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Sedentariness and overweight in relation to mortality in sub-Saharan Africa. A mediation analysis based on the WHO global health observatory data repository

Sunday Onagbiye,¹ Hannah Asare,² Petra Bester,³ Cristian Ricci⁴

¹North-West University, South Africa; ²Centre of Excellence for Nutrition, North-West University, South Africa; ³Africa Unit for Transdisciplinary Health Research (AUTHeR), North-West University, South Africa; ⁴Africa Unit for Transdisciplinary Health Research (AUTHeR), North-West University, South Africa

Correspondence: Sunday Onagbiye, North-West University, South Africa.

E-mail: onagbiyesunday@gmail.com

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Abstract

Aims: The aim of the study was to investigate the complex mediation analysis between physical inactivity and overweight in relation to mortality.

Methods: The study is based on public data collected by the Global Health Observatory (GHO) of the World Health Organisation.

Results: We showed that the median early mortality attributable to NCDs during the period 2016 - 2019 in both men and women all together was 23.2% (5th to 95th range = 17.2, 35.6) while that in men alone was 25.1% (16.5, 45.7) and that of women was 22.0% (17.0, 27.9). When considering regional early NCDs mortality for both men and women, a systematically high median was observed in Southern Africa (28.7% (22.2, 43.8)) and a low median in Eastern Africa (21.1% (17.15, 27.3)). The analysis of the overall relation between physical inactivity, overweight and early mortality due to NCDs revealed a statistical significance of the direct association between physical inactivity and early mortality due to NCDs.

Conclusion: Our findings revealed three main epidemiological and public health concerns. First, an early mortality attributable to NCDs in a range of about 20% to 30% across the SSA regions for both sexes were observed. Second, there was a direct effect between physical inactivity and early NCDs mortality as well as for the indirect effect mediated by overweight. Finally, a percentage point decrease of physical inactivity prevalence and overweight could effectively generate a reduction of mortality due to NCDs. Future studies are needed to confirm the scientific evidence observed in this study. Such studies should be based on observation of individual subjects, adopt a longitudinal design, and collect information that evaluate the complex relation between physical inactivity and early NCDs mortality, along with the role of overweight as a possible mediator.

Introduction

Globally, noncommunicable diseases (NCDs) have been continuously reported to be the number one leading cause of reduced life expectancy and poor quality of life, and has thus become a major public health concern ¹. According to world experts, NCDs kill an estimated 41 million people every year and this accounts for an estimated 71% of the global mortality burden ². In low- and middle-income countries including sub-Saharan Africa, NCDs have been shown to account for an estimated 77% of all yearly deaths, representing more than 70% of the overall global mortality. The four main types of NCDs and which are also the top four killers with 80% attributable deaths worldwide are cardiovascular diseases (CVDs) such as heart attacks and stroke; cancers; chronic respiratory diseases such as chronic obstructive pulmonary disease and asthma; and diabetes. For instance, cardiovascular diseases alone have been reported to account for 17.9 million deaths annually while cancers, respiratory diseases, and diabetes account for 9.0 million, 3.9 million, and 1.6 million deaths respectively ³. On the other hand, cancers, respiratory diseases and diabetes account for an estimated 22%, 9.5% and 3.9% of the annual deaths in sub-Saharan Africa, respectively ⁴. Of note is that, while the mortality burden of cancers, respiratory diseases and diabetes are similar in men and women, the mortality attributable to CVDs are acknowledged to be higher in women than in men ⁵. There are several risk factors for NCDs with modifiable risk factors such as physical inactivity and overweight being among the most important. In sub-Saharan Africa as an example, the prevalence of insufficient physical activity and overweight are rising, and this is seen to be in relation to the current mass urbanisation and a shift towards westernised lifestyle such as sedentariness and excessive intake of ultra-processed and highly energetic foods ⁶⁻⁸. It has been recently reported that an estimated 21.4% (19.1 - 23.3) of the inhabitants of sub-Saharan Africa were insufficiently active with women (24.8% (21.8 - 27.2)) being less active than men (17.9% (15.1- 20.5)) ⁹. Moreover, data from WHO-Global Health Observatory Data Repository has revealed that the overall prevalence of overweight among adults stands at approximately 29%,

