Socioeconomics

(also known as socio-economics or social economics) is the social science that studies how economic activity affects and is shaped by social processes. In general it analyzes how societies progress, stagnate, or regress because of their local or regional economy, or the global economy.

Socioeconomic topics such as federal mandates/regulations, conflict of interest, and practice management have become increasingly important for all neurosurgeons. Graduating residents immediately need a host of skills to successfully navigate neurosurgical practice. Surgical and medical skills are closely evaluated through the ABNS, and a formal socioeconomic curriculum has been developed with defined milestones. Nevertheless, little has been done to evaluate neurosurgery resident competence in socioeconomic and medicolegal principles. The purpose of a study of Kessler et al., was to assess the competence of ACGME neurosurgical residents in socioeconomic knowledge.

Neurosurgery resident members of the American Association of Neurological Surgeons (N = 1385) were sent a Survey Monkey of 10-questions. The survey covered the most basic of SE principles. Initial survey responses were collected across a one-month period from April to May 2018.

The response rate was 14% (194/1385). Overall, neurosurgery residents would have received a grade of “D,” with an average score of 67% on the survey. For seven of the ten questions, the majority (>50%) of neurosurgery residents answered correctly. Furthermore, for three questions, over 90% of residents selected the correct answer. However, for half of all questions, residents averaged a score of less than 65%. Residents tended to answer questions correctly for physician compensation and compensation models, but incorrectly for topics of informed consent, Controlled Substances Act and conflicts of interest.

With the increasing complexity of neurosurgery practice, solid knowledge of socioeconomic topics is essential. The study confirms suspected deficiencies in socioeconomic proficiency among neurosurgery residents, despite the availability of a validated curriculum. This knowledge gap will likely impact career success and satisfaction. Nevertheless, this survey had a significantly low response rate, and it may be an incomplete representation of the neurosurgical resident mind. Focused educational initiatives through the neurosurgical Residency Review Committee and individual training programs must facilitate an action plan that ensures the effective implementation of socioeconomic curricula [1].

Patients undergoing transsphenoidal pituitary surgery at high-volume center (HVCs) have shorter hospitalizations, fewer postoperative electrolyte abnormalities, and lower charges; however, socioeconomic factors may influence access to quality care [2].

Acute Ischemic Stroke

The coronavirus disease 2019 (COVID-19) pandemic heralded a number of indirect perturbations to patient behavior and disease epidemiology, and mounting evidence suggests that the COVID-19 pandemic may have exacerbated underlying health disparities along racial and socioeconomic (SES) groups for acute ischemic stroke (AIS).

Rodrigues et al. used 1 large national insurance database to identify whether patient demographics, disease severity, or mechanical thrombectomy (MT) rates changed for the treatment and management of AIS during COVID-19.

AIS patient records were queried from the Clinformatics® Data Mart Optum SES Database from the following 2 time periods: March 1, 2019-June 30, 2019 (pre-COVID-19), and March 1, 2020-June 30, 2020 (COVID-19). The database contains the longitudinal healthcare claims of approximately 77 million patients covered by a major insurance provider between 2003 and June 30, 2020 across all 50 states. Interrupted time-series analyses were used to assess trend differences before and after the COVID-19 pandemic.

During the pre-COVID-19 period (March 1, 2019-June 30, 2019), there were 9,072 patients who presented for AIS, compared to 7,366 during COVID-19 (March 1, 2020-June 30, 2020). In both periods, the majority of patients were white (66.83% pre-COVID-19 and 67.91% during COVID-19). The average hospitalization duration was not different during the 2 time periods ($p = 0.632$), nor were rates of MT ($p = 0.260$). Total inpatient costs rose slightly for the COVID-19 period (USD 30,739 vs. USD 29,406; $p = 0.015$), and the median National Institutes of Health Stroke Scale (NIHSS) score was higher during CO-VID-19 (5 vs. 4; $p = 0.023$). When longitudinal trends were assessed for rates of MT and average NIHSS score for black and white patients, no differences were noted during the CO-VID-19 pandemic. Patients without any undergraduate experience did not present with AIS in increasing or decreasing incidence during COVID-19 ($p = 0.268$), but they did undergo declining rates of MT ($p = 0.013$).

In the largest SES analysis of AIS patients during the COVID-19 era, they found that several SES factors, including race and income, did not seem to significantly impact utilization of MT for the treatment of AIS or the severity of the stroke at presentation [3].

Previous studies have demonstrated that socioeconomic disparities in access to treatment of cerebrovascular diseases exist. We studied the Nationwide Inpatient Sample (NIS) to determine if disparities exist in utilization of mechanical thrombectomy for acute ischemic stroke.

Significant socioeconomic disparities exist in the utilization of mechanical thrombectomy in the United States [4].

