DEPRESSION, STRESS, SOCIOECONOMIC STATUS, & INFLAMMATION IN HISPANIC HF PATIENTS

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HEART FAILURE

• A MAJOR PUBLIC HEALTH ISSUE IN THE U.S. & WESTERN COUNTRIES
• HALLMARK SYMPTOMS SOB, FLUID RETENTION, EDEMA, FATIGUE, & POOR EXERCISE TOLERANCE
• > THAN 5 MILLION AMERICANS CURRENTLY HAVE HF
• > PREVALENT IN ELDERLY WITH > THAN 80% OF HF PTS >= 65 YEARS OLD
• > THAN ½ MILLION NEW CASES DIAGNOSED EACH YEAR
• HIGH 30 DAYS READMISSION RATES D/T HF EXACERBATION
• ACCOUNTS FOR MORE THAN 30% OF THE CAUSES OF HOSPITALIZATION IN ELDERLY PTS
• HOSPITALIZATION ACCOUNTS FOR 65% OF THE COSTS OF TREATING HF
  • $33.2 BILLION & ACCOUNTS FOR 1.5% OF TOTAL HEALTHCARE EXPENDITURE
• ACCOUNTS FOR ALMOST 300,000 DEATHS EACH YEAR IN THE U.S.
• ONE-YEAR MORTALITY RATE IS 50%
• SYMPATHOADRENAL & INFLAMMATORY ACTIVATION
DEPRESSION

A common comorbid in HF (3% - 48%, which is 2-3x that of general public) associated with:

• 2.5 fold higher risk for developing new HF
• Worsening functional decline
• Increased risk of HF hospitalization, LOS, & cost
• Higher outpatient utilization and increased healthcare costs
• Predictive of poor outcomes, short and long-term mortality
• Predictive of cognitive impairment & disability
• High risk for non-adherence to medications and prescribed treatment regimens
• Exaggerated physiologic reactivity to acute stress
• Sympathoadrenal & inflammatory activation
HEART FAILURE & DEPRESSION
SHARED PATHWAYS

• IN VIVO & IN VITRO STUDIES SHOWED CONSISTENT ACTIVATION OF NEURO-SYMPATHETIC (HPA/SNS) & INFLAMMATORY MEDIATORS, SUCH AS IL-1, IL-6, TNF-ALPHA, CRP, FIBRINOGEN,... IN BOTH HF & DEPRESSION

• RCT HAS SHOWN THAT ANTI-INFLAMMATORY MEDICATIONS MAY IMPROVE DEPRESSION OUTCOME

• IN HF THESE MEDIATORS ARE INITIALLY COMPENSATORY BUT DETRIMENTAL WHEN CHRONICALLY ACTIVATED

• THESE INFLAMMATORY MEDIATORS INTERACT WITH KEY BIOLOGICAL SYSTEMS IMPLICATED IN DEPRESSION INCLUDING ALTERING NEUROENDOCRINE STRESS ACTIVITY, NEURAL PLASTICITY, COGNITIVE FUNCTIONING, REACTIVE OXYGEN STRESS SPECIES, AND NEUROTRANSMITTER METABOLISM & ACTIVITY

• CAUSAL RELATIONSHIP IS BIOLOGICALLY PLAUSIBLE BUT REMAINS INCONCLUSIVE
STRESS & SOCIOECONOMIC STATUS

• SES CHARACTERIZED BY A COMPOSITE OF FACTORS E.G. OCCUPATIONAL STATUS, ECONOMIC RESOURCES, EDUCATION, AND SOCIAL STATUS.

• MORE FINANCIAL HARDSHIP, POORER HOUSING CONDITIONS, AND INCREASED LEVELS OF CHRONIC STRESS ALSO CHARACTERIZE LOW SES, AS DOES POORER AND MORE PHYSICALLY REPETITIOUS WORKING CONDITIONS AND LESS JOB SECURITY AND JOB LATITUDE

• LOW SES IS ACCOMPANIED BY POORER HEALTH HABITS AND HIGHER FREQUENCIES OF CORONARY RISK FACTORS, WHICH ACCOUNT FOR APPROX. ½ OF THE SES-CAD RISK FACTORS

• LONGITUDINAL STUDIES INDICATE A STRONG INVERSE GRADIENT BETWEEN SES LEVEL & ADVERSE CARDIAC EVENTS

• LOW SES CAN BE VIEWED AS A COMPOSITE CHRONIC PSYCHOLOGIC STRESS

• STRESS CAN INCREASE THE LIKELIHOOD OF MALADAPTIVE BEHAVIORS AND LIFESTYLE CHOICES THAT ADVERSELY AFFECT HEALTH

• STRESS CAN CAUSE A CHANGE IN SUBJECTIVE SYMPTOMATOLOGY RESULTING IN EITHER OVERUSE OR UNDERUSE OF HEALTHCARE SYSTEM
STRESS & SOCIOECONOMIC STATUS (SES)

- Hypothalamic-Pituitary-Adrenal (HPA) Dysfunction frequently accompanies chronic stress & increased dysfunction is observed as SES levels decline.

