

# Coping, stress hormones and cardiovascular function in urbanised Africans

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*For it is by grace you have been saved, through faith – and this is not from yourselves, it is a gift from God.*

*Ephesians 2:8*

## OPSOMMING

### **AFRIKAANSE TITEL: Coping, streshormone en kardiovaskulêre funksie in verstedelike Afrikane**

**Motivering:** Verstedeliking is tans 'n meer universele verskynsel as ooit tevore. Die negatiewe uitwerking van verstedeliking op gesondheid, onder andere kardiovaskulêre disfunksie, hoë voorkomssyfers van hipertensie en endokriene strespatrone, kom meer prominent voor by swart Afrikane as hul blanke eweknieë. Die verband tussen die onderliggende fisiologiese en psigologiese meganismes van hiërdie verskynsel is egter steeds onduidelik.

**Doelstelling:** Die hoof doelstelling van hiërdie studie is om die verband tussen coping-style, streshormone en kardiovaskulêre funksie by landelike en stedelike Afrikane na te vors en om sodoende te bepaal of daar 'n verband tussen 'n spesifieke coping-styl, streshormoonvlakke en kardiovaskulêre disfunksie is.

**Metodologie:** Hierdie studie is 'n onderdeel van die "Transition and Health during Urbanisation in South Africa" (THUSA) – studie, 'n deursneebeeld van 'n vergelykende epidemiologiese studie wat tussen 1996-1998 afgehandel is. Landdrosdistrikte (37) in Noordwes is geïdentifiseer en ewekansig geselekteer om alle vlakke van verstedeliking te verteenwoordig. Die aanvanklike groep proefpersone het bestaan uit 821 oënskynlik gesonde manlike en vroulike Afrikane tussen die ouderdomme van 16 en 70 jaar. Na die verwydering van onvolledige stelle gegewens het hierdie studiegroep bestaan uit 353 manlike en vroulike Afrikane. Antropometriese metings is gedoen deur geregistreeerde antropometriste en vraelyste is voltooi met behulp van opgeleide veldwerkers en gekwalifiseerde sielkundiges. Proefpersone is verdeel in 'n aktiewe coping (AC) groep en een wat passief cope (PC), soos afgelei van hulle reaksies op die S-COPE-vraelys, as gevalideerde en betroubare Setswana vertaling van die oorspronklike COPE-vraelys. Die proefpersone is daarna verdeel volgens hulle vlak van verstedeliking, d.w.s. in landelike en verstedelike groepe. Die landelike groep het bestaan uit proefpersone van stamgebiede en plaaswonings, met beperkte toegang tot lopende water en krag. Die verstedelike groep het bestaan uit blou-boordjie werkers wat aan die buite-verstedelike rand van die groter metropolitaanse gebiede woon, met toegang tot lopende water en krag. Rustende bloeddrukwaardes is gemeet aan die hand van die FINApres-metode. Proefpersone is verdeel in normotensiewe en hipertensiewe

groepe in ooreenstemming met bloeddrukwaardes van die FINA-pres-metode en die Riva-Rocci/Korotkoff-metode. Vastende, rustende serum-streshormoonwaardes van kortisol, prolaktien en testosteroonvlakke is gemeet en gekorreleer met die kardiovaskulêre waardes, afhanklik en onafhanklik van copingstyle. Betekenisvolle verskille tussen die veranderlikes is bepaal met variansie analyses onafhanklik van ouderdom, liggaamsmassa-indeks (BMI) en leefstylfaktore soos fisiese aktiwiteit, alkoholverbruik en rookgewoontes. Ingeligte toestemming is verkry van alle deelnemers, met die toestemming van die ouers van minderjarige adolessente. Die Etiek Komitee van die Potchefstroomse Universiteit (PU vir CHO) het die studie goedgekeur. Die leser word verwys na die opsomming aan die begin van die manuskrip in Hoofstuk 3 vir 'n beskrywing van die proefpersone, navorsingsontwerp en analitiese metodes wat in hierdie verhandeling gebruik is.