21% in men and 37% in women ^{10,11}. Although physical inactivity and overweight have been extensively reported to be risk factors for many NCDs, their joint effect is still under discussion. Insufficient level of physical activity may act directly on NCDs risk and related mortality by a number of different mechanisms such as impaired functionality of the immune system and increased inflammation ^{12,13}. Furthermore, insufficient physical activity may cause overweight as a result of energy imbalance whereby the calories ingested are greater than the calories utilised ^{8,14}. As a result, physical inactivity may be considered to indirectly increase NCDs risk by acting through weight gain, a mechanism commonly referred to as mediation.

Little is however known about the mediation importance of these two modifiable risk factors for NCDs and their quantitative ratio against one another in sub-Saharan Africa. In view of this, the aim of the present work was to disentangle the above challenge. To this aim, a description was given about insufficient physical activity, overweight and mortality due to NCDs in sub-Saharan Africa using country level information from national surveys from the WHO-Global Health Observatory Data Repository. Afterwards, a mediation model was applied to physical inactivity prevalence, overweight prevalence, and mortality due to NCDs in sub-Saharan Africa. Using this analysis, an estimation was given about the direct and the overweight mediated effect of physical inactivity on mortality due to NCDs in sub-Saharan Africa. Due to a well-known difference of overweight and physical activity patterns by sex, and differences in NCDs mortality profile among sexes, all evaluations were performed by sex. Finally, to consider specific geographical differences, all the above-mentioned evaluation were also done according to the main geographical areas within the greater sub-Saharan Africa.

Methods

The present work was based on available public data collected by the Global Health Observatory of the WHO ¹¹. This data is collected yearly at country-level, representing time

series of ecologic studies, and it is freely accessible to researchers of public and private institutions. Definitions and meta-data of the indicator used are collected on supplementary table 1 while supplementary table 2 gives a description of the overall sub-Saharan Africa and by geographical macro regions.

Statistical analysis

Description of physical inactivity, overweight prevalence, and mortality due to NCDs was performed using median and 5th to 95th centile for the overall sub-Saharan Africa and by geographical macro regions. Data about physical inactivity, overweight prevalence, and early mortality due to NCDs were also described by country using a map of sub-Saharan Africa.

The mediation analysis was conducted using a statistical model based on a system of simultaneous equations. This is a type of statistical model in which a dependent variable could be a function of another dependent variable rather than just an independent variable. In such models, all of the causal relations are jointly determined ¹⁵. A simple system of three simultaneous equation was interpolated to portray the overall framework of one independent variable, one mediator and one outcome. The direct effect (a) was defined by the association between the prevalence of physical inactivity and early mortality attributable to NCDs. The indirect effect of physical inactivity prevalence over early NCDs mortality through overweight prevalence was modelled by two steps. The first step was modelled as the association between the prevalence of physical inactivity with the prevalence of overweight (b). The second step was modelled as the association between the prevalence of the overweight with the early mortality attributable to NCDs. The overall mediation effect comprehensive of the above described direct and indirect effects of physical inactivity over the mortality attributable to NCDs was therefore computed as $b \times c$. Supplementary figure 1 portray the mediation model adopted. All variables were rescaled and normalized using the Blom's transformation, a

mathematical transformation resulting in normalized and rescaled variables following a normal and standard Gaussian distribution, usually acknowledged as ideal for regression¹⁶. The use of such transformation bears at least two great advantages. Firstly, all variables included in the model are normally distributed which should likely results in better fulfilling of regression assumptions such as homoscedasticity, normality of the outcome and normality of the regression residuals. Secondly, regression coefficients result were rescaled in a metric of standardized effect size with values in a range 0.5 - 0.8 resulting in a medium to large effect size with values above 0.8 being interpreted as large effect size. A second regression analysis was conducted on the original data metric to derive the expected reduction in early NCDs' mortality in relation to one percentage point decrease of physical inactivity and overweight prevalence. The Bayesian Information Criteria (BIC) was calculated to report model fitting. All models were performed for the overall sub-Saharan Africa, by sex and by macro regional areas. Mortality due to NCDs during the period 2016 - 2019 was summarized by country using sex specific median while the most recently updated value (updated to 2016) was used for the prevalence of physical inactivity and overweight. Sub-Saharan Africa maps were performed using the `spmap` function of the STATA software, vers. 12. The mediation analyses were conducted using the `lavaan` and the `systemfit` packages of the R software vers. 4.1.2.