- Cortisol variability is inversely related to SES levels.

- Stress associated with self-destructive behaviors such as non-adherence with meds, substance abuse, poor diet, lack of exercise...

- Disruption of autonomic & hormonal homeostasis → metabolic abnormalities, inflammation, insulin resistance, endothelial dysfunction → poor cardiac outcomes.

- Low SES is associated with:
  - Depression
  - Worse cardiac symptoms
  - Increased inflammation
WHY HISPANICS?

- Hispanics represent the largest and fastest growing minority group in the United States with an expected growth to reach 45% of the U.S. population by year 2050.
- Hispanic elderly, currently constitute 5% of Americans will increase by 11 folds by 2050.
- Hispanics appear to be at higher risk for CAD because they are disproportionately affected by cardiac risk factors (diabetes, dyslipidemia, hypertension, obesity, atherogenic diet, and decreased activity).
- A relationship is suggested to exist between Hispanic ethnicity and the presence of HF.
- The growth & high cardiac risk in Hispanics will intensify the increasing prevalence of HF in the U.S.
- Hispanics with HF are at a higher risk for poorer outcomes than non-Hispanic Whites.
- Hispanics are more likely to be hospitalized & re-hospitalized with HF due to higher incidence of metabolic syndrome, poor self-care, barriers to accessing health care, limited financial resources, and low education and occupational grades.
HISPANICS & STRESS

• MANY ARE IMMIGRANTS FROM MEXICO AND ENTER AMERICA TO WORK BUT HAVE NO LEGAL DOCUMENTATION

• THE EXPERIENCE OF IMMIGRATION ITSELF CAN BE EXTREMELY STRESSFUL PARTICULARLY WITH THE TIGHTENING OF THE BORDER CONTROLS OVER THE PAST 15 YEARS.

• MOST MEXICAN IMMIGRANTS HAVE LEFT THEIR SUPPORT SYSTEMS BEHIND, WHICH CAN CONTRIBUTE TO SIGNIFICANT PSYCHOSOCIAL PROBLEMS

• REGARDLESS OF THEIR CITIZENSHIP STATUS, HISPANICS IN THE USA TEND TO HAVE A LOWER SES THAN NON HISPANIC WHITES

• MANY HAVE DIFFICULTY ACCESSING NEEDED SERVICES IN THE USA B/C OF CULTURAL & LANGUAGE BARRIERS

• ACCULTURATION MAY NOT BE PROTECTIVE AND CAN LEAD TO GREATER STRESSES AND PSYCHOLOGICAL PROBLEMS

• REGARDLESS OF PLACE OF BIRTH, REPORT OF DISCRIMINATION IS COMMON

• LITTLE IS KNOWN ABOUT STRESS, DEPRESSION IN HF HISPANICS
RESEARCH GOAL & OBJECTIVES

THE OVERALL GOAL OF THIS EXPLORATORY STUDY WAS TO:

• INVESTIGATE DEPRESSION AND EXPLORE ITS SOCIO-PSYCHO- & BIOLOGICAL DETERMINANTS IN HISPANICS WITH HF.

THE SPECIFIC AIMS OF THIS STUDY WERE TO:

• 1. TO COMPARE DEPRESSIVE SYMPTOMS BETWEEN HISPANICS AND NON-HISPANICS WITH HF
• 2. EXAMINE THE RELATIONSHIP AMONG DEPRESSION, PERCEIVED STRESS, SES, AND CRP IN A SAMPLE OF PATIENTS WITH STABLE HEART FAILURE.
THEORETICAL FRAMEWORK

- HPA ACTIVATION
- SNS ACTIVATION
- & INFLAMMATION

STRESS:
- HF &
- LOW SES

DEPRESSION
- &
- POOR OUTCOMES
METHODOLOGY
SUBJECTS, SETTING, AND DESIGN

• **DESIGN:** EXPLORATORY, CROSSECTIONAL, DESCRIPTIVE

• **SAMPLE:** 55 OUTPATIENTS WITH STABLE HF WERE CONVENIENTLY RECRUITED FROM TWO HISPANIC SERVING COMMUNITY BASED CARDIOLOGY CLINICS.

