POLICY BRIEF

THE SOUTH AFRICAN MEDICAL RESEARCH COUNCIL

The Second South African
COMPARATIVE RISK ASSESSMENT STUDY
(SACRA2)

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Authors: Ian Neethling, Rifqah Roomaney and Debbie Bradshaw on behalf of the SACRA2 Collaborating Group

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South Africa has high rates of mortality and morbidity which are underpinned by the occurrence of risk factors related to lifestyle, social behaviours and the environment. The aim of this study was to quantify the contribution of 18 selected risk factors to identify areas of public health priority. This brief is intended for policy makers and health decision-makers to highlight the risk factors that require public health attention and intervention at policy and programmatic level to reduce the burden of disease experienced by the South African population.

Background

South Africa faces a quadruple burden of disease. This includes colliding epidemics of 'maternal, new-born and child health conditions', 'HIV/AIDS and tuberculosis (TB)', 'non-communicable diseases' and 'violence and injury' resulting in a particularly high disease burden considering the average amount that is spent on health care.

The SACRA2 study provides estimates of the disease burden that can be attributed to each of the 18 risk factors, which are considered modifiable through interventions that have been shown to work.[1] Using local empirical data for the prevalence of the risk factors, we have estimated the attributable disability-adjusted life years (DALYs), a composite measure of the loss of health.

Key Findings

- Unsafe sex remained the dominant risk factor between 2000 and 2012, while interpersonal violence persisted as the second leading risk factor.
- Improvements have been observed, in particular, the reductions in the burden attributable to household air pollution and water and sanitation.
- On the other hand, shifts in cardiometabolic risk factors, particularly the rapid emergence of high fasting plasma glucose accompanied by increases in high systolic blood pressure and high BMI, can be seen as well as the increased impact of ambient air pollution.

Methodology

The CRA method is a standardised and systematic approach to quantify the contribution of individual risk factors to the observed burden of disease. The method requires a counterfactual theoretical minimum risk exposure level, the level of risk exposure in the population and the size of the epidemiological relationship between a risk factor and health outcomes known as the Relative Risk (RR). It compares the observed burden of disease due to a risk exposure with the counterfactual to provide a population attributable fraction (PAF).

Population Attributable Fraction (PAF)

A PAF is the proportion of the disease cases in a population that would be prevented if population exposure to a risk factor were absent, assuming the exposure was causal. The PAF is determined by the prevalence of exposure to the risk factor in the population, and the relative risk of disease occurrence given exposure.

Relative Risk (RR)

The relative risk is the risk of developing a disease or being injured or disabled in an exposed population relative to the risk in an unexposed population.

Results

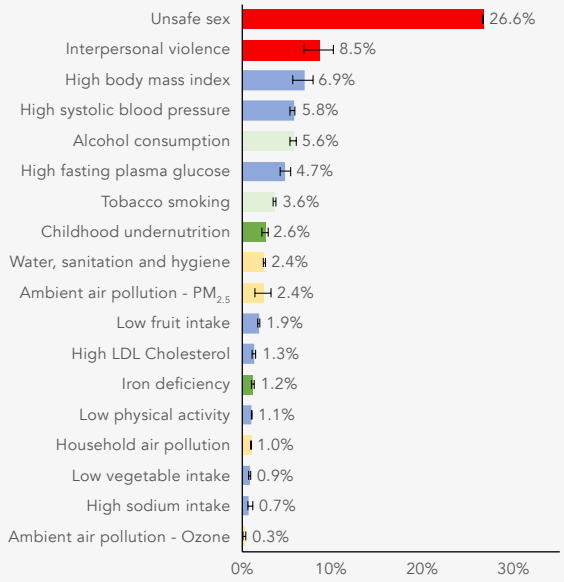

Figure 1. *The proportion of the total burden of disease measured in disability-adjusted life years experienced in South Africa in 2012 attributed to each risk factor.*

Social behaviour risk factors
Non-communicable disease cluster
Undernutrition- related risk factors
Addictive substances and
Environmental risk factors.