Results

Distribution of early mortality attributable to NCDs, prevalence of physical inactivity and overweight.

When considering both men and women together, it was observed in this study that the median early mortality attributable to NCDs during the period 2016 - 2019 was 23.2% (5th to 95th range = 17.2, 35.6) while that in men alone was 25.1% (16.5, 45.7) and that of women was 22.0% (17.0, 27.9). When considering regional early NCDs mortality for both men and women, a systematically high median was observed in Southern Africa (28.7% (22.2, 43.8)) and a low

median in Eastern Africa (21.1% (17.15, 27.3)). A similar higher pattern was observed by sex in Southern Africa with early NCDs mortality of 32.6% (25.1, 50.7) in men and 24.0% (19.5, 38.2) in women. On the other, a lower sex-specific early NCDs mortality was observed in Western Africa in men (22.5% (15.3, 28.8)) and in women (21.5% (17.9, 25.4)). When considering physical inactivity, a prevalence of 21.8% (5.6, 38.2) was observed for the general population of sub-Saharan Africa. Moreover, the prevalence of physical inactivity appeared to be quite higher in women (25.0% (6.0, 47.1)) in comparison to men (17.7 (5.2, 29.1)). An overweight prevalence of 28.1% (22.0, 43.4) was also observed in the general sub-Saharan African population with woman recording a much higher prevalence (35.9% (28.3, 56.5)) compared to men (19.6% (13.7, 33.7)). However, when considering geographical area, the prevalence of overweight in men was higher in Central Africa (24.2% (16.0, 33.7)), and higher in women (52.7% (33.6, 65.4)) in Southern Africa.

Early mortality attributable to NCDs, prevalence of physical inactivity and overweight is reported by region on Table 1. The above results were confirmed, and somehow reinforced by investigations conducted at country level. When considering early NCDs mortality in both sexes, the three countries with the highest early NCDs mortality were all observed in Southern Africa, especially in Lesotho, Eswatini, and Mozambique with prevalence of 38.7%, 38.4% and 26.4%, respectively. This result was partially confirmed when considering the prevalence of physical inactivity with South Africa recording the second to highest prevalence of 38.2% while Mali, a country in Western Africa, recorded the highest prevalence of 40.4%. Finally, Southern African countries such as South Africa and Botswana also recorded the highest overweight prevalence of 53.8% and 43.4%, respectively. When considering men only, it was also observed that Southern African countries such as Lesotho, Eswatini, and Mozambique had the highest early mortality due to NCDs with rate of 39.5%, 45.7% and 50.7%, respectively. It was further observed that Southern and Western Africa countries such as South Africa (28.5%),

Cabo Verde (29.1%) and Liberia (33.7%) had the highest prevalence of physical inactivity in men. Again, when looking at overweight prevalence in men, Botswana, Gabon a country in Central Africa, and South Africa recorded the highest rate of 29.7%, 33.7% and 40.5%, respectively. In women, early mortality due to NCDs was observed to be higher in Western and Southern African countries such as Guinea, Zimbabwe, and Lesotho with rate of 25.4%, 27.9% and 38.2%, respectively. It was also observed that the prevalence of physical inactivity among women was higher in Ivory Coast, Mali, both of which are countries in Western Africa as well as in South Africa with rate of 37.3%, 47.1% and 47.3%, respectively. Finally, women from the Southern African regions were also observed to have recorded the highest prevalence of overweight. Women from Lesotho, Botswana and South Africa had the highest overweight prevalence with a rate of 53.7%, 56.5% and 65.4%, respectively. Early mortality attributable to NCDs, prevalence of physical inactivity and prevalence of overweight are presented by countries on Figure 1.

