



Published in final edited form as:

Pain. 2008 June ; 136(3): 235–238.

Socioeconomic Disadvantage and Pain

Ellen L. Poleshuck^a and Carmen R. Green^b

^aDepartments of Psychiatry and Obstetrics/Gynecology, University of Rochester Medical Center, Rochester, NY 14642 USA

^bDepartment of Anesthesiology, University of Michigan Health System, Ann Arbor, MI, 48109 USA

1. Introduction

Socioeconomic disadvantage (SED) and its contribution to the pain experience is of growing interest and relevance. This review will provide a brief overview of definitional and measurement issues related to SED. Selected literature considering the relationships between SED and pain will then be summarized, and several possible mechanisms to explain the relationships will be considered. Last, future directions for research and practice will be discussed.

2. Definitions of socioeconomic disadvantage

Socioeconomic disadvantage has been defined in many ways, making it difficult to compare studies or to identify patterns across studies [27]. Educational level is often used as a proxy for SED among individuals with health concerns since it is easily obtained, relatively stable beyond early adulthood, unlikely to be changed by impaired health, and has a greater association with health than income [6,26]. Yet education varies across groups in its social meaning and consequences, may be less relevant to those living below the poverty level, has limited variability, and the economic return of education varies by gender, race, and ethnicity [16,27]. Socioeconomic status (SES) is a composite demographic variable also frequently used in health research. SES generally includes a summary score composed of income, occupational status, and educational level. It is challenging to measure occupational status for individuals who work in the home or are not employed, however, a particularly relevant issue for individuals with pain. Additional limitations to using SES include: 1) information is limited to the individual, neglecting household and neighborhood information [8]; 2) its lack of precision and reliability; 3) it can fluctuate over time; 4) individuals' reluctance to disclose income information; and 5) it may not be comparable across racial, ethnic, age, or gender groups [1,27]. Other variables (e.g. income, housing status, and insurance status) are often used in SED studies, but again there are difficulties associated with each of these measures. In planning pain studies, the complexity of determining what variables are most relevant for assessing SED in an increasingly diverse and aging society must be considered.

Corresponding Author: Ellen L. Poleshuck, Ph.D., 300 Crittenden Boulevard, University of Rochester Medical Center, Rochester, NY 14642, USA, Phone: 585-275-3138, Fax: 585-276-2065, E-mail: Ellen_Poleshuck@urmc.rochester.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

3. The association between pain and socioeconomic disadvantage

The relationships between socioeconomic disadvantage and risk for chronic disease are largely constant regardless of the definition of SED used. Over the years, lower SES has been associated consistently with virtually every aspect of poorer health including increased morbidity, decreased life expectancy, and higher infant mortality [20]. Not surprisingly, SED also is consistently associated with increased risk for pain. Pain and SED are linked for patients with an array of pain sites (e.g. musculoskeletal [9], sciatica [14], ulcer [18], neuropathic pain [31]). The relationship between SED and pain spans continents, including Europe [2,12] and North America [5,25]. Finally, associations between SED and pain have been found in both community samples [5] and medical settings [31] alike.

4. Possible Mechanisms

While there is good evidence supporting SED as a risk factor for pain, identifying explanatory mechanisms is complicated. Improved understanding of how pain and SED are related can lead to improved treatment for individuals with SED and pain. Recent articles investigating possible mechanisms will be described briefly.

A. Pain coping

Positive pain beliefs and active pain coping strategies, such as positive self-statements, tend to be more effective than negative pain beliefs and passive pain coping styles, like catastrophizing, praying and hoping [3]. Individuals with less education tend to use less effective pain coping strategies [4]. In their study of 293 patients seeking care in a pain clinic for chronic spinal pain, Roth and Geisser [26] developed and tested a mediational model of cognitions to explain the relationship between educational level and pain. Path analysis revealed that perceiving pain as an uncontrollable signal of harm and catastrophizing mediated the relationships between educational level and pain-related disability. One explanation might be that higher education is associated with better critical thinking skills, better ability to navigate healthcare systems effectively, more effective interactions with health care providers, all leading to greater belief in agency over one's own health [27]. As the study authors suggest, if pain patients feel helpless and hopeless, and have a passive approach to their recovery, greater difficulty with pain is a likely outcome. Studies such as Roth and Geisser's promote the development of explanatory models to advance specificity in understanding the association between SED and pain.

