from attempting suicide (self-directed violence).

Cross sectional overview of violence and injuries at individual level 2015

In 2015, participants who were victims of physical assault (interpersonal violence) reported the highest number of injuries ($n=4$). Three of them were female. Chi squared test revealed no significant association between gender and being a victim of physical assault ($X^2 = 0.080$, $df=1$, $p= 0.78$). Only one person reported sustaining a serious injury from attempting suicide.

Longitudinal overview 2005-2015

During the 10-year period a total of 102 participants reported sustaining serious injuries from the causes listed in Table 1. Overall z test revealed a significant decrease in the occurrence of serious injuries over the 10-year period ($z = 4.605$ and $p = 0.00$), except in 2010 where a significant increase was observed for injuries related to physical assault ($z = -2.15$ and $p = 0.03$) and domestic violence ($z= -2.99$ and $p = 0.00$).

[Preferred position for Table2]

Table 2 shows the occurrence of violence at household level. Z test revealed a significant decrease in the occurrence of violence at household level ($z = 5.34$ and $p = 0.00$). Since 2005 up to the end of the study, the most reported act of violence at household level was house break-ins ($n = 126$). Theft ($n = 123$) and violent attacks ($n = 89$) were also common throughout the study.

[Preferred position for Table3]

Table 3 shows how the participants' perceptions regarding the occurrence of crime evolved over the 10-year period. In this study perception entails the participants' view about how crime has evolved over time. Over the 10-year period house breaking was the most perceived crime to have increased (Table 3). Other crimes that were also highly perceived to have increased were armed robbery and violent attacks (Table 3). The Z-score test revealed a significant decrease in the number of participants who perceived that crime had increased over the 10-year period ($z = 5.68$ and $p = 0.00$).

3.6 Discussion

Interpersonal violence which includes: physical assault and domestic violence was among the leading cause of serious injury. Families in townships struggle to cope with socio-economic pressures (Popovici *et al.*, 2013:1). This normally results in violence within families which eventually extends to the entire community (Kim, 2012:396). Low levels of education in this urban population could also be a risk factor for interpersonal violence (Kreager *et al.*, 2013:565). The significant increase in injuries related to physical assault and domestic violence reported in 2010 can be attributed to excitement generated by the Fédération Internationale de Football Association (FIFA) world cup hosted by SA in 2010 (Bob & Swart, 2010:94). Heightened emotions and alcohol consumption in supporters could have contributed to increased violence.

Motor vehicle accidents both as a pedestrian or passenger were also among the leading causes of serious injury. According to Sukhai and Jones (2014:24), poor road infrastructure is a major contributing factor to accidents in SA. Before independence, townships were considered as dormitory areas and most of them have partially paved road infrastructure (Ribbens *et al.*, 2008:57). After independence the SA government has been trying to upgrade infrastructure in municipal areas but there is still a gap in townships when it comes to proper road and pedestrian

infrastructure. The roads are characterised by poor lighting, poor drainage and potholes making the environment conducive for accidents (Ribbens *et al.*, 2008:57).

Places where alcohol is sold are associated with high incidences of violence and injuries (Setlalentoa *et al.*, 2010:11). Bars, taverns and shebeens (an unlicensed or illegally operated drinking establishment [Merriam Webster Dictionary, 2012]) are concentrated in SA townships. In this study alcohol was among the risk factors for sustaining injuries and this could be due to easy access to alcohol in the township. These results are consistent with what was reported by Raina *et al.* (2016:92) regarding alcohol use and sustaining fall related injuries. The study assessed risk factors for non-fatal injuries in low-middle income countries and reported a higher incidence of falls among the adult participants who were currently drinking alcohol than those who were not.

In this study it was interesting to note that there was no significant difference in the occurrence of fall related injuries between the period 2005 and 2010. Normally it is expected that as people grow older their risk of falling would increase. According to Ambrose *et al.* (2013:53) the risk of falling increases due to physiologic and pathological changes associated with ageing but for this particular population there was no significant change. This anomaly can be attributed remarkable advances in knowledge about how to prevent falls among the elderly in SA (Cumming, 2013:378).

Understanding the change in perceptions over time is indispensable in directing stakeholders in engaging communities to further develop their understanding of violence and injuries (McMahon & Baker, 2011:1). Perceptions are influenced by the environment (Ruchiwit *et al.*, 2012:35). In the urban environment number of participants who perceived crime to have increased was significantly decreasing. These results are congruent with data from Crime Statistics South Africa. In the North-West Province, Potchefstroom the total number of crimes (car hijacking, sexual

assaults, robberies, housebreaking, murder and theft) in 2005, 2010 and 2015 was 1 519, 970 and 1 233 respectively (Council of International Investigators, 2016). According to Census 2001 and 2011, during the same time periods Potchefstroom had the following populations: 128 353 for 2005 and 162 762 for 2010 and 2015. The Z-test also reveals a significant decrease in the total number of crimes between 2005 and 2015 ($z = 11.79$ and $p = 0.00$). Even though people perceive crime to have decreased, it is still endemic and this can generate fear within the community. People may actually be hindered from participating in matters concerning their health when they feel the environment is unsafe.

3.7 Conclusion

Results show a significant decrease in the occurrence of different forms of violence and injuries over the 10-year period. An association between violence or injuries and environmental risk factors like employment status and alcohol use was revealed. People living in the urban community (township) are at heightened risk of sustaining injuries or experiencing violence due to socio-economic factors. However, follow up studies should compare the urban and rural contexts to ascertain the impact of the demographic transition (urbanisation) on violence and injuries.

Implication of the study

Violence and injuries are a serious problem, especially in SA townships. The problem remains endemic despite several interventions and policies instituted. Failure to address socio-economic inequalities implies violence and injuries will perpetually contribute to the quadruple burden of diseases in SA. There is need for transdisciplinary collaborations to address such a complex problem.

Ethical considerations

The PURE study gained permission from the North-West Department of Health. Ethical approval was obtained from the Ethics Committee of the North-West University for the period January 2005

to December 2009 (ethical number 04M10) as well as for the period 2010 to December 2015 (ethical number NWU-00016-10-A1). Extension on the ethical approval was obtained until January 2020 (NWU-00016-10-A1).

To show respect for the participants, written consent was obtained from all current active participants prior to the study.

Participation was voluntary and one could withdraw at any time without being penalised.

Limitations of the study

The major potential source of bias in this study was the high proportion of subjects lost to follow-up. More than half of the participants were lost due to loss of follow up, withdrawal or mortality. The PURE study recruited mostly Tswana-speaking people in an urban context in the North West province, so the study population cannot be representative of all black South Africans living the townships. This may limit the generalisability of the findings. The use of standardised questionnaires developed in Canada, was limiting because they were not context-specific and there was not much detail asked pertaining to violence and injuries.