Mediation analysis of physical inactivity and overweight in relation to early NCDs mortality

The analysis of the overall relation between physical inactivity, overweight and early mortality due to NCDs revealed a statistical significance of the direct association between physical inactivity and early mortality due to NCDs. This association was found to be statistically significant in Western Africa, irrespectively of the sex. In men, a statistically significant direct association was observed between physical inactivity and early mortality due to NCDs in Central Africa. In women, a statistically significant direct association was observed between physical inactivity and early mortality due to NCDs and this was also observed in the Southern African region. Notably, the direct association between physical inactivity and early mortality due to NCDs that was observed in this study is not only statistically significant, but it was also numerically relevant. Thus, having a regression coefficient estimate ranging between 0.30 and 0.53, it may be speculated that a medium to strong direct association between physical

inactivity and early mortality due to NCDs was observed. When considering sub-Saharan Africa as whole, men only and both men and women together, the indirect effects of overweight mediated effect of physical inactivity on the early mortality due to NCDs were statistically significant. However, a borderline statistical significance was observed for the direct effect of physical inactivity over mortality when both the indirect effects were statistically significant. Notably, those statistically significant indirect effects still had a relevantly high value ranging between 0.37 and 0.67. In women, indirect effect linking physical inactivity to overweight was borderline while the other indirect effect linking overweight to early mortality due to NCDs was statistically significant. Again, both direct and indirect effects were statistically significant in the Southern region of sub-Saharan Africa where overweight and physical inactivity were higher. Using mediation analyses models applied to untransformed data, it was observed that a percentage point reduction of physical inactivity would result in 0.22% reduction of early mortality due to NCDs and 0.31% reduction of overweight in men living in sub-Saharan Africa. Moreover, it was observed that a 1% reduction of overweight prevalence in men in sub-Saharan Africa would result in a 0.15% reduction of their early mortality due to NCDs. When considering women in sub-Saharan, it was observed that a 1% reduction of physical inactivity would result in 0.17% reduction of early mortality due to NCDs and 0.37% reduction of overweight prevalence. Furthermore, a 1% reduction of overweight prevalence would result in 0.24% reduction of early mortality due to NCDs in sub-Saharan African women. Finally, according to the BIC, it was observed that the mediation model performed over the overall data frame of all sub-Saharan countries had a quite satisfactory fitting. On the contrary, it should be fairly stated that sub analyses model made by geographical region did not appear to have a satisfactory fitting level, probably due to the fewer number of observations used.

Discussion

This study revealed three main epidemiological and public health concern in sub-Saharan Africa. Notably, an early mortality attributable to NCDs in a range of about 20% to 30% across the sub-Saharan African regions and for both sexes were observed. When the same criteria for calculation was applied during the period 2016 - 2019, an early mortality attributable to NCDs of 12.5% to 13% was observed for Europe and between 13.5 to 14 for US. On the contrary, physical inactivity prevalence in sub-Saharan Africa in 2016 was lower compared to that recorded for the same year in Europe (ranging between 30 to 50% across different European countries) and US (50.1%) ¹¹. Similarly, an overweight prevalence of 38% for both sexes was observed in sub-Saharan African while Europe (58.7%) and US (67.9%) recorded the highest ¹¹. Briefly, it seems that early mortality due to NCDs is higher than what could be expected considering physical inactivity and overweight. This evidence seems contradictory. However, there is a number of possible mechanisms explaining such an outcome. First, there is an increasing body of evidence showing that Black people are at higher risk of NCDs such as CVDs in comparison to Caucasians. Such burden appear as mostly driven by cultural and behavioural factors ^{17,18}. In addition, it has been postulated that some specific cultural behavioural factors negatively interact with the current economic transition and thus possibly resulting in a more than additive negative effect on health status. This sounds as reasonable, especially when considering low- and middle-income countries such as those in sub-Saharan Africa ^{19,20}. There is also an accumulating body of evidence supporting biological mechanisms which showed that Black people have higher NCDs risk, and this is also widely acknowledged for CVDs risk, especially in Black women ²¹⁻²³.