B. Race and ethnicity

There is a substantial literature designed to understand the role of race and ethnicity in the pain experience. While definitional challenges regarding race and ethnicity complicate this literature, there is evidence for differences in pain frequency, severity, disability, and treatment by race and ethnicity [7,10,11]. One potential explanation for the association between SED and pain could be it is better accounted for, or is confounded by, the association between race, ethnicity and pain. Portenoy and colleagues' [25] community-based telephone survey of 1335 people found lower income, less education, and being unemployed, but not race or ethnicity, predicted pain disability. Of note, African American and Latino participants were more likely to be in each of these categories than Whites. Similarly, in a study of 2,070 adults aged 50 and over attending a pain clinic, structural equation modeling demonstrated complicated relationships between race, neighborhood SES, and pain, and these relationships varied depending on the specific pain dimension used [8]. Overall, however, neighborhood socioeconomic status was a better predictor of pain than African American or White racial status. Not all studies have found that SED is important to understanding the relationship between race and pain [24], and further investigation into the association between race,

ethnicity, SED, and pain is indicated. Based on the limited evidence examining pain specifically and health more generally, racial and ethnic differences in pain experiences probably are related to SED but cannot fully account for the association.

C. Occupational factors

Socioeconomically disadvantaged individuals often have physically demanding jobs with limited autonomy, low job satisfaction, and poor or no health insurance. All may directly or indirectly increase chronic pain rates. In a review of 15 observational studies [30], the lack of work autonomy and job modifications predicted chronic pain disability. There is less evidence that lack of job satisfaction, heavy physical demands, perception of difficult job conditions, and low SES increased risk for chronic pain disability. Occupation is closely intertwined with SED, and it is difficult to separate its impact on specific job responsibilities as compared to the income, status, autonomy, and stress levels associated with different occupations. An interesting study of 38,000 employed Norwegian adults examined the respective contributions of workplace conditions and educational level to pain. Work autonomy, physical demands, and job satisfaction played much more minor roles than did education in predicting back pain disability [12]. Although further research is needed, occupational factors may account for some of the associations found between SED and pain.

D. Other possible mechanisms

Many other factors contribute to the association between SED and pain that have not been directly examined. Contextual issues often occurring with SED could prove particularly relevant to understanding associations between SED and pain. Social support, for example, is associated with both educational level [22] and pain [30]. The quality and quantity of interpersonal relationships may serve as a protective or risk factor for the link between SED and pain. Healthy relationships with a partner, family or friends may buffer individuals from the cumulative toll of SED, decreasing pain vulnerability. Additionally, childhood abuse is more common among individuals with SED [28] and with pain [17]. There are long-term implications of childhood abuse in addition to mental health, such as changes in pituitary-adrenal axis and autonomic nervous system responsivity [13]. Further research may increase understanding of the impact of childhood abuse and its association with SED and pain.

Implications and future directions

Clearly SED plays a key role in understanding pain. Several directions for additional investigation and practice follow.

First, a more standardized and comprehensive approach to defining and measuring SED is necessary in the pain field. We recommend using multiple relevant indicators, including years of education, household income divided by number of household members, insurance status, and neighborhood SES. Stratifying by race, ethnicity, gender, and age allows for examination of potential interactions between SED and these other variables; for example, African American women with SED may prove to be at particular risk for pain difficulties. Occupational status may be less useful in capturing SED given the impaired function of many pain patients. Additionally, we recommend not collapsing data such as education into categories to preserve as much range and precision as possible [19]. These strategies allow for a more comprehensive and accurate evaluation of SED, facilitating comparisons across studies and promoting greater specificity in understanding the factors influencing differences [27].

Second, individuals with SED must be studied in pain research. Research based in settings such as churches, homeless shelters, and community centers, and using targeted neighborhoods for recruitment, would include individuals with SED who may be missed in traditional pain

studies recruiting through phone or mail surveys or in medical settings. The validity of commonly used pain measures for individuals with SED should also be evaluated. Most measures are validated with predominantly educated White individuals with financial resources, and it is important to consider whether these measures function differently with different populations. Community-based participatory research with patients, families, and health care practitioners may be a particularly useful method for understanding the treatment needs of patients with pain and SED. Increased understanding of obstacles to engagement and adherence in pain treatments would contribute to the development of more appropriate treatment options. Individuals with low-income, lack of insurance coverage, or chronic pain, for example, are all more likely than those with higher income, insurance coverage, or no disabling pain to fail to fill a prescription due to cost [15]. In a study of treatment adherence among low-income individuals with panic disorder [21], treatment engagement and adherence was higher among those who: a) expressed understanding of how treatment might help them, and b) had fewer logistical barriers such as transportation and work constraints. Lastly, differential treatment effects need to be considered; patients with SED and pain may respond differently to standardized treatment of pain.