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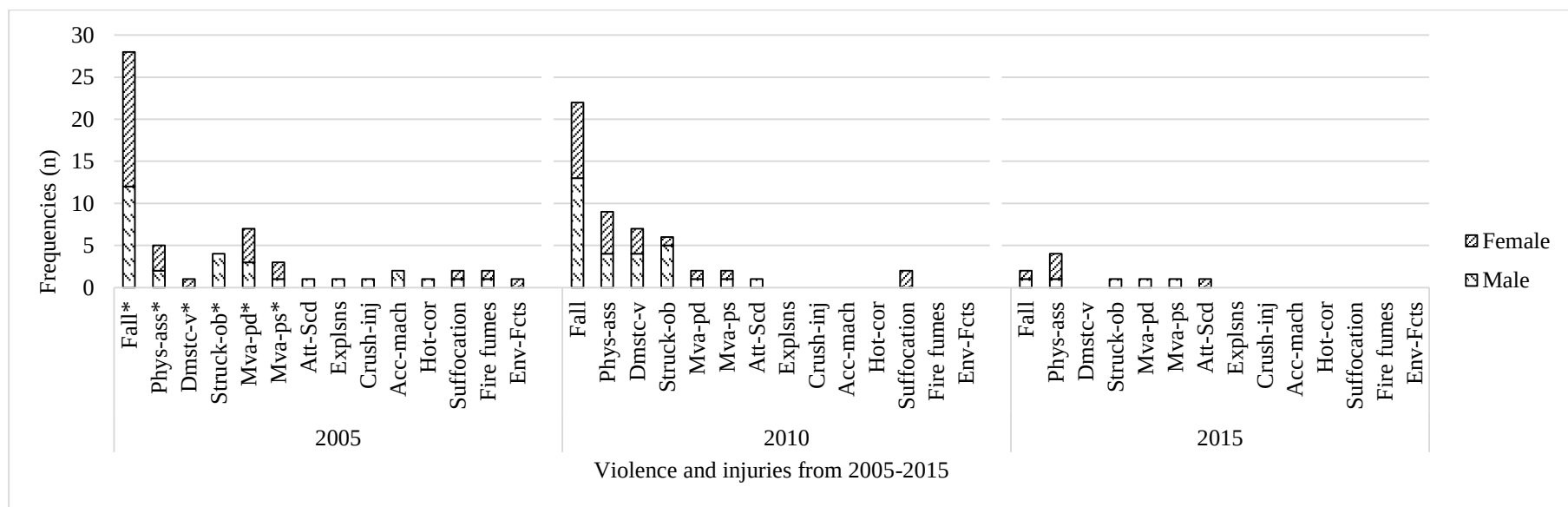
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Key: Cause of serious injuries

falls	Phys-ass	Dmstc-v	Struck-ob	Mva-pd	Mva-ps	Att-scd	Explsns	Crush-inj	Acc-mach	Hot-cor	Suffocation	Fire fumes	Env-fcts
Falls*	Physical assault*	Domestic Violence*	Struck by an object*	Motor vehicle* accident as a pedestrian	Motor vehicle* accident as a passenger	Attempted suicide	Explosives related injuries	Crush injuries	Accident caused by machinery	Hot corrosive substance	Suffocation	Fires Fumes	Natural Environmental factors

The variables with an asterisk* were reported because they had relatively outstanding frequencies throughout the study.

Figure 1: Change over time: violence and injuries at individual level (2005-2015)

Table 1: Basic demographic characteristics

2005			2010			2015			
	Male (n=401)	Female (n=603)	Total (n=1004)	Male (n=213)	Female (n=367)	Total (n=580)	Male (n=121)	Female (n=266)	Total (n=387)
Age (yrs.)	50.02±10.28	50.32±10.95	50.66±10.70	55.28±10.09	56.22±11.17	56.01±10.59	60.03±9.38	60.62±10.36	60.44±10.06
Marital Status (%)									
Never married	41.6	34.3	37.3	35.7	31.9	33.3	48.4	40.0	42.6
Currently married	27.4	27.2	27.3	28.2	24.5	25.9	29.5	23.8	25.6
Living with partner/common law	20.4	14.6	16.9	19.7	13.4	15.7	0.8	-	0.8
Widowed	4.7	13.3	9.9	8.0	20.4	15.9	18.9	31.7	27.6
Separated	1.7	2.7	2.3	0.5	1.1	0.9	-	-	-
Divorced	2.7	3.6	3.3	7.0	8.7	8.1	2.5	4.5	3.9
Level of education (%)									
None	22.4	18.6	20.1	23.0	25.1	24.3	14.8	13.6	14.0
Primary	48.9	55.6	52.9	39.4	39.0	39.7	39.3	38.5	38.8
Secondary/high school	24.7	22.1	23.1	33.3	34.3	34.0	45.9	47.2	46.8
Trade school	0.5	0.2	0.3	0.9	0.3	0.5	-	-	-
College/University	1.2	0.8	1.0	1.9	1.1	1.4	-	0.8	0.8
Currently employed (%)									
Yes	18.5	16.4	17.2	24.9	24.0	24.3	13.1	16.2	15.2
No	38.7	45.4	42.7	74.2	74.6	74.3	86.9	83.8	84.8
Current alcohol use (%)									
Yes	67.3	37.3	42.9	32.2	67.3	52.2	67.3	37.3	49.2
No	32.7	62.7	50.8	65.4	35.0	46.1	32.7	62.7	50.8

Table 2: Occurrence of violence at household level

	2005	2010	2015
	Total (N=852)	Total (N=505)	Total (N=387)
Armed robbery (n)	12	10	11
Violent attacks(n)*	56	25	8
Murder (n)	7	8	1
Vehicle hijacking (n)	17	2	1
House breaking (n)*	85	21	20
Theft (n)*	72	28	23
Rape (n)	18	5	4
Women abuse e.g. (beat, swear words, sexual (n)	12	9	1
Child abuse e.g. (burn, swear word, rejection) (n)	5	3	2
Child sexual abuse (n)	3	-	2

The variable with an asterisk* were reported because they had significant values

Table 3: How perceptions about the occurrence of crime have evolved over time

	2005	2010	2015
	Total (N=1004)	Total (N=580)	Total (N=387)
Crime increased (%)	49.2	45.5	32.3
Crime did not increased (%)	24.2	41.6	67.7
Armed robbery (%)*	24.2	16.2	25.6
Violent attacks (%)*	21.6	24.0	19.6
Murder (%)	29.4	30.5	10.1
Vehicle hijacking (%)	18.9	10.0	2.6
House breaking (%)*	49.6	32.8	22.2
Theft (%)	42.0	21.4	22.2
Rape (%)	34.2	29.0	5.7
Women abuse e.g. (beat, swear words, sexual (%)	34.1	17.2	2.3
Child abuse e.g. (burn, swear word, rejection) (%)	34.2	14.1	-
Child sexual abuse (%)	27.9	11.7	2.3

The variable with an asterisk* were reported because they had significant values

CHAPTER 4: EVALUATION AND RECOMMENDATIONS

4.1 INTRODUCTION

Chapter Four concludes this research report. It presents a short discussion on the summary of the findings including possible explanations and speculation of the research findings; followed by an evaluation. The limitations of the study, implication of research findings and recommendations for future research are presented.

4.2 SUMMARY OF FINDINGS

A brief discussion of the findings follow with a literature control where findings were aligned with literature; or differed from literature; or where these findings differed from other researchers' findings.

The characteristics of the environment (physical, social, economic and political) influence health behaviours among urban residents (Carpenter & Nevin, 2010:260; Mohamed, 2013:1). In this study, violence and injuries were embedded in the social sphere and related to problems such as unemployment, level of education and behavioural factors like alcohol use. The highest number of serious injuries recorded in this study were fall-related (n=39). There was a significant association ($X^2 = 236.539$, $df = 6$, $p = 0.00$) between alcohol use and sustaining a fall-related injury. These results are consistent with a recent study that was also done in an urban area in SA by Kalula *et al.* (2016:4). These authors reported an association between alcohol use and falling among adults in an urban community. There is also an international discourse confirming a similar result. Pinheiro *et al.* (2010:89) conducted a cross-sectional study in Brazil and reported an association between alcohol use and fall-related injuries.

The high proportion of participants using alcohol which itself was linked to fall related injuries can be attributed to inability to cope with the socio-economic pressures within the townships. The mushrooming of *shebeens* in townships is an underlying environmental risk factor associated with the increase in fall related injuries. *Shebeens* used to function as gathering places for political dissidents in townships during apartheid (Weaver, 2015:199), but now they are regarded as ideal centers for socialisation. The tavern makeshift (*shebeens*) are always packed with young adults including the elderly on any day of the week. The presence of quite a number of such drinking outlets in townships influences drinking patterns and ultimately results in people being violent sustaining injuries (Herrick & Charman, 2013:25).