Another remarkable finding of this study was the confirmation of the existence of a direct effect between physical inactivity and early NCDs mortality as well as for the indirect effect mediated by overweight. Firstly, and by using standardized data, it was observed that the direct effect of physical inactivity dominated over the overall indirect effect, and this was numerically higher

by a factor of two. Secondly, and by using the data in their original metric, this study was able to calculate to what extent a percentage point decrease of physical inactivity and overweight prevalence would have resulted in a reduction in early NCDs mortality. This finding has been supported by a large body of scientific evidence by showing some possible reasons and biochemical pathways explaining why physical activity may improve health and reduce NCDs mortality^{12,24–26}. Nevertheless, there is still paucity of evidence regarding the extent to which physical inactivity and overweight may interact or act independently to determine mortality due to NCDs, of which this study sought to address.

Additionally, analysis was done regarding how much of early mortality due to NCDs could be avoided by improving physical activity and reducing overweight in sub-Saharan Africa. Based on the results of this study, it was observed that, a percentage point decrease of physical inactivity prevalence and overweight could effectively generate a reduction of mortality due to NCDs. Indeed, it may seem that the effect of a percentage point decrease of physical inactivity prevalence and overweight over early NCDs mortality reduction is inconsequential, being estimable at 0.2 - 0.3 percentage point. On the contrary, this is a large number of life of years saved considering that the overall mortality due to NCDs seems to be higher than 30 million with respect to the disability-adjusted life years in sub-Saharan Africa as a whole²⁷.

Strength and limitation

The present work has many strength points. Firstly, this study portrayed an updated picture of physical inactivity, overweight and early mortality due to NCDs in sub-Saharan Africa. Such information is of great epidemiological value because it showed to what extent the current economic transition in sub-Saharan Africa impact on health status. Moreover, the findings of this study were detailed at regional level and was performed by sex, thus giving more information of great public health interest. Secondly, the use of the mediation analysis gave the opportunity to investigate how the joint action of physical inactivity and overweight determine

early NCDs mortality in a mechanism where overweight play a mediation role between physical inactivity and early NCDs mortality. Finally, the exposures (physical inactivity and overweight) were regressed over the percentage of 30-year-old-people who would die before their 70th birthday from any NCDs. Consequently, the results of this study could be interpreted as the expected percentage reduction of early mortality due to NCDs, which is given by overweight and physical inactivity.

Nevertheless, this study also had some limitations such as the small sample size of the data used in the analysis. It should however be noted that since this study had countries as observational unit, the limitation of the sample size was somehow inevitable. The small sample size which subsequently affected the statistical power may have resulted in several not statistically significant results, irrespective of the large effect sizes observed. This consideration is particularly true for the analyses stratified by sub-Saharan African regions which were observed to be affected by lower sample size. These limitations may be attributable to the study being based on countries as observational unit. However, it should be highlighted that such limitations are common to all ecologic studies and should not represent an impediment to perform such studies²⁸.

In conclusion, prospective studies are needed to confirm the scientific evidence observed in this study. Such studies should be based on observation of individual subjects, it should adopt a longitudinal design and should collect many information aimed at evaluating the complex relation between physical inactivity and early NCDs mortality, along with the role of overweight as a possible mediator. Until such a goal is reached, the current work represents the best available approach to investigate the complex relation linking physical inactivity to NCDs through overweight in sub-Saharan Africa.

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Supplementary table 1. Definitions of variables used

NCDs' Mortality (%): Mortality from CVD, cancer, diabetes or Chronic Respiratory Disease (CRD) is the percent of 30-year-old-people who would die before their 70th birthday from any of cardiovascular disease, cancer, diabetes, or chronic respiratory disease, assuming that s/he would experience current mortality rates at every age and s/he would not die from any other cause of death.

Overweight Prevalence (%): Prevalence of overweight adults is the percentage of adults ages 18 and over whose Body Mass Index (BMI) is more than 25 kg/m². Body Mass Index (BMI) is a simple index of weight-for-height, or the weight in kilograms divided by the square of the height in meters.