• **INCLUSION CRITERIA:** AGE OF 18 YEARS OR OLDER, DIAGNOSIS OF HF FOR > 6 MONTHS, NYHA II-IV, & DOCUMENTATION OF LVEF ≤ 40%.

• **EXCLUSION CRITERIA:** SMOKING, ANY CONDITION OR DISEASE THAT AFFECT THEIR IMMUNE SYSTEM, SUCH AS AUTOIMMUNE DISEASE, MALIGNANCY, HIV, CANCER, EXCESSIVE ALCOHOL INTAKE, OR WERE TAKING CORTICOSTEROIDS.

• **COGNITIVE STATUS:** EVALUATED WITH THE MMSE WITH A SCORE OF <=24 SUGGESTIVE OF SUBSTANTIAL COGNITIVE IMPAIRMENT. THE MMSE IS A SIMPLE 30-POINT QUESTIONNAIRE THAT ASSESES FOR VARIOUS MENTAL FUNCTIONS INCLUDING ATTENTION, MEMORY, RECALL, AND ORIENTATION. AVAILABLE IN ENGLISH AND SPANISH

• **ETHICAL CONSIDERATION:** INSTITUTIONAL REVIEW BOARD APPROVAL WAS OBTAINED & ALL SUBJECTS WERE CONSENTED PRIOR TO ENROLLMENT IN STUDY. SUBJECTS WERE REIMBURSED FOR THEIR TIME THROUGH GROCERY STORE $25 GIFT CARD
METHODOLOGY

PROCEDURES & DATA COLLECTION

• **PROCEDURES:** COMPLETED DURING PATIENTS’ ROUTINE CARDIOLOGY FOLLOW-UP.

• **DATA COLLECTION:** SOCIODEMOGRAPHIC AND CLINICAL INFORMATION WERE OBTAINED THROUGH SELF-REPORT QUESTIONNAIRES AND CONFIRMED BY MEDICAL CHART REVIEW.

• **SES:** MULTIDIMENSIONAL CONSTRUCT, INVOLVES INCOME, POVERTY, DEPRIVATION, WEALTH, AND EDUCATION. BECAUSE LEVEL OF EDUCATION HAS SHOWN STABILITY AND A BETTER ASSOCIATION WITH RISK FACTORS FOR CHRONIC DISEASES COMPARED TO INCOME AND OCCUPATION, EDUCATION WAS USED AS THE PRIMARY INDEX.

• **PSS:** USED TO MEASURE SELF-REPORTED STRESS LEVEL. 14-ITEMS, SCORES RANGING 0-56 WITH HIGHER SCORES INDICATING GREATER STRESS.

• **DEPRESSION:** ASSESSED USING PHQ-9- SELF-REPORT QUESTIONNAIRE, CONSISTS OF 9 ITEMS, SCORES RANGE 0 TO 27 WITH HIGHER SCORES REPRESENTING HIGHER LEVELS OF DEPRESSIVE SYMPTOMS.

• BLOOD COLLECTED FOR HS-CRP ANALYSIS

• **STATISTICAL ANALYSIS:** T-TEST, CH-SQUARE, MULTIPLE LINEAR REGRESSION ANALYSIS USING SPSS VERSION 22
## RESULTS-GROUPS’ COMORBIDITIES COMPARISON

*P≤ .05*

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RESULTS-GROUPS’ MEDICATIONS COMPARISON

*P≤ .05

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<th>NON-HISPANICS N=38 (%)</th>
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<td>ACE INHIBITORS</td>
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<td>ALDACTONE</td>
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## RESULTS - GROUPS CHARACTERISTICS & COMPARISON

*P ≤ .05

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<td>AGE</td>
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<td>INCOME</td>
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<td>Hs-CRP</td>
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## RESULTS - LINEAR REGRESSION ANALYSIS #1

SES-EDUCATION

*P ≤ .05*

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<tr>
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<td>CRP (log trans)</td>
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RESULTS - LINEAR REGRESSION ANALYSIS #2
SES AS YEARLY INCOME
*P ≤ .05

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<tr>
<td>hsCRP (log transf.)</td>
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DISCUSSION