Third, more complex and comprehensive models for understanding the relationships between SED and pain must be developed and tested. Exploring how SED may interact with other risk factors to contribute to pain and treatment outcomes and possible mechanisms to explain the link between SED and pain will lead to better models and facilitate development of treatment guidelines. Studies examining the respective contributions of SED, race, and ethnicity in predicting pain, similar to Portenoy and colleagues' work [25], provide useful examples of research that serve to develop and refine working models.

Fourth, clinicians should be aware of their patients' life situations and recognize when SED and other challenges may contribute to the pain experience. Treatment recommendations may not be followed if a patient is coping with extreme socioeconomic disadvantage and related stressors. Referrals to social workers, public welfare agencies, and other resources may be important to consider. While acknowledging and addressing patients' life situations is unlikely to resolve their pain conditions, it may help to enhance physician-patient relationships, increase adherence and outcomes, limit time and money spent on unsuccessful interventions, and improve patients' quality of life and functioning. Last, social and health policy changes designed to decrease financial disparities and improve health care access and quality are needed. Improvements in housing, education, and employment, in addition to health systems, must be included in processes designed to improve health in general, and pain specifically [29].

This review provides a brief survey of recent work regarding socioeconomic disadvantage and pain. Our conclusions are tentative because we did not rate the quality of the studies, and because the variation in measuring SED makes it difficult to compare across studies. Nonetheless, the preponderance of the work finds compelling evidence that SED impacts pain systematically and must inform our work with pain patients.

Acknowledgements

Donna E. Giles, Ph.D. provided invaluable feedback on an earlier draft of this paper. Matthew E. Bair, M.D.'s thoughtful and important input also contributed to the manuscript development. The work was supported in part by NIH/NIMH Grant 5K23MH079347.

Reference List

1. Baker TA, Green CR. Intra-race differences among Black and White Americans presenting for chronic pain management: the influence of age, physical health, and psychosocial factors. *Pain Med* 2005;6:29–38. [PubMed: 15669948]