Prevalence of physical inactivity: Percent of defined population attaining less than 150 minutes of moderate-intensity physical activity per week, or less than 75 minutes of vigorous-intensity physical activity per week, or equivalent

Supplementary table 2. List of included Sub Saharan countries by region. Only countries having physical inactivity prevalence, overweight mortality and early mortality due to NCDs were reported

Eastern Africa: Kenya, Malawi, Rwanda, Seychelles, Tanzania, Uganda

Western Africa: Benin, Ghana, Guinea, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, The Gambia, Togo

Central Africa: Chad, Cameroon, Congo, The Democratic Republic of the Congo, Cote d'Ivoire, Gabon

Southern Africa: Botswana, Eswatini, Lesotho, Mozambique, South Africa, Zambia, Zimbabwe

Table 1. Early mortality attributable to non-communicable diseases, prevalence of physical inactivity and prevalence of overweight. Values reported as median (5th to 95th percentile) for sub-Saharan Africa and regional areas.

Men + Women	M-NCDs (%)	P-In (%)	P-OW (%)
sub-Saharan Africa	23.2 (17.2, 35.6)	21.8 (5.6, 38.2)	28.1 (22.0, 43.4)
Eastern Africa	21.1 (17.2, 27.3)	15.2 (5.5, 22.4)	23.4 (20.9, 36.8)
Western Africa	23.1 (17.2, 25.8)	21.4 (9.8, 40.4)	28.4 (22.0, 32.0)
Central Africa	23.3 (22.2, 24.3)	26.7 (23.3, 33.1)	30.9 (23.1, 40.2)
Southern Africa	28.6 (22.2, 43.8)	22.1 (5.6, 38.2)	38.3 (26.4, 53.8)
Men			
Sub Saharan Africa	25.1 (16.5, 45.7)	17.7 (5.2, 29.1)	19.6 (13.7, 33.7)
Eastern Africa	24.8 (17.5, 30.2)	12.2 (5.2, 17.7)	14.8 (13.4, 28.5)
Western Africa	22.5 (15.3, 28.8)	17.7 (9.2, 33.7)	20.3 (14.6, 24.5)
Central Africa	24.2 (22.5, 27.1)	21.3 (17.7, 29.1)	24.2 (16.0, 33.7)
Southern Africa	32.6 (25.1, 50.7)	19.1 (5.1, 28.5)	21.7 (18.0, 40.5)
Women			
sub-Saharan Africa	22.0 (17.0, 27.9)	25.0 (6.0, 47.1)	35.9 (28.3, 56.5)
Eastern Africa	22.0 (17.0, 27.9)	25.0 (6.0, 47.1)	35.9 (28.3, 56.5)
Western Africa	21.5 (17.9, 25.4)	24.9 (10.3, 47.1)	36.0 (29.2, 41.0)
Central Africa	22.5 (17.8, 23.7)	32.2 (26.8, 37.3)	37.4 (29.8, 46.4)
Southern Africa	24.0 (19.5, 38.2)	26.3 (6.0, 47.3)	52.7 (33.6, 65.4)

Notes. **M-NCDs:** Early mortality attributable to non-communicable diseases (%), **P-In:**

Prevalence of insufficient physical activity (%), **P-OW:** Prevalence of overweight (%).