• DESPITE SOME LIMITATIONS, SOME OF THE RESULTS OF THIS STUDY ARE CONSISTENT WITH EXISTING EVIDENCE. OTHER FINDINGS ARE NEW ALTHOUGH CONSIDERED PRELIMINARY.
  • HISPANICS HAVE LOWER SES: EDUCATION & INCOME LEVELS
  • LOWER RATES OF HF SECONDARY TO ISHD IN HISPANICS
  • NO DIFFERENCE WAS FOUND BETWEEN HISPANICS AND NON-HISPANICS IN DEPRESSION AND PERCEIVED STRESS SCORES AND CRP PLASMA LEVELS
  • SES DID NOT PREDICT DEPRESSION SCORES
  • CRP DID NOT PREDICT DEPRESSION SCORES POSSIBLY BECAUSE OF THE SMALL SAMPLE NUMBER
  • PERCEIVED STRESS INDEPENDENTLY PREDICTED DEPRESSION SCORES
• ALTHOUGH NOT INVESTIGATED, PERCEPTION OF STRESS AND NOT THE CAUSE OF STRESS MAY PLAY A KEY ROLE IN DEPRESSION STATES AND THUS MUST BE THE ULTIMATE TARGET FOR INTERVENTIONS WITH THESE PATIENTS.
STUDY LIMITATIONS

• SMALL SAMPLE NUMBER-EXPLORATORY
• STUDY DESIGN-CROSSSECTIONAL, DESCRIPTIVE
• HOMOGENOUS SAMPLE
  • OUTPATIENT
  • MAJORITY OF HISPANICS IN CALIFORNIA ARE ORIGINALLY FROM MEXICO
NURSING IMPLICATIONS

• THE AHA RECENT ADVISORY ON THE SCREENING, REFERRAL, AND TREATMENT OF PATIENTS WITH DEPRESSION & HEART DISEASE RECOMMENDS THAT AN ASSESSMENT OF DEPRESSIVE SYMPTOMS BE PERFORMED USING VERSIONS OF PHQ.

• BECAUSE OF THE HIGH PREVALENCE & UNTOWARD EFFECTS OF DEPRESSION IN PATIENTS WITH HF, APN ARE BEST EQUIPPED TO IMPLEMENT THEIR SPECIALIZED KNOWLEDGE AND SKILLS IN THE IDENTIFICATION & TREATMENT OF DEPRESSION

• STRATEGIES SHOULD FOCUS PRIMARILY ON INDIVIDUALIZED PATIENT ASSESSMENT, ENHANCED PATIENT-NURSE COMMUNICATION, PHARMACOLOGIC & NON-PHARMACOLOGIC INTERVENTIONS, SELF-MANAGEMENT STRATEGIES, INTENSIVE PATIENT/CAREGIVER EDUCATION REGARDING CHRONIC ILLNESSES & COMORBID CONDITIONS, RECOGNITION OF WORSENING SYMPTOMS, & RESOURCE ALLOCATION
RESEARCH IMPLICATIONS

• THE EVIDENCE IS GROWING ON THE EFFECT OF THE IMMUNE SYSTEM AND ITS RELATIONSHIP TO CARDIAC DISEASE. HOWEVER, REDUCING STRESS CAN BE DIFFICULT PROSPECT, PARTICULARLY AMONG LOW INCOME AND MINORITY POPULATIONS FACING A MYRIAD OF STRESSORS BEYOND THEIR CONTROL. RATHER THAN REDUCING STRESSORS, HELPING PATIENTS DEVISE HEALTHIER AND MORE EFFECTIVE COPING MECHANISMS MAY BE A MORE FRUITFUL STRATEGY IN MINIMIZING THE HARMFUL EFFECTS OF STRESS.

• BEHAVIORAL CARDIOLOGY IS EMERGING AS A FIELD OF CLINICAL PRACTICE BASED ON THE RECOGNITION THAT ADVERSE LIFESTYLE BEHAVIORS, EMOTIONAL STRESS, AND CHRONIC LIFE STRESS CAN ALL PROMOTE CAD AND ADVERSE CARDIAC EVENTS.

• PROSPECTIVE STUDIES ARE NEEDED TO DETERMINE WHICH PATIENTS MAY RESPOND TO SPECIFIC FORMS OF BEHAVIORAL INTERVENTIONS AND ALSO DEFINE HOW CARDIOLOGY PROVIDERS CAN BEST COLLABORATE WITH OTHER HEALTHCARE PROVIDERS AND HEALTHCARE DELIVERY SYSTEMS TO REDUCE PSYCHOLOGIC DISTRESS IN A COST-EFFECTIVE AND PRACTICAL MANNER.
REFERENCES


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