Physical assaults and domestic violence (interpersonal violence) were among the second leading cause of serious injury (n=26). There was a significant association between domestic violence and employment status ($X^2 = 16.86$, $df = 4$, $p = 0.02$). The majority of the participants were unemployed. There is quite substantial literature reporting an association between unemployment and interpersonal violence, especially domestic violence (Anderberg *et al.*, 2013:2; Tertilt & Berg, 2015:1; Heath, 2014:57). Normally, when families are struggling financially, stress can escalate, leading to alcohol abuse (Popovici & French, 2013:1) which will in turn lead to violence and injuries (da Silva *et al.*, 2015:252). In this study, apart from physical assault, domestic violence (which is also interpersonal violence) was the third leading cause of serious injuries. This may also be attributed to the socio-economic pressures in the township, particularly when considering the high levels of unemployment.

The high levels of unemployment, which is associated with interpersonal violence in this study, can be due to the huge inequality gap that exists in SA. Over the years, urbanisation of the black people was difficult because they were forced to live far away from the main cities where there were no employment opportunities (Todes *et al.*, 2010:332). The situation was exacerbated after Apartheid as government policies led to the construction of new townships, which were even further from the main cities than the Apartheid townships (Jürgens *et al.*, 2013:258). People in the township are mostly dependant on government grants and pension for survival (Sekhampu & Grobler, 2011:41).

At household level the most reported act of violence was house breaking. Theft and violent attacks were also common throughout the study. According to the Gallup Global Law and Order (GGLO) report (2015), SA is among the worst countries in the world for providing citizens a sense of safety. Despite the significant decrease observed with time, the number of people who perceived that crime has increased in SA remained high and this can instil a sense of insecurity or fear among citizens (Alkimim *et al.*, 2013:124). The results are similar to what was reported in a study recently by Harris and Radaelli (2016:3). It was revealed that 59% of adult South Africans believe that crime rates increased. In another study done in Brazil by Weber Corseuil *et al.* (2012:1), it was revealed that perceiving that the neighbourhood is safe is associated with a 25% increase in physical activity among older adults. In this study the high number of people who think crime has increased can translate to reduced physical activity among the adult population.

According Breetzke (2010:446), the huge socio-economic inequality in SA is a risk factor for crime, which in turn generates new perceptions of urban threat. This could be the reason why there were so many participants who perceived that crime has increased in this urban community.

4.3 EVALUATION

This study is evaluated by asking the questions whether this research obtained the proposed aim and objectives, the appropriateness of the methodology, rigour of the research conducted and health research ethics adverse events (if any).

4.3.1 Evaluation of the research aim and objectives

The aim of this research was to give a description of violence and injuries among a sample of adults aged 35 to 70 years at the time of enrolment into a study in an urban area within the North-West Province over a period of 10 years. The objectives were to determine the types and frequencies of violence and injuries in an urban area at baseline and five-year follow-ups (2005, 2010 and 2015); and to investigate possible changes in the type and frequencies of violence and injuries in an urban area over ten years. The results of the study give a cross sectional description in terms of frequencies and types of violence or injuries at three intervals (2005, 2010 and 2015). A longitudinal overview (description) of how violence and injuries have been occurring over a period of 10 years is given in the same manner. Therefore, it can be concluded that the study met its aims and objectives.

4.3.2 Purpose

The new political dispensation in SA follows the global trends of rural to urban migration (geographical transition) (Rauch & Parsons, 2016:6). Over the years, there has been massive rural to urban migration in SA which led to rapid growth of informal settlements in townships (Viljoen & Sekhampu, 2013:732). People living in these townships are not provided with decent accommodation, infrastructure and other social services (Lorraine & Molapo, 2014:900). Poverty, high unemployment rate (Barrar, 2010:i) and lack of basic resources amidst the ineptitude of the state to govern effectively has led to a situation where violence is seen as a legitimate way of expressing discontent in townships (Norman *et al.*, 2010:1). People living in townships are also at heightened risk of sustaining injuries due to precarious home and work environments in towns. Most research on violence in SA is segmented and continues to be focused on particular geographic settings or locations (Ratele *et al.*, 2010:421). There is paucity in literature of how violence and injuries have evolved over time among this particular population. Yet violence and injuries are actually a threat to development in all spheres (health, economy, social etc.) (Kunkeler & Peters, 2011:279). However, for the purpose of this study, the negative impact of violence and injuries on health was the impetus to explore the different types of violence and injuries in an urban context in SA.

The description given on the occurrence of violence over a long period of time will serve as benchmark for interventions or future studies on violence / injuries and ultimately attainment of “age friendly cities” (A movement launched by the WHO in 2006 to promote health by enabling people of all ages to actively participate in community activities and treat each other with respect) in SA (WHO, 2007). It can be concluded that the research purpose was valid.

4.3.3 Appropriateness of the methodology

The longitudinal study provided descriptive data which can be used to develop hypotheses or recommendations for future studies (Sedgwick, 2013:2). For example, further research can be done to find out if there is an association between violence and the development of chronic illnesses.

4.3.4 Rigour and health research ethics

The prospective, observational, cohort study was quantitative in nature and therefore the principles of validity and reliability ensured that the knowledge generated was scientific. Validity and reliability are rooted in positivism. In this study the role of the researcher was limited to data collection and interpretation through objective approach and the research findings are observable and quantifiable (Botma *et al.*, 2010:42). In the PURE study the data collecting tools were standardised for all the countries which are part of the PURE study. The principle investigator (PI) and research assistants received extensive training prior data collection. However, because the study was part of the PURE study, concluding all measurements required the whole day and there was risk of participants getting tired or frustrated. This was addressed by providing the participants with breakfast and lunch. It can therefore be concluded that the study was of good quality and had minimal risk

4.4 LIMITATIONS OF THE STUDY

The major potential source of bias in this study was the high proportion of subjects lost to follow-up. More than half of the participants were lost loss of follow up, withdrawal or mortality. The PURE study recruited mostly Tswana-speaking people in an urban context in the North-West Province, so the study population cannot be representative of all black South Africans living the townships. This may limit the generalisability of the findings. The use of standardised questionnaires developed in Canada, was limiting because they were not context-specific and there was not much detail asked pertaining to violence and injuries.

4.5 IMPLICATIONS OF THE STUDY FINDINGS

In 2006, the World Health Organisation (WHO) launched the “age friendly cities” movement based mainly on the lived experiences of older residents (Plouffe & Kalache, 2010:734). Today many researchers are supporting this notion through the development of conceptual models which integrate assumptions about the relative importance of key community structures and contexts (Keating *et al.*, 2013:320), since violence and injuries are amongst other factors which prohibit a community to be age friendly (Barusch, 2013:465). Results obtained in this study are of paramount importance because to serve as benchmark for the creation of age friendly communities in SA.

The fact that violence was occurring both at individual and household level implies a complex interplay between the individual factors and the community factors that promote violence and injuries. In the urban context alcohol use was among the individual factors associated with sustaining serious injuries. At community level, high levels of unemployment were associated with domestic violence. Within the social ecological model, the risk factors identified are related at four different levels i.e. individual, relationships, community and society (Figure 2 in chapter 2). This implies more people could actually be affected by violence and injuries within this urban community apart from those who participated in this study.