LDL=low-density lipoprotein, $PM_{2.5}$=particulate matter size 2.5 µm.

Disability-adjusted life years (DALYs)

This is a summary measure of population health which is quantified by the future stream of life lost due to premature mortality quantified as the years of life lost (YLL) measured against a standard life expectancy, combined with the loss of healthy life due to disabling consequences of disease and injury, i.e. years lived with disability (YLD). Years of life lost in the future have been discounted at a rate of 1.5% per annum.

Age-standardised DALY rates

The overall number of DALYs per 100 000 population if the South African population had the age structure of the world population in 2000.

Data Sources

Estimates of the level of risk exposure by age and sex for the years, 2000, 2006 and 2012 were sourced from local data and statistically modelled, depending on the availability of data. Relative risks were sourced from the Global Burden of Disease, Injuries, and Risk Factors (GBD) study as well as published cohort and intervention studies. PAFs were applied to estimates of deaths and disability adjusted life years (DALYs) from the Second South African National Burden of Disease Study (SANBD2) to obtain the attributable death and DALY for each risk factor.

Study limitations

The major limitation of the study is that the results are for the year 2012 as the latter is the latest year for which burden of disease estimates are available. Without contemporary data, it is impossible to know how different the current risk factor profile might be, nor the impact that COVID-19 would have had. The 2016 South Africa Demographic and Health Survey would suggest, however, that many of the trends in the exposure to risk factors observed in SACRA2 have continued beyond 2012. The 2017 SABSSM survey shows there has been a substantial decrease in the incidence of HIV and model estimates of HIV and AIDS suggest that the disease burden attributable to unsafe sex would be comparable with other leading risk factors.

Changes between 2000 and 2012

- Our study shows slight shifts in the risk factor profile between 2000 and 2012.
  - On the one hand, the increased impact of ambient air pollution accompanied by reductions in household air pollution and improvements in water and sanitation can be seen.
  - On the other hand, shifts in cardiometabolic risk factors, particularly the rapid emergence of high fasting plasma glucose accompanied by increases in high systolic blood pressure and high BMI, can be seen.
- The study highlights enormous potential for health promotion and disease prevention and suggests that risk factors related to NCDs will overtake unsafe sex and interpersonal violence, if not addressed.
- Stronger commitment is needed to support and implement policies aimed at healthier diet and lifestyle choices as well as improving air quality.

2000 Risk Factor	Rank	DALYs	% total DALYs
Unsafe sex	1	5 925 035	31.0
Interpersonal violence	2	2029 020	10.6
Alcohol consumption	3	1 280 187	6.7
High body mass index	4	1 057 665	5.3
High systolic blood pressure	5	970 056	4.9
Tobacco smoking	6	763 910	4.0
Childhood undernutrition	7	614 689	3.2
Water, sanitation and hygiene	8	587 109	3.1
High fasting plasma glucose	9	534 397	2.8
Ambient air pollution - $PM_{2.5}$	10	358 653	1.9
Low fruit intake	11	357 591	1.9
Low density lipoprotein cholestrol	12	286 712	1.5
Household air pollution	13	280 676	1.5
Iron deficiency	14	260 520	1.4
Low physical activity	15	194 284	1.0
Low vegetable intake	16	164 201	0.9
High sodium intake	17	148 601	0.8
Ambient air pollution - Ozone	18	36 086	0.2

2012 Risk Factor	Rank	DALYs	% total DALYs
Unsafe sex	1	5 470 661	26.6
Interpersonal violence	2	1 756 869	8.5
High body mass index	3	1 423 038	6.9
Alcohol consumption	4	1 161 413	5.6
High systolic blood pressure	5	1 105 148	5.4
High fasting plasma glucose	6	971 163	4.7
Tobacco smoking	7	743 997	3.6
Childhood undernutrition	8	530 922	2.6
Water, sanitation and hygiene	9	503 576	2.4
Ambient air pollution - $PM_{2.5}$	10	483 807	2.4
Low fruit intake	11	386 308	1.9
Low density lipoprotein cholestrol	12	270 829	1.3
Iron deficiency	13	239 652	1.2
Low physical activity	14	219 851	1.1
Household air pollution	15	208 816	1.0
Low vegetable intake	16	182 049	0.9
High sodium intake	17	147 326	0.7
Ambient air pollution - Ozone	18	61 130	0.3