Figure legends

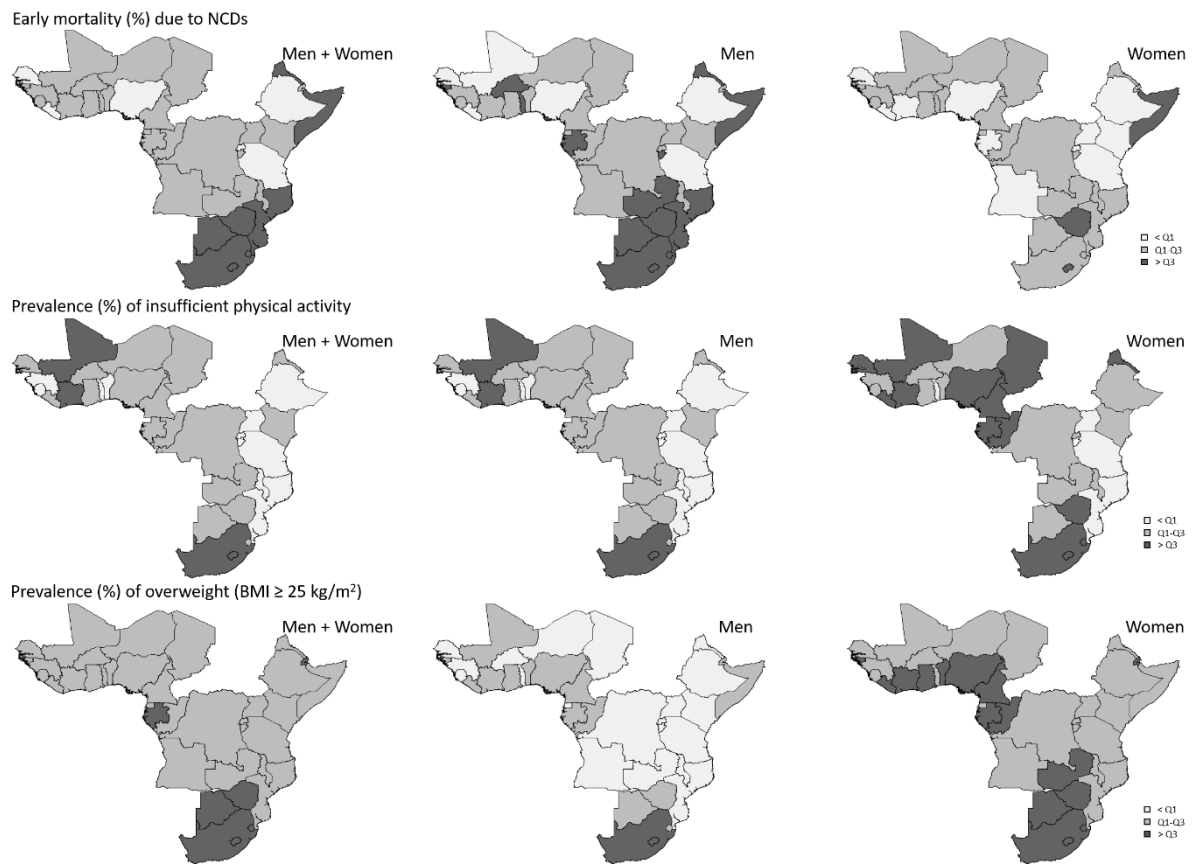
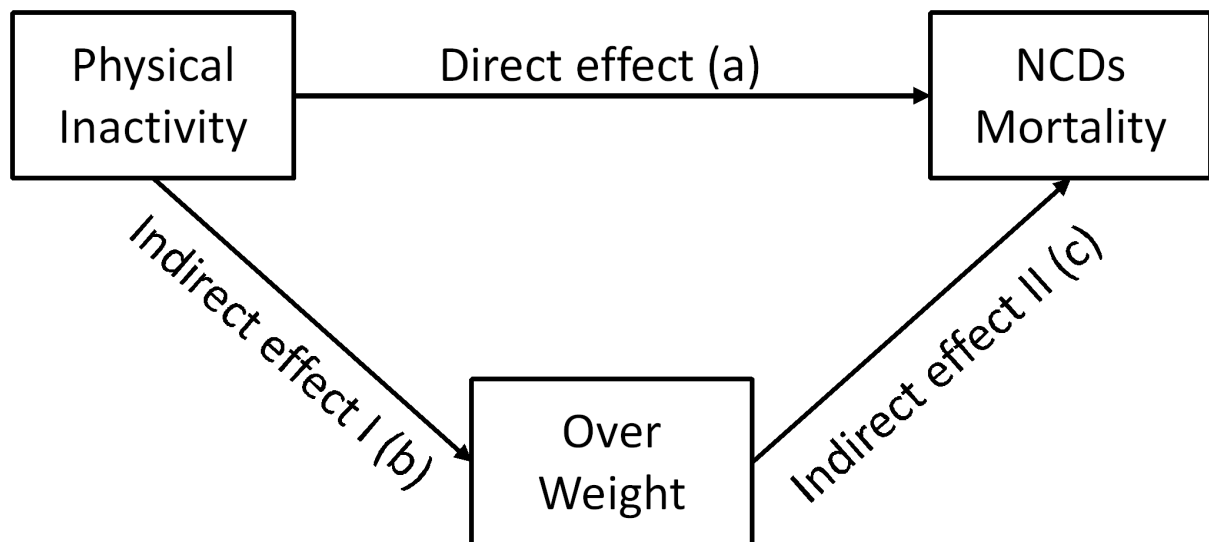


Figure 1. Countries' distribution of early mortality due to non-communicable diseases, prevalence of insufficient physical activity and overweight in sub-Saharan Africa.