4.6 RECOMMENDATIONS FOR FUTURE RESEARCH AND PRACTICAL APPLICATIONS

In SA most people perceive that it is the duty of the government to stop crime in communities (Harris & Radaelli, 2016:5). There is need to develop and initiate community-based programs and interventions to stop violence and injuries. People in townships should be engaged at all levels, from designing, implementation and evaluation of interventions.

Traditional mono-disciplinary or sector-based approaches are limited when it comes to addressing complex problems like violence and injuries. Moreover, the activities of different stakeholders are determined more by particular interests, which can be economic, political, etc., and less need to build a system that is equitable and sustainable. A transdisciplinary approach is therefore indispensable for the development of sustainable and equitable violence and injuries prevention interventions within urban context where risk factors are can be social, economic, political or cultural. A transdisciplinary approach will involve melding of all possible stakeholders and different academic disciplines in the formulation, implementation and evaluation of interventions to address violence and injuries.

Follow up studies should compare urban and rural communities to ascertain whether there were any differences in the occurrence of violence and injuries over time.

Postgraduate students from Regional- and Urban planning, Nursing Science and Occupational Health and Safety are invited to do an assessment of falling risks within citizens' physical environment and start a health education campaign to improve environmental safety.

Understanding the change in perceptions over time is indispensable in directing stakeholders in engaging communities to further develop their understanding of violence and injuries (McMahon & Baker, 2011:1). There is need for a follow-up on this study with focus groups to explore how the participants perceive the increase in violence and injuries and to also have interviews with South African Police Department to understand their perceptions.

There is need to conduct participatory action research with participants from a transdisciplinary approach to design training material that can enable participants to increase their personal, household, community health and safety.

Finally, there is need to promote effective and approachable reporting structures to ensure that violence and injuries statistics are correct and updated.

4.7 SUMMARY

The characteristics of the environment (physical, social, economic and political) influence health behaviours among urban residents. In this study violence and injuries were embedded in the social sphere and related to problems such as unemployment, level of education and behavioural factors like alcohol use. Results obtained for violence and injuries at individual and household level imply a complex interplay between the individual factors (alcohol use) and community factors (high levels of unemployment) that promote violence and injuries. Within the social ecological model, the risk factors identified are related at four different levels i.e. individual, relationships, community and society. This implies more people could actually have been affected by violence and injuries within this urban community apart from those who participated in this study. However, the longitudinal study provided descriptive data which can be used as benchmark to facilitate transdisciplinary collaborations in addressing the complex problem of violence and injuries. The study also generated appropriate recommendations for future research and practical application.

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ANNEXURES

ANNEXURE A: PURE QUESTIONNAIRE

PURE

9 YEAR FOLLOW-UP VISIT PARTICIPANT QUESTIONNAIRE

INSTRUCTIONS

Please answer EACH question by marking
an X in ONE BOX on each line:
(unless otherwise instructed)



OR

By writing number(s) in the spaces provided:



OR

By specifying the answer on the line(s) provided

Adult Questionnaire

8. Occupation

Group 1: Legislators, senior officials and managers

Legislators and senior officials
Corporate managers
General managers
Businessman

Group 2: Professionals

Physical, mathematical and engineering science professionals
Life science and health professionals
Teaching professionals
Other professionals

Group 3: Technicians and associate professionals

Physical, mathematical and engineering- science associate professionals/technicians
Life science and health associate professionals/technicians
Teaching associate professionals/technicians
Other associate professionals/technicians

Group 4: Clerks

Clerks
Customer service clerks

Group 5: Service workers and shop and market sales workers

Personal and protective services workers
Models, salespersons and demonstrators

Group 6: Skilled agricultural and fishery workers

Market-oriented skilled agricultural and fishery workers
Subsistence agricultural and fishery workers

Group 7: Craft and related trade workers

Extraction and building trade workers
Metal, machinery and related trades workers
Precision, handicraft, printing and related trades workers
Other craft and related trades workers

Group 8: Plant and machine operators and assemblers

Stationary plant and related operators
Machine operators and assemblers
Drivers and mobile plant operators

Group 9: Elementary occupations

Sales and services elementary occupations
Agricultural, fishery and related labourers
Labourers in mining, construction, manufacturing and transport

Group 10: Armed forces

Armed forces

Group 11: Homemaker

Housewife/Househusband

Adult Questionnaire

18. Accidents and Injuries

Location of Injury

- 1= Factory/industrial place
- 2= Office
- 3= Agriculture field/farm
- 4= Home
- 5= Road
- 6= Sport/game e.g. track, court, field, etc.
- 7= Public building
- 8= Mine/quarry
- 9= Construction site e.g. building, road-works, etc.
- 10 = Other

Type of Injury

- 1= Burns
- 2= Scalds
- 3= Fractures
- 4= Muscle and ligament sprains/tears
- 5= Cuts and lacerations
- 6= Bruises and abrasions
- 7= Suffocation
- 8= Head injury (where person did not lose consciousness)
- 9= Head injury (where person lost consciousness for some time)

Subject ID

Centre #

Community#

Household #

Subject #

Subject
Initials

F M L

18. During the past 12 months, have you had any injuries that were serious enough to limit your normal activities? (check all that apply)

☐ No → Go to #19 ☐ Yes → answer 18a – 18s

If yes, please provide details:

Please refer to facing page for Location and Type Codes

Cause of injury

Absence from work or

Location Type usual activities (Days)

a) Motor vehicle accident (as a passenger)	☐ No ☐ Yes →			
b) Motor vehicle accident (as a pedestrian)	☐ No ☐ Yes			
c) Struck by an object	☐ No ☐ Yes			
d) Explosion	☐ No ☐ Yes →			
e) Natural/environmental factors (gales/cyclones/lightning, etc.)	☐ No ☐ Yes →			
f) Suffocation	☐ No ☐ Yes →			
g) Poisoning	☐ No ☐ Yes →			
h) Snake/scorpion bite	☐ No ☐ Yes →			
i) Fall	☐ No ☐ Yes →			
j) Fire/flames, resultant fumes	☐ No ☐ Yes →			
k) Physical assault (gun, kidnapping, etc.)/violent crime	☐ No ☐ Yes →			
l) Domestic violence (beaten by a family member)	☐ No ☐ Yes →			
m) Drowning/submersion	☐ No ☐ Yes →			
n) Hot or corrosive liquids/floods/substances	☐ No ☐ Yes →			
o) Crush injuries (boulders, building materials, etc.)	☐ No ☐ Yes →			
p) Accident caused by machinery	☐ No ☐ Yes →			
q) Attempted suicide	☐ No ☐ Yes →			
r) Armed conflict	☐ No ☐ Yes →			
s) Other(specify) _____	☐ No ☐ Yes →			

Subject ID

Centre #

Community#

Household #

Subject #

Subject
Initials

F M L

20. Have you ever ☐ No → go to #21 ☐ Yes → answer a, b and c
fractured a bone?

a) Number of fractures

b) Years since last fracture

(yrs)

c) Bone (s) broken in the most recent
fracture (If more than 3, list most severe sites)
Please refer to facing page for fracture locations

(location)



If other, specify

For Women Only (Questions 21 - 24)

21. Are you currently pregnant ? ☐ No ☐ Yes → Go to #22

22. Do you still have periods? ☐ No → answer 22a ☐ Yes → Go to #23

a) How many years since you stopped menstruating? years

23. Have you ever used an oral/ injectable contraceptive? ☐ No ☐ Yes

24. a) How many live children have you given birth to?