Figure 2. *The change in the ranking of the risk factors in South Africa in 2000 and 2012.*

Social behaviour risk factors
Non-communicable disease cluster,
Undernutrition- related risk factors,
Addictive substances and
Environmental risk factors.

Risks are connected by lines between time periods; Solid lines are increases and dashed lines are decreases; DALYs=disability-adjusted life-years. LDL=low-density lipoprotein; $PM_{2.5}$=particulate matter size 2.5 µm.

CALL TO ACTION

This study highlights an urgent need to strengthen health promotion and disease prevention initiatives. In addition, the health surveillance systems to measure risk factors and health outcomes of the population need to be further developed.

Contact

Ian Neethling, email: ian.neethling@mrc.ac.za
Rifqah Roomaney, email: rifqah.roomaney@mrc.ac.za
Debbie Bradshaw, email: debbie.bradshaw@mrc.ac.za

Additional Findings

For additional findings please go to the following link:
2nd South African Risk Assessment Study (SACRA2) | South African Medical Research Council (samrc.ac.za)

SACRA2 Collaborative group

Please find a list of the collaborating group at the following link:
2nd South African Risk Assessment Study (SACRA2) | South African Medical Research Council

Risk factor leads

Unsafe sex - Debbie Bradshaw: debbie.bradshaw@mrc.ac.za
Interpersonal violence - Megan Prinsloo: megan.prinsloo@mrc.ac.za
High BMI - Debbie Bradshaw: debbie.bradshaw@mrc.ac.za
High systolic blood pressure - Beatrice Nojilana: beatrice.nojilana@mrc.ac.za
Alcohol consumption - Richard Matzopoulos: richard.matzopoulos@mrc.ac.za
Fasting plasma glucose - Victoria Pillay-van Wyk: victoria.pillay-vanwyk@mrc.ac.za
Tobacco smoking - Pam Groenewald: pamela.groenewald@mrc.ac.za
Childhood undernutrition - Nadine Nannan: nadine.nannan@mrc.ac.za
Water, sanitation, and hygiene - Nadine Nannan: nadine.nannan@mrc.ac.za
Ambient air pollution – $PM_{2.5}$ - Rifqah Roomaney: rifqah.roomaney@mrc.ac.za
High LDL cholesterol - Ian Neethling: ian.neethling@mrc.ac.za
Iron deficiency - Oluwatoyin Awotiwon: oluwatoyin.awotiwon@mrc.ac.za
Low physical activity - Ian Neethling: ian.neethling@mrc.ac.za
Low fruit intake - Annibale Cois: acois@sun.ac.za
Low vegetable intake - Annibale Cois: acois@sun.ac.za
Household air pollution - Rifqah Roomaney: rifqah.roomaney@mrc.ac.za
High sodium intake - Beatrice Nojilana: beatrice.nojilana@mrc.ac.za
Ambient air pollution ozone - Rifqah Roomaney: rifqah.roomaney@mrc.ac.za

Technical Advisor to the study

Rosana Pacella: r.pacella@greenwich.ac.uk

Reference

1. Bradshaw D, Pillay-van Wyk V, Neethling I, Roomaney RA, Cois A, Joubert JD, Nannan N, Abdelatif N, Awotiwon OF, Turawa EB, Nojilana B, Groenewald P, Matzopoulos R, Prinsloo M, Cairncross E, Wright CY, Peer N, Pacella R, on behalf of the SACRA2 collaborative group. Second Comparative Risk Assessment for South Africa (SACRA2) highlights need for health promotion and strengthened surveillance. South African Medical Journal 2022.