Preventing Cardiovascular Disease:
Going Beyond Conventional Risk Assessment

Running title: Gidding et al.; Going Beyond Conventional Risk Assessment

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The rise of cardiovascular disease (CVD) as a leading cause of medical morbidity and mortality world-wide has long been thought to be a consequence of industrialization. As industrialization has spread globally, CVD has risen as a world-wide cause of illness and death. Diets higher in saturated fat and salt, sedentary lifestyle, tobacco use, and obesity, known cardiovascular risk factors, all appear to accompany industrialization. However, it is unlikely that a “return to nature” will solve the CVD problem. A positive consequence of industrialization is a longer life expectancy in part due to a more stable food supply, modern control of infectious diseases, and reduced perinatal morbidity. Since CVD has a long incubation period, perhaps the most potent cardiovascular risk factor is age, one “cause” of higher disease rates may be simply living long enough to acquire heart disease.

If the oversimplifications above told the entire story, CVD rates would equally impact the population across all social strata and in all countries. However, this is not the case. After age, the second most ignored cardiovascular risk factor is socioeconomic status, with those at the lower end of the spectrum having dramatically higher rates of CVD. While early in the course of industrialization, the upper classes might have been the first to experience the rise in CVD rates, as industrialization progressed it is the lower classes that have suffered disproportionately. In analyses structured to emphasize the impact of socioeconomic status on risk, the gradient from the lowest to the highest classes may be as much as four fold. The two risk factors with the highest gradients across social class are probably tobacco use and obesity, abetted by lower education, the higher cost/lower availability of higher nutritional quality foods to poorer people, and marketing of less healthy products, including tobacco, to lower classes.

In this issue of Circulation, Pulkki-Raback et al report that psychosocial factors measured in youth impact cardiovascular health in young adulthood, independent of cardiovascular risk
factors. The effect was not trivial, from the lowest to the highest quintile of psychosocial risk, the median change in cardiovascular health was almost the equivalent of a major risk factor. An approximate assessment of the impact of such a change on life expectancy may be obtained from studies of lifetime cardiovascular risk. Berry et al combined data from 18 cohort studies with average age at enrollment about 15 years older than the young adults studied by Pulkki-Raback et al. Over the course of follow up, one additional risk factor would increase likelihood of CVD from a baseline of about 4-5% with low risk to 12-15% with one risk factor. If one assumes that psychosocial factors are causal in the acquisition of behaviorally mediated conventional risk factors, the impact is likely even greater as true risk would be the sum of the risk factor and the psychosocial factors. The implication of this study is that psychosocial factors exert an influence on CVD beginning at a very young age, in much the same way that an inherited dyslipidemia or early onset of tobacco use might contribute to chronic risk exposure. This effect is not limited to CVD and extends to other diseases as well.

The most important of these psychosocial factors, according to the data of Pulkki-Raback et al are socioeconomic environment, the better off you are the more likely you are to have better cardiovascular health, and self-regulatory behavior, the more you are able to tolerate frustration, get along well with others, and not engage in violent behavior, the likelier you are to have low risk. Favorable family health behaviors and emotional environment performed the next best in multivariate models with smaller contributions from social adjustment and recent stressful events. These findings lend credence to the idea that improved education, per se, will lower CVD rates. Education by itself can improve health judgments, improve social adaptation, and help reduce psychosocial stressors.

Understanding psychosocial factors that predict cardiovascular health is important in so
far as they can be modified to improve outcomes. While Pulkki-Råback et al state that attainment of the AHA goal to improve population health by 2020 might be facilitated by targeting psychosocial factors, they don’t discuss if and how specific psychosocial factors examined in this study can realistically be modified. Certainly, this is no easy feat, particularly for factors related to economic status and family environment, and is not likely to be achieved by pediatricians or medical specialists who are typically charged with the task of improving the health of individual children. Instead, population-based, family-focused prevention and intervention efforts are likely to have the highest yield. Universal prevention strategies are also consistent with Pulkki-Råback et al’s finding that the effects of psychosocial factors persist throughout the range of cardiovascular health rather than simply having effects in the high-risk population.

Several family-focused prevention/intervention programs have demonstrated beneficial effects on child and family psychosocial factors. The Incredible Years®, a group of workshop-based programs for parents and teachers, has been shown to increase positive parenting and improve children’s behavior, emotional literacy, social skills, problem solving, and school readiness. The Triple P Positive Parenting Program, which provides support and guidance to parents in a variety of formats (e.g., group sessions, public seminars, one-on-one support, eight-module online parenting course), has demonstrated positive effects on children’s social, emotional, and behavioral outcomes, parenting practices, parenting satisfaction and efficacy, and child–parent relationships. Mothers participating in the Nurse–Family Partnership, a program of prenatal and infancy home visiting by nurses for low-income mothers having their first babies, demonstrated reduced prenatal tobacco use, greater intervals between births, improvements in employment, and reduced use of Medicaid and other public assistance, while their children exhibited reduced behavioral problems, depression, and injuries. Of note, aspects of each
psychosocial factor examined by Pulkki-Råback et al (socioeconomic environment, emotional environment, parental health behaviors, stressful events, self-regulation of the child, social adjustment of the child) have been impacted by one or more of the family-focused programs described above. However, such programs cannot be successfully implemented at the population level without significant community, state and federal commitment.

Besides concerns about whether or not the factors identified in this study are modifiable, it is unclear if they are generalizable. A high psychosocial score is strongly dependent on having a classic nuclear family and strong social support networks. For several of the categories, particularly self-regulatory behavior and lack of stressful events, the vast majority of the cohort achieved the highest possible score; for others (high social adjustment and favorable health behaviors of parents) this was also true in a high percentage. This suggests that those children at highest future risk are at the extreme adverse end of the psychosocial scales herein and may have many more proximate problems to worry about than CVD 30-50 years in the future. Further, these data were collected several decades ago, long prior to the “digital age” which has considerably altered both the activities of daily life and interpersonal communication.

In reviewing this thought provoking paper, it was hard for us not to wonder about the actual meaning of the term ‘psychosocial”. Is it simply a catch all phrase for that universe of factors that are not biologically measurable such as lipid levels or blood pressure or body mass index or other novel risk factors? Or, more positively, is it a useful construction describing measureable psychological and sociological factors that are important in contemporary life? Perhaps the safest thing to say about the word “psychosocial” is that like increasing rates of CVD, psychosocial factors, as currently defined, are an inevitable consequence of industrialization.
Conflict of Interest Disclosures: None.

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