Boys

Girls

b) Did you breast feed any of your children? ☐ No ☐ Yes

Subject ID

Centre #	Community#	Household #	Subject #

Subject Initials			
	F	M	L

Tobacco

25. Which best describes your history of tobacco use?

- a) ☐ Formerly used tobacco products ☐ Currently use tobacco products ☐ Never used tobacco products → Go to #26

b) At what age did you start? yrs

c) Have you ever regularly used any of the following tobacco products? (check all that apply)

Past users only

	Average amount/day	Duration (years)	When Stopped (years ago)	If less than 1 yr (months ago)
(i) Cigarettes (all kinds)	number			
(ii) Beedies	number			
(iii) Cigars	number			
(iv) Pipes	number			
(v) Sheesha/water pipe Hookah	# of times			
(vi) Chewing tobacco	# of times			
(vii) Snuff	# of times			
(x) Other <u>Specify</u>				

Question 26 to be answered by non-smokers and former smokers only

26. During the past 12 months, have you been regularly (at least once per week) exposed to other people's tobacco smoke?

("Exposed" is defined as a minimum of 5 consecutive minutes, during which you inhale other people's smoke.)

- ☐ No → Go to #27 ☐ Yes → Please answer questions 26a

a) Over the past 12 months, what has been your typical exposure to other people's smoke?

("Exposed" is defined as a minimum of 5 consecutive minutes, during which you inhale other people's smoke)

Select ONE only

- ☐ 1-2 times/week ☐ 3-6 times/week ☐ at least once a day ☐ 2-3 times/day ☐ 4 or more times/day

Subject ID

Centre #	Community#	Household #	Subject #

Subject Initials		
F	M	L

27. Are you a member of any of the following:

How often do you participate in the activities of this group?

Per Month OR Per Year

(i) Self help group, Co-operative, Social club, Sports club,	☐ No ☐ Yes →		
(ii) Religious Group (e.g: church group, etc.)	☐ No ☐ Yes →		
(iii) Other _____ Specify	☐ No ☐ Yes →		

28. Please answer the following: (choose only one option for each)

	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree
(i) People are generally honest and want to help others.	☐	☐	☐	☐
(ii) If I do nice things for someone, I can anticipate that they will respect me and treat me just as well as I treat them.	☐	☐	☐	☐

30. In a difficult situation, whose help can you count on from? (Please see facing page for definitions)

(i) Civic organizations: specify _____

☐ none	☐ little	☐ moderate/average	☐ a great deal
-------------------------------	---------------------------------	---	---------------------------------------

(ii) Religious organizations: specify _____

☐ none	☐ little	☐ moderate/average	☐ a great deal
-------------------------------	---------------------------------	---	---------------------------------------

Subject ID

Centre #

Community#

Household #

Subject #

Subject
Initials

F M L

31. Have you experienced any of the following events during the last 12 months?

	No response	No	Yes	
(i) Loss of job	☐	☐	☐	
(ii) Retirement	☐	☐	☐	
(iii) Loss of crop/business failure	☐	☐	☐	
(iv) Household break in	☐	☐	☐	
(v) Marital separation/divorce	☐	☐	☐	
(vi) Other major intra-family conflict	☐	☐	☐	→ Please specify _____
(vii) Major personal injury or illness	☐	☐	☐	
(viii) Violence	☐	☐	☐	
(ix) Armed conflict/war	☐	☐	☐	
(x) Death of a spouse	☐	☐	☐	
(xi) Death/major illness of another close family member	☐	☐	☐	
(xii) Other major stress	☐	☐	☐	→ Please specify _____
(xiii) Wedding of family member	☐	☐	☐	
(xiv) New job	☐	☐	☐	
(xv) Birth in the family	☐	☐	☐	
(xvi) Separation from family	☐	☐	☐	
(xvii) Unavailability of food/ food insecurity	☐	☐	☐	

Subject ID

Centre #

Community#

Household #

Subject #

Subject
Initials

F M L

32. Please answer the following: (Choose only one option for each)

For the following question, stress is defined as feeling irritable or filled with anxiety, or as having sleeping difficulties as a result of conditions at work or at home.

- | | No
response | Never
Experienced
Stress | Some
Period
of Stress | Several
Periods
of Stress | Permanent
Stress |
|---|--------------------------|--------------------------------|-----------------------------|---------------------------------|--------------------------|
| a) How often have you felt stress at work in the last 12 months?
(Mark here if not applicable: i.e. no longer working ☐) | ☐ | ☐ | ☐ | ☐ | ☐ |
| b) How often have you felt stress at home in the last 12 months? | ☐ | ☐ | ☐ | ☐ | ☐ |

33. What level of financial stress have you felt in the last 12 months?

- ☐ No response
 ☐ Little/none
 ☐ Moderate
 ☐ High/severe

Subject ID

Centre #

Community#

Household #

Subject #

Subject
Initials

F M L

35. Please answer the following: (Choose only one option for each)

	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree
a) I can do most of my regular shopping (food, household necessities, etc.) at stores within easy walking distance (less than 15 minutes) of my home.	☐	☐	☐	☐
b) Walking or bicycling in my neighbourhood is difficult because of the speed and/or amount of traffic.	☐	☐	☐	☐
c) My neighbourhood is generally free from pollution (litter, air pollution and noise pollution).	☐	☐	☐	☐
d) My neighbourhood streets are well lit at night.	☐	☐	☐	☐
e) I can see other people when I am walking in my neighbourhood.	☐	☐	☐	☐
f) I can speak to other people when I am walking in my neighbourhood.	☐	☐	☐	☐
g) There is a high crime rate in my neighbourhood.	☐	☐	☐	☐
h) There is a problem with unattended dogs in my neighbourhood.	☐	☐	☐	☐

Subject ID

Centre #

Community#

Household #

Subject #

Subject
Initials

F M L

36. Please answer the following: (Please check all that apply)

i) Has your household been a victim of the following crime(s) in the last 12 months?

	No	Yes
1. Armed robbery	☐	☐
2. Violent attacks	☐	☐
3. Murder	☐	☐
4. Vehicle hijacking	☐	☐
5. House breaking	☐	☐
6. Theft	☐	☐
7. Rape	☐	☐
8. Women abuse eg. (beat,swear-words,sexual) please specify _____	☐	☐
9. Child abuse eg. (burn,swear-words,rejection) please specify _____	☐	☐
10. Child sexual abuse	☐	☐
11. Other, please specify _____	☐	☐

ii) Do you think that crime in your area has increased in the past 5 years?

☐ No☐ Yes

If yes, which of the following crime(s)?

- ☐ Armed robbery
☐ Violent attacks
☐ Murder
☐ Vehicle hijacking
☐ House breaking
☐ Theft
☐ Rape
☐ Women abuse
☐ Child abuse
☐ Child sexual abuse
☐ Other, please specify _____

Subject ID

Centre #

Community#

Household #

Subject #

Subject
Initials

F M L

37. Questions on HIV:

(i) Do you know people who have HIV/AIDS? ☐ No ☐ Yes

if yes, which of these people: (please mark all that apply)

- ☐ Your children
- ☐ Your grandchildren
- ☐ Your spouse
- ☐ Your family members
- ☐ Your friends
- ☐ People in the community

(ii) What would you consider the mean age of the people who are ill/have died of HIV/AIDS? Tick only one block.

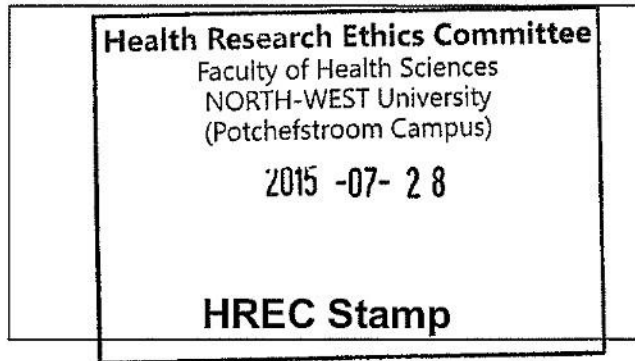
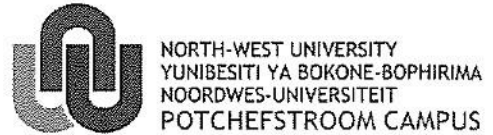
- ☐ Younger than 10 years ☐ Between 11-20 years ☐ Between 21-30 years
- ☐ Between 31-40 years ☐ Between 41-50 years ☐ Over 50 years

(iii) If someone in your household is HIV positive, who is the primary caregiver? Tick only one block.