Supplementary figure 1. Framework of mediation of overweight on the relation between physical inactivity and mortality due to NCDs.

Table 2. Results of mediation analysis with regression coefficients and 95% confidence limits, statistically significant results are reported in bold ($\alpha < 0.05$), Borderline non-significant results are reported in italic ($0.05 \leq \alpha < 0.1$).

Men + Women	Direct effect (a)	Indirect effect	Indirect effect (c)	Indirect effect (b*c)	BIC
	P-In → M-NCDs	(b)	P-OW → M-NCDs	P-In → P-OW → M-	Fitting
		P-In → P-OW		NCDs	
sub-Saharan Africa	<i>0.36 (-0.01, 0.73)</i>	0.40 (0.08, 0.73)	0.44 (0.10, 0.78)	<i>0.18 (-0.02, 0.37)</i>	193.0
Eastern Africa	0.58 (-0.31, 1.48)	0.08 (-0.86, 1.01)	0.03 (-0.63, 0.70)	0.00 (-0.06, 0.06)	49.7
Western Africa	0.48 (0.09, 0.87)	0.09 (-0.36, 0.53)	0.17 (-0.33, 0.67)	0.02 (-0.07, 0.10)	57.6
Central Africa	0.06 (-0.61, 0.74)	0.22 (-0.23, 0.55)	0.12 (-0.19, 0.43)	0.15 (-0.27, 0.56)	23.3
Southern Africa	0.30 (0.04, 0.55)	<i>0.44 (-0.02, 0.91)</i>	0.23 (-0.11, 0.57)	0.10 (-0.08, 0.29)	28.7
Men					
sub-Saharan Africa	<i>0.34 (-0.03, 0.71)</i>	0.47 (0.17, 0.78)	0.41 (0.05, 0.78)	<i>0.19 (-0.02, 0.41)</i>	190.1
Eastern Africa	0.57 (-0.40, 1.54)	0.76 (-0.41, 1.92)	0.07 (-0.46, 0.60)	0.05 (-0.35, 0.46)	48.1
Western Africa	0.53 (0.12, 0.93)	0.06 (-0.31, 0.44)	0.28 (-0.33, 0.90)	0.02 (-0.09, 0.13)	56.3
Central Africa	0.44 (0.18, 0.71)	0.22 (-1.10, 1.55)	0.19 (0.04, 0.35)	0.04 (-0.21, 0.30)	21.1

Southern Africa	0.20 (-0.07, 0.48)	0.47 (0.04, 0.90)	0.09 (-0.28, 0.45)	0.04 (-0.14, 0.22)	28.8
Women					
sub-Saharan Africa	0.09 (-0.28, 0.46)	0.37 (0.03, 0.70)	0.16 (-0.19, 0.52)	0.06 (-0.08, 0.20)	198.9
Eastern Africa	0.52 (-0.16, 1.20)	0.25 (-0.54, 1.04)	0.43 (-0.16, 1.02)	0.11 (-0.26, 0.47)	48.2
Wester Africa	0.08 (-0.52, 0.67)	0.02 (-0.53, 0.57)	0.35 (-0.26, 0.97)	0.01 (-0.19, 0.20)	62.8
Central Africa	0.03 (-2.42, 2.47)	0.67 (0.45, 0.88)	0.45 (-0.89, 1.78)	0.74 (-1.50, 2.99)	23.2
Southern Africa	0.48 (0.12, 0.84)	<i>0.41 (-0.02, 0.84)</i>	0.59 (0.08, 1.10)	0.24 (-0.09, 0.57)	34.2