**Resultate:** Resultate van die THUSA-studie toon aan dat die verstedelike proefpersoongroep jonger, fisies meer aktief is, meer alkohol verbruik en hoër hipertensie-voorkomssyfers getoon het as hulle landelike eweknieë. Verstedelike mans het 'n kardiovaskulêre patroon van hoër vaskulêre aktiwiteit, (totale perifere weerstandwaardes (TPR), laer kardiaale omset (CO) en meegewendheidswaardes (Cw) maar hoër hartfrekwensie as landelike persone getoon. Die endokriene profiel van verstedelike mans het hoër prolaktien en laer testosteroonwaardes getoon, gekoppel aan kleiner kortisol:prolaktien en groter kortisol:testosteroonverhoudings. Verstedelike vrouens het dieselde tendens getoon met 'n patroon van hoër vaskulêre aktiwiteit (hoër diastoliese bloeddruk (DBP) en TPR waardes, met laer CO, Cw) en prolaktienwaardes vergeleke met landelike vrouens. As copingstyle in berekening gebring word was dit die AC verstedelike mans vergeleke met landelike eweknieë, wat ook 'n patroon soortgelyk aan dié van alle verstedelike mans getoon het, betreffende leefstylfaktore, bloeddruk en hipertensie-voorkomssyfers. Bykomend het hulle hoër hartfrekwensie- en laer Cw waardes, gekoppel aan groter prolaktien- en kleiner testosteroonwaardes asook 'n groter kortisol:prolaktien-verhouding getoon. Die verstedelike AC en PC vrouens het beide meer alkoholverbruik en hoër vaskulêre aktiwiteit getoon maar slegs die AC vrouens het hoër hipertensie-voorkomssyfers vergeleke met landelike eweknieë getoon. Net die PC verstedelike vrouens het hoër hoër prolaktienwaardes getoon en fisiese aktiwiteit gerapporteer vergeleke met hul landelike eweknieë.

**Gevolgtrekking:** Verstedeliking onder Afrikane kan geassosieer word met 'n swakker kardiovaskulêre patroon gekoppel aan 'n verergerde stres-ervarende

patroon, vergeleke met landelike proefpersone. Hiérdie patroon is meer beklemtoon in AC stedelike mans wat moontlike chroniese stres-ervarings toon, met 'n groter Kortisol:prolaktien-verhouding.

## SUMMARY

### **TITLE: COPING, STRESS HORMONES AND CARDIOVASCULAR FUNCTION IN URBANISED AFRICANS**

**Motivation:** Urbanisation is now a more universal phenomenon than ever before. The negative effects of urbanisation on health, i.e. cardiovascular dysfunction, hypertension prevalence rates and endocrine patterns of stress are more prominently found in black Africans compared to white counterparts. The association between the underlying physiological and psychological mechanisms of this phenomenon, is however, still unclear.

**Objectives:** The main objective of this study is to investigate the association between coping styles, stress hormones and cardiovascular function in rural and urban Africans.

**Methodology:** This study is part of the "Transition and Health during Urbanisation in South Africa" (THUSA) study, a cross-sectional comparative epidemiological study, which ran from 1996-1998. Magistrate districts (37) in the North-West province was identified and randomly selected to be representative of all levels of urbanisation. The initial subject group consisted of 821 apparently healthy African men and women between the ages of 16 and 70 years. After removal of incomplete datasets, this study group consisted of 353 African men and women. Anthropometric measurements were taken with assistance from biokineticists and questionnaires were completed with the help of trained field workers and qualified psychologists. Subjects were divided into an active coping (AC) group or passive coping (PC) group, dependent on their responses on the S-COPE questionnaire, which is a validated and reliable Setswana translated version of the original COPE questionnaire. The subjects were subsequently divided according to their level of urbanisation i.e rural or urban groups. The rural group consisted of subjects from tribal areas and farmland dwellings who had limited access to water and electricity. The urban group consisted of blue-collar workers living on the peri-urban fringe of greater metropolitan areas, who had access to water and electricity. Resting blood pressure values were measured using the FINApres method. Subjects were divided into normotensive and hypertensive groups in accordance with blood pressure values from the FINApres method and Riva-Rocci/Korotkoff method. Fasting, resting serum stress hormone values of cortisol, prolactin and testosterone levels were measured













































































































