2. Bergman S, Herrstrom P, Hogstrom K, Petersson IF, Svensson B, Jacobsson LTH. Chronic musculoskeletal pain, prevalence rates, and sociodemographic associations in a Swedish population study. *J Rheumatol* 2001;28:1369–1377. [PubMed: 11409133]
3. Boothby, J.; Thorn, BE.; Stroud, MW.; Jensen, MP. Coping with Pain. In: Gatchel, RJ.; Turk, DC., editors. *Psychosocial factors in pain: Critical perspectives*. New York: Guilford Press; 1999. p. 343-359.
4. Cano A, Mayo A, Ventimiglia M. Coping, pain severity, interference, and disability: The potential mediating and moderating roles of race and education. *J Pain* 2006;7:459–468. [PubMed: 16814685]
5. Cote P, Cassidy JD, Carroll L. The factors associated with neck pain and its related disability in the Saskatchewan population. *Spine* 2000;25:1109–1117. [PubMed: 10788856]
6. Dionne CE, Von Korff M, Koepsell TD, Deyo RA, Barlow WE, Checkoway H. Formal education and back pain: a review. *J Epidemiol Community Health* 2001;55:455–468. [PubMed: 11413174]
7. Edwards CL, Fillingim RB, Keefe F. Race, ethnicity and pain. *Pain* 2001;94:133–137. [PubMed: 11690726]
8. Fuentes M, Hart-Johnson T, Green CR. The association among neighborhood socioeconomic status, race and chronic pain in black and white older adults. *J Ntl Med Assoc* 2007;99:1160–1169.
9. Gran JT. The epidemiology of chronic generalized musculoskeletal pain. *Best Pract Res Clinical Rheumatol* 2003;17:547–561. [PubMed: 12849711]
10. Green CR, Anderson KO, Baker TA, Campbell LC, Decker S, Fillingim RB, Kaloukalani DA, Lasch KE, Myers C, Tait RC, Todd KH, Vallerand AH. The unequal burden of pain: confronting racial and ethnic disparities in pain. *Pain Med* 2003;4:277–294. [PubMed: 12974827]
11. Green CR, Baker TA, Sato Y, Washington TL, Smith EM. Race and chronic pain: A comparative study of young black and white Americans presenting for management. *J Pain* 2003;4:176–183. [PubMed: 14622701]
12. Hagen KB, Tambs K, Bjerkedal T. What mediates the inverse association between education and occupational disability from back pain? A prospective cohort study from the Nord-Trondelag health study in Norway. *Soc Sci Med* 2006;63:1267–1275. [PubMed: 16704890]
13. Heim C, Newport DJ, Heit S, Graham YP, Wilcox M, Bonsall R, Miller AH, Nemeroff CB. Pituitary-adrenal and autonomic responses to stress in women after sexual and physical abuse in childhood. *JAMA* 2000;284:592–597. [PubMed: 10918705]
14. Heliövaara M, Makela M, Knekt P, Impivaara O, Aromaa A. Determinants of sciatica and low back pain. *Spine* 1991;16:608–614. [PubMed: 1830689]
15. Kennedy J, Morgan S. A cross-national study of prescription nonadherence due to cost: data from the joint Canada-United States survey of health. *Clin Ther* 2006;28:1217–1224. [PubMed: 16982299]
16. Krieger N, Williams DR, Moss NE. Measuring social class in US public health research: concepts, methodologies, and guidelines. *Annu Rev Public Health* 1997;18:341–378. [PubMed: 9143723]
17. Lampe A, Doering S, Rumpold G, Solder E, Krismer M, Kantner-Rumplmair W, Schubert C, Sollner W. Chronic pain syndromes and their relation to childhood abuse and stressful life events. *J Psychosom Res* 2003;54:361–367. [PubMed: 12670615]
18. Levenstein S, Kaplan GA. Socioeconomic status and ulcer: a prospective study of contributory risk factors. *J Clin Gastroenterol* 1998;26:14–17. [PubMed: 9492856]
19. Liberatos P, Link BG, Kelsey JL. The measurement of social class in epidemiology. *Epidemiol Rev* 1988;10:87–121. [PubMed: 3066632]
20. Link BG, Phelan J. Social conditions as fundamental causes of disease. *J Health Soc Behav* 1995;80–94. [PubMed: 7560851]
21. Mukherjee S, Sullivan G, Perry D, Verdugo B, Means-Christensen A, Schraufnagel T, Sherbourne CD, Stein MB, Craske MG, Roy-Byrne PP. Adherence to treatment among economically disadvantaged patients with panic disorder. *Psychiatr Serv* 2006;57:1745–1750. [PubMed: 17158489]
22. Murrell SA, Meeks S. Psychological, economic, and social mediators of the education-health relationship in older adults. *J Aging Health* 2002;14:527–550. [PubMed: 12392025]
23. Peat G, Thomas E, Handy J, Croft P. Social networks and pain interference with daily activities in middle and old age. *Pain* 2004;112:397–405. [PubMed: 15561396]

24. Plesh O, Crawford PB, Gansky SA. Chronic pain in a biracial population of young women. *Pain* 2002;99:515–523. [PubMed: 12406528]
25. Portenoy RK, Ugarte C, Fuller I, Haas G. Population-based survey of pain in the United States: differences among White, African American, and Hispanic subjects. *J Pain* 2004;5:317–328. [PubMed: 15336636]
26. Roth RS, Geisser ME. Educational achievement and chronic pain disability: mediating role of pain-related cognitions. *Clin J Pain* 2002;18:286–296. [PubMed: 12218499]
27. Shavers VL. Measurement of socioeconomic status in health disparities research. *J Ntl Med Assoc* 2007;99:1013–1023.
28. Sidebotham P, Heron J, Golding J. Child maltreatment in the "Children of the Nineties": deprivation, class, and social networks in a UK sample. *Child Abuse Negl* 2002;26:1243–1259. [PubMed: 12464299]
29. Smedley BD. Expanding the frame of understanding health disparities: from a focus on health systems to social and economic systems. *Health Educ Behav* 2006;33:538–541. [PubMed: 16878351]
30. Teasell RW, Bombardier C. Employment-related factors in chronic pain and chronic pain disability. *Clin J Pain* 2001;17:S39–S45. [PubMed: 11783830]
31. Torrance N, Smith BH, Bennett MI, Lee AJ. The epidemiology of chronic pain of predominantly neuropathic origin. Results from a general population survey. *J Pain* 2006;7:281–289. [PubMed: 16618472]