- ☐ Spouse
- ☐ Parents
- ☐ Family member
- ☐ Child.children
- ☐ Friends
- ☐ Volunteer

38. Do you care for any orphans in your family? ☐ No ☐ Yes

ANNEXURE B: INFORMED CONSENT FORM.



**INFORMATION LEAFLET AND WRITTEN INFORMED
CONSENT FORM FOR PARTICIPANTS OF THE PURE STUDY**

TITLE OF THE RESEARCH PROJECT: Prospective Urban and Rural Epidemiology
(PURE) study

REFERENCE NUMBERS: NWU-00016-10-A1

PRINCIPAL INVESTIGATORS: Prof A Kruger and Dr IM Kruger

ADDRESS: North-West University (Potchefstroom Campus), Africa Unit for
Transdisciplinary Health Research (AUTHeR), Building E8, Office G03.

Dear participant

You have been part of the PURE research since it started in 2005. Whether you took part in the research every year or even only some of the years, we would like to invite you once more to be part of this research.

This information document will provide you with all the information that you need to know about the research. A fieldworker who lives within your community will discuss all of the information in this document with you in order for you to understand why this research is done and why you are invited to be part of this research.

What is this research about?

This research has already started in 2005 and will finish in December 2015. This research study wants to look at different risks to your health and how these risks can develop over time.

What are some of the risks to your health?

- Being too fat (overweight or obese) or too thin (underweight),
- Having high blood pressure (hypertension) or too low blood pressure (hypotension),
- Having too high blood sugar levels (hyperglycaemia) or too low blood sugar levels (hypoglycaemia),

What might cause you to develop some of these risks?

- The type of foods you eat, for example too much salt or too much fat;
- If you don't do any exercise;
- Smoking or using tobacco products;
- Drinking alcohol;
- Some factors (genetic characteristics) that you inherit from your parents or even your grandparents,

Why have you been invited to take part in the study?

You have been invited to be part of the study because:

- In 2005:
 - you were between the ages of 35 and 70 years
 - you were a healthy man or woman

- you did not have any chronic disease or illness
- you permanently lived in a household within the community

Even though you might have developed some illness since 2005, you can still be part of the study. If you are part of the study now we want to see how you are doing.

Do you have to take part in the study?

You are not forced to take part in this research. It is important that you understand that you don't have to be part of this research study. You are invited, and therefore you can choose if you want to be part or not. You can agree to be part of the research now and change your mind later. If you do not want to be part of the research anymore, you will not be treated differently and you will not be punished or judged for not wanting to be part of the research.

This research was approved by a group of people (known as a committee) from the North-West University. These people looked at all the procedures of the research to make sure that if you decide to be a part of the research, you will not be hurt or harmed in any way. These people are known as the Health Research Ethics Committee of the Faculty of Health Sciences of the North-West University on the Potchefstroom campus. It might happen that during the research one or more of these committee members may come to check that the researchers are keeping to the procedures that was explained to you and no unnecessary procedures are performed on you.

What will you have to do if you decide to be part of the study?

If you decide to be part of the study the following will be done:

- A fieldworker that lives within your community will visit you at your house and he / she will explain everything to you and let you ask any questions if you don't understand anything. You will then be given 7 days to think about whether you want to continue to be part of the research.
- If you, after 7 days, agree to continue to be part of the research and you understand everything, you will sign a form, known as a written informed consent form, with the fieldworker.

- Once you have signed the written informed consent form an appointment will be made with you for you to come to the research facility. The date that will be scheduled with you, will be one that suits you the best. All of the arrangements will be made with you to bring you to the place where the research will take place.
- On the day of the appointment one of the taxis involved in the research will pick you up from a place that was arranged with you.
- When you arrive at the place where the research will take place the following will be done with your permission / consent:
 - A small amount of blood (33 ml) will be drawn from the inside of your arm.
 - Your blood pressure will be measured.
 - Your heart function will be checked (electrocardiogram). For us to be able do this test, you will be asked to take off your shirt or blouse to reveal your chest. If you are a women, you are allowed to keep on your underwear. Little round stickers will be placed on your skin all around the area of your heart.
 - The speed that the blood travels through your blood vessels will be measured (pulse wave velocity). This will be done by placing a thing that looks like a pen on the skin of your neck while placing another one on the skin near your pubic area. For us to be able to do this test, the researcher will gently pull down your pants or skirt to reveal just a small area between the inside of your leg and your private area (pubic area) where the pen-like device will be placed.
 - Your blood vessels in your neck will be checked for any blockages or deposits (intima-media thickness) by placing some liquid gel on the skin of your neck and then by using a thing that looks like a torch to take a picture (sonar) of your blood vessels.
 - You will be weighed and your body length will be measured. You will be asked to remove your shoes and all of your extra clothing. You will be allowed to keep on your pants / skirt and your shirt / blouse.
 - The amount of body fat and amount of muscles you have will be measured. You will be asked to remove just your shirt / blouse. If you are a women, you may keep your underwear on. The thickness of your skin on

your stomach, arms and back will be measured using a tong-like instrument. The researcher will pinch the skin between their fingers and place the tong over the skin to measure how thick the skin fold is. A measuring tape will also be used to measure the circumference of your hip, waist and upper arm.

- The amount of fat and muscle will also be measured using a special machine called the Bodpod. You will be asked to climb into the machine and sit on a little bench. A see-through lid will close around you. You will be asked to sit very still and make no movements at all. The machine will blow some air around you and this will then measure the amount of fat and muscle in your body. You will need to wear a tight pants and tight shirt. We will also give you a swimming cap to put on your head while you are in the machine.
- A photo (X-ray) will be taken of your forearm to see if the bones are still hard and strong (bone mineral density).
- Your lung function will be measured. A little plastic pipe will be placed between your lips. Then you have to take a deep breath and blow out the air as hard and as fast as you can through the little pipe.
- You will perform a test to see how strong you're muscles in your hands / forearm (hand grip strength) and legs are (chair stand / rise and walk test). To test how strong your muscles in your hand is you will be asked to squeeze your hand very tight around an instrument with a handle. To test the strength of your muscles in your legs you will have to sit down on a chair and then stand up without using your hands and arms. You will also be asked to walk on a straight line for 6 metres without any help.
- You will complete several questionnaires.
- You will be asked information regarding all the medicines that you currently use.
- You will be asked to give a little bit of urine in a small bottle.
- If you agree and give permission, a HIV test will be performed (If you do not want to be tested for HIV, you can still be part of the study). A needle will be used to prick one of your fingers to get a small drop of blood. This drop of blood will be used to do the HIV test.
- If you are newly diagnosed with HIV, or if you are currently HIV positive we will test your CD4 count. This test will show us how many CD4 cells

there are in your body. These cells keep your body healthy and prevent you from getting sick. If the number of cells are too low then you will need medicine (anti-retroviral therapy (ART)). This test is done by a small prick on one of your fingers to get a drop of blood. The drop of blood will be used to count the number of CD4 cells in your body.

- If you are HIV positive, and you agree and give permission, personal information will be collected from your personal files that are kept at the hospital or clinic that you attend. This will provide us with information to better understand how HIV and the treatment you receive for HIV influence your health.

What do you have to do before coming to the study?

- We ask that you do not eat or drink anything (except for water) from the previous night 22:00 (ten o'clock). This will help to see if your blood sugar levels are normal.
- Please bring along all the medication that you are currently drinking
- Please bring along your South African ID document
- Please bring along your clinic book or medicine sheet that contains all your medication that is prescribed to you

Will you benefit from taking part in this research?

When you are finished for the day, some of the results will be given back to you. This will include:

- Blood pressure
- Blood sugar levels
- Heart function (electrocardiogram)
- Lung function (spirometry)
- How hard the bone in your forearm is (bone mineral density)
- How strong your muscles in your hand / forearm (hand grip strength) and legs (chair stand / rise and walk test) are
- Your height and weight
- Your HIV status and most recent CD4 count – if you gave permission for the test to be done and you want to know your status

If you participate you will also help us to understand what the risks are to your health. If we know what the risks are we can help the government to set up policies that will address this health risks in order to help other South Africans, like you, to have better health.

Are there any dangers involved in you taking part in this research?

Most of the measurements that will be performed won't hurt or harm you in any way, but you might experience the following:

1. If you give permission to a blood sample, you might feel uncomfortable or scared. We want to make sure that you are not hurt in any way and therefore we will use a qualified nurse that has a lot of experience. She will talk to you and explain to you everything that she is going to do in order for you to feel at ease. Some of this blood will be used (tested) to help us to understand what the reason(s) are that some people get non-infectious (non-communicable) diseases (such as heart attack and stroke) as well as high blood sugar (Type 2 Diabetes) and high body weight (obesity) and others may not. All the blood tests and experiments will only look at the reasons that change your chance of getting non-communicable diseases of lifestyle.
2. Some of this blood will also be used to get genetic material (DNA and RNA) to look at genetic factors. Genetic factors (inherited from your parents) are like a book that tells your body how to work. Sometimes there are mistakes (genetic alterations) that cause an increase in your chance of getting non-communicable diseases (these are diseases of the heart and blood vessels (such as heart attack and stroke) as well as high blood sugar (Type 2 Diabetes) and high body weight (obesity). We want to look at these genetic mistakes to better understand how these diseases develop. We promise that all genetic tests and experiments will only focus on genetic factors that contribute to your chance of getting non-communicable diseases of lifestyle.
3. During some of the measurements (weight and height, body composition, ECG, and pulse wave velocity) you will be asked to remove some of your clothes keeping only your underwear or light clothing on. This might make you feel uncomfortable or shy. To help you feel less shy and uncomfortable the area where these measurements will be done will be private and closed off. This

means that no one will be able to see you and that only the person that will take the measurements and someone to help him / her will be with you.

4. You will be asked to do a test (strength test) in order to see how strong the muscles in your hand / forearm and legs are. Although this is not a very hard test to do, and it does not take very long (only a few minutes) you might get tired. The researcher will ask you to rise / stand up from a chair as well as to walk 6 meters. If you feel that you cannot do the test, you will not be forced to do it, and you can move on to the next station.
5. You will be asked not to eat or drink anything from 22:00 (ten o'clock) the night before you come to the study. You will only be allowed to drink water. You should also not eat any breakfast on the morning of the study and not drink coffee, tea, juice or cold drink. Not eating or drinking anything might make you feel uncomfortable or light headed (dizzy or faint). As soon as you arrive at the research study, we will take a blood sample (if you give us permission) and then we will give you a light breakfast to make you feel better.
6. Doing all of the measurements on the day of the study, will take the whole day. This might make you feel very tired. We will give you a lunch as well as tea / coffee / juice / water throughout the duration of the day at the seating / waiting area.
7. Being part of such a big study can be frightening and overwhelming. To prevent us from wasting your time and to make sure that you know where to go and what to do, there will be people available at all times to help you and show you where you have to go every time.
8. HIV testing will also be performed on the day of the study (with your permission). Being newly diagnosed with a long-lasting disease such as HIV might cause you to worry. To help reduce the worry, there will be a professional person (counsellor) that will come and talk to the whole group about HIV and the test they will do. They will explain everything to you. The counsellor will then take you alone to a private room where nobody can hear you when you talk to the counsellor. When they do the test, a small needle is used to prick your finger and

a little drop of blood is used to test for HIV. You can decide if you want to know your status. Whether the test is positive or negative, the counsellor will talk to you alone and give you all of the information that you need to know. If you are positive and you want to know your status, you will receive a letter that you can take to your clinic or hospital and they will help you with treatment.

There are more benefits than dangers / risks when you partake in the study.

Who will see my personal information (data)

When you arrive at the study, you will be given a unique number, and only this number will be used when you provide us with any personal information or when we do the measurements. No one, except the supervisor of this research will be able to identify you. All your information will be kept safe and secret and will be locked away. No one will have access to your information except the supervisors of this study. All of the information will be stored for 5 years after the study has finished.

The PURE study also takes place in other countries. The main country that is supervising this study is Canada. Because we have a contract with them, we have to share the data with them. Only the information you provide us within the questionnaires and the body measurements will be shared with them. We won't share your information from your HIV status or DNA with them. They will also keep your information safe and secret. They will not share your information with anyone else.

Will you be paid to take part in this study and are there any costs involved?

You will be provided with a breakfast when you arrive at the study. Furthermore, the measurements will take about a whole day, and therefore we will also provide you with lunch. Water / juice / coffee / or tea will also be provided.

There will not be any travel costs for you, since we will arrange for transport for you to the research facility and back to the point where you were picked-up. You will also receive R50.00 (fifty rand) for any expenses due to your attendance at the study. If you are referred to the hospital or clinic you can use this money for any expenses.

If you are fulltime employed we will make special arrangements with your employer for you to be able to take part in the study. If you lose your work income for the day you will be compensated for the day (one day of work).

Is there anything else that you should know or do?

- If you have any questions that the fieldworkers cannot answer you can ask that the researcher explains it to you. You can contact the researcher, Dr Lanthé Kruger at 018 299 2093 or lanthe.kruger@nwu.ac.za. You can also contact the researcher if you have any problems with the research.
- You can contact the Health Research Ethics Committee via Mrs Carolien van Zyl at 018 299 2089 or carolien.vanzyl@nwu.ac.za if you have any concerns or complaints that have not been fully addressed by the researcher.
- You will receive a copy of this information and consent form for you to keep with you.

How will you know about the findings?

Results that are immediately available will be given to you in private and in person on the day of the study. Other results of the research will be shared with you as a group (everyone that was a part of this study) and with your community leaders verbally during a personal visit from the lead researchers. When we share the results with the community leaders and with the group we will never share personal information. This means that people will not be able to identify you, and you will be safe from any harm such as stigmatization.

Storage of blood and urine samples

The blood and urine samples that we collect from you will be stored in a special freezer that will protect it. Only we will have access to your blood and urine samples, and no one else. The samples will be kept in these freezers for an unlimited period of time until we have money available to test (analyse) them. All of the tests (analyses) will be related to this study (PURE) and what you give permission for. Some of your blood samples may be sent to laboratories outside of South Africa for analysis if it cannot be done here. If we are finished with the tests of the blood, we will destroy it so that no one else can use it.

Declaration by participant

By signing below, I agree to take part in a research study entitled:

Prospective Urban and Rural Epidemiology study (PURE)

I declare / confirm that:

- I have read this information and consent form and it is written in a language that I understand and is comfortable with.
- I have had a chance to ask questions and all my questions have been answered to my satisfaction.
- I understand that taking part in this study is completely my choice and I have not been forced to take part.
- I may choose to leave the study at any time and will not be penalised or judged in any way.
- I may be asked to leave the study before it has finished, if the researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.

If you want to get tested for HIV you have to give permission here below:

Yes, I want to get tested for HIV

☐

No, I don't want to get tested for HIV

☐

If you want to know your HIV status you have to indicate it to us here below:

Yes, I want to know my HIV status

☐

No, I don't want to know my HIV status

☐

Do you give permission that we may have access to your medical records at the hospital or clinic?

Yes, I give permission

☐

No, I don't give permission

☐

Do you give permission that we may collect your genetic material from your blood sample?

Yes, I give permission

☐

No, I don't give permission

☐

Do you give permission that your genetic samples may be analysed outside of South Africa if it cannot be done here?

Yes, I give permission

☐

No, I don't give permission

☐

Do you give permission that some of your blood samples may be analysed outside of South Africa if it cannot be done here?

Yes, I give permission

☐

No, I don't give permission

☐

Do you want to be contacted when there are any NEW research studies that will take place within your area?

Yes, I want to be contacted

☐

No, I don't want to be contacted

☐

Signed at (*place*) on (*date*) 20....

.....
Signature of participant

.....
Signature of witness

Declaration by person obtaining consent

I (*name*) declare that:

- I explained the information in this document to
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I did/did not use an interpreter.

Signed at (*place*) on (*date*) 20....

.....
Signature of person obtaining consent

.....
Signature of witness

Declaration by researcher

I (*name*) declare that:

- I explained the information in this document to
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I did/did not use an interpreter.

Signed at (*place*) on (*date*) 20....

.....
Signature of researcher

.....
Signature of witness

ADDENDUM A**SUMMARY FOR DATA COLLECTION (2005 – 2015) AND
INTENDEND FUTURE USE FOR THE PROSPECTIVE URBAN
AND RURAL EPIDEMIOLOGIC (PURE) STUDY**

WHAT WAS COLLECTED?	WHAT INFORMATION DOES THIS GIVE US?
1. Blood sample	1.1 DNA damage due to environmental factors 1.2 Genetic factors related to non-communicable diseases 1.3 Indication of liver function 1.4 Clotting factors related to non-communicable 1.5 Risk markers for non-communicable diseases 1.6 Indication of bone health 1.7 Indication of nutritional status
2. Urine sample	2.1 Indication of kidney function 2.2 Indication of salt intake 2.3 Hypertension markers
3. Hair sample	3.1 Presence of toxins (fumonisin mycotoxins)
4. Body composition (Anthropometrics)	4.1 Height 4.2 Weight 4.3 Amount of fat in the body 4.4 Amount of muscles in the body 4.5 Amount of water in the body 4.6 Waist circumference 4.7 Hip circumference 4.8 Head circumference 4.9 Arm circumference 4.10 Leg circumference 4.11 Skinfolds
5. Blood pressure	5.1 To see if the blood pressure is too high or too low.
6. Pulse wave velocity	6.1 Indication of the flexibility of the arteries.
7. Electrocardiograph	7.1 Indication of heart function.
8. Vascular sonar (intima-media thickness)	8.1 Indication of blockages in the blood vessels.
9. Bone mineral density	9.1 Indication of the strength of the bones in the arm.
10. Lung function test (spirometry)	10.1 Indication of lung function.
11. Hand grip strength	11.1 Indication of the strength of the muscles in the hand.
12. Chair rise/stand test	12.1 Indication of the strength of the muscles in the legs.
13. 6 metre walk test	13.1 Indication of the strength of the muscles in the legs.
14. HIV test and CD4 count	14.1 Test for HIV and to test for the levels of CD4 cells in the body.
15. PURE Adult questionnaire	15.1 Provides demographic information. 15.2 Provides information regarding tobacco and alcohol use.

	15.3 Provides information regarding the use of medication. 15.4 Provides information regarding your health. 15.5 Provides information regarding violence and injuries. 15.6 Provides information on major personal events. 15.7 Provides information on female health. 15.8 Provides information on support systems used. 15.9 Provides information on consumer habits. 15.10 Provides information on work-, financial-, and home related stress. 15.11 Provides information regarding your neighbourhood. 15.12 Provides non-personal information regarding people living close to you who have HIV/AIDS.
16. PURE Family census questionnaire	16.1 Provides demographic- and health information on family members currently living within the household.
17. PURE Physical activity questionnaire	17.1 Provides information on the type, duration and frequency of physical activity.
18. International Physical Activity Questionnaire (IPAQ)	18.1 Provides additional information on the type, duration and frequency of physical activity.
19. PURE Health Services questionnaire	19.1 Provides information on health services, health related expenditures, medication use and health knowledge.
20. PURE Annual contact form	20.1 Provides mortality and morbidity information regarding participant and members of household.
21. PURE Event reports	21.1 Provides information regarding new diagnoses of non-communicable disease(s).
22. PURE Verbal Autopsy questionnaire	22.1 Provides information regarding death of participants.
23. PURE: EPOCH 1: Environmental Profile of a community's health	23.1 Provides information regarding community.
24. PURE: EPOCH 2: Environmental Profile of a community's health	24.1 Provides information regarding community.
25. PURE Community profile questionnaire	25.1 Provides information regarding community.
26. Assessing neighbourhood walkability	26.1 Provides information regarding community.
27. Mental health questionnaire: MHC-SF	27.1 Provides information on emotional-, social-, and psychological wellbeing.
28. Mental health questionnaire: SWLS	28.1 Provides information regarding satisfaction with life.
29. Mental health questionnaire: AFM	29.1 Affectometer provides information regarding positive mental health.
30. Mental health questionnaire: MLQ	30.1 Measures to what extent respondents feel their lives are of meaning. Measures how engaged and motivated respondents are in efforts to find meaning or deepen their understanding of meaning in their lives.
31. Mental health questionnaire: PHQ-9	31.1 Provides information on possible mental health disorders.

32. Mental health questionnaire: K6	32.1 Provides information psychological distress (depressive and anxiety symptoms).
33. Mental health questionnaire: MRG	33.1 Provides information on the most meaningful things, most important relationships and most important goals.
34. Mental health questionnaire: MMSE	34.1 Provides information on positive impairment.
35. Bone health questionnaire	35.1 Provides information regarding risk factors for bone health. 35.2 Provides information regarding bone fractures.
36. HIV and stigma questionnaire	36.1 Provides information regarding attitudes and stigma on HIV/AIDS.
37. Medicine use questionnaire	37.1 Provides information regarding use of chronic medication.
38. Quantitative Food Frequency Questionnaire (QFFQ)	38.1 Provides quantitative information regarding frequency of dietary intake. 38.2 Provides quantitative nutrient information. 38.3 Provides quantitative information on nutritional status.
39. 24-hour recall dietary intake	39.1 Provides information of dietary intake over the past 24 hours.

Declaration by participant

By signing below, I, ID number: give permission that all of my data (information obtained from questionnaires, personal communication and interviews, physical measurements, and biological samples) that was voluntarily collected from me during the entire duration of the **Prospective Urban and Rural Epidemiology study (PURE) study** (between January 2005 - December 2015) may be used for any further analyses (primary and secondary), however, with the understanding that any analyses and its related results will only be relevant to the scope of the **Prospective Urban and Rural Epidemiology study (PURE) study**, and for which I gave permission (written informed consent).

I further agree to the secure storage and archiving of all of my data on the premises of the North-West University, Potchefstroom Campus. I understand that all of my data that was collected between January 2005 and December 2015, will be stored for an unspecified period until such time is suitable for appropriate further analyses (primary and secondary), and that it will be kept anonymously to everyone except the principle investigator.

Signed at (*place*) on (*date*) 20....

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Signature of participant

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Signature of witness

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Signature of researcher

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Signature of witness