Spinal Imaging

Few studies have examined the general correlation between socioeconomic status and imaging. The study of Derakhshan et al. is the first to analyze this relationship in the spine patient population.

Patients that were diagnosed with lumbar radiculopathy and/or myelopathy and had at least 1

subsequent lumbar magnetic resonance imaging (MRI), computed tomography (CT), or X-ray ordered were retrospectively identified. Demographic information and the number of ordered and completed imaging studies were among the data collected. Patient insurance status and income level (estimated based on zip code) served as representations of socioeconomic status.

A total of 24105 patients met the inclusion criteria for this study. Regression analysis demonstrated that uninsured patients were significantly less likely to have an MRI, CT, or X-ray study ordered ($P < .001$ for all modalities) and completed ($P < .001$ for MRI and X-ray, $P = .03$ for CT). Patients with lower income had higher rates of MRI, CT, and X-ray ($P < .001$ for all) imaging ordered but were less likely to have an ordered X-ray be completed ($P = .009$). There was no significant difference in the completion rate of ordered MRIs or CTs.

Disparities in image utilization based on socioeconomic characteristics such as insurance status and income level highlight a critical gap in access to health care. Physicians should work to mitigate the influence of such factors when deciding whether to order imaging studies, especially in light of the ongoing shift in healthy policy in the United States [5].

Spinal dysraphism

Spinal dysraphism is still a major public health problem in developing countries. Management of patients with spinal dysraphism is complex and needs close coordination between pediatrician, neurologist, neurosurgeon, and rehabilitation experts. A large number of factors influence the outcome [6].

Cerebrovascular diseases

Aneurysmal subarachnoid hemorrhage

Variations in outcomes by primary payer-including in-hospital post-procedural mortality-were more pronounced for patients of all insurance types who underwent microsurgical clipping. The observed differences by primary payer are likely multifactorial, attributable to varied socioeconomic factors and the complexities of the American healthcare delivery system [7].

Higher per-capita gross percapita gross domestic product (GDP), and population-to-neurosurgeon ratio were associated with improved outcome after aneurysmal subarachnoid hemorrhage aSAH. The former result may speak to the availability of resources, while the latter may be a reflection of better outcomes with centralized care. Although patient clinical and radiographic phenotypes remain the primary predictors of outcome

National socioeconomic disparities also explain heterogeneity in outcomes following aSAH [8].

Socioeconomic status is associated with subarachnoid hemorrhage inpatient mortality risk in the United States, but not in Canada, although it does not influence the pattern of use of institutional care among survivors in both countries [9].

Cerebrovascular procedures

From 2002 to 2010, there were 1 290 883 cerebrovascular procedures cerebrovascular procedures (CVPs). discharges with an hospital-acquired conditions (HACs) rate of 0.5%. Significant disparities in HAC frequency existed according to ethnicity and insurance provider. Minorities and Medicaid patients had increased frequency of HACs ($P < .05$), as well as prolonged length of stay and higher inpatient costs ($P < .05$).

HAC incidence is associated with racial and socioeconomic factors in patients who undergo CVPs. Awareness of these disparities may lead to improved processes and protocol implementation, which might help to decrease the frequency of these potentially avoidable events [10].

Spinal metastases

Surgery for SpM increased after publication of a positive randomized controlled trials (RCT) . A significantly greater proportion of patients with lower socioeconomic status, more comorbidities, and greater metastatic burden underwent surgery post-RCT. These patients experienced more postoperative complications and higher in-hospital charges but less in-hospital mortality [11].

Lumbar discectomy

Access to ambulatory lumbar discectomies appears to be more common for younger, white, male patients, with private insurance and less comorbidities, in the setting of higher volume hospitals. Further investigation is needed in the direction of mapping these disparities for appropriate resource utilization [12].

Pediatric epilepsy surgery

A study were done to evaluate the influence of socioeconomic status (SES) on time-to-surgery (TTS) and surgical outcome in children with treatment-resistant epilepsy in a universal health care system. The cohort consisted of children who had undergone resective epilepsy surgery between 2001 and 2013 in Canada. The patients' postal codes were linked to Statistics Canada National Household Survey data to obtain dissemination area income, which was used to infer SES. Time-to-surgery was defined as the interval from date of epilepsy onset to date of surgery. Seizure outcome was classified using ILAE classification. The associations between SES and TTS, as well as SES and surgical outcome, were assessed. Two hundred eighty-four children who had epilepsy surgery were included. Patients in the lowest income quintile had a significantly higher TTS relative to the highest income quintile ($\beta=0.121$, $p=0.044$). There were no significant associations between income quintiles and seizure-free surgical outcome (odds ratio (OR)=0.746-1.494, all $p>0.05$). However, patients in the lowest income quintile had a significantly lower odds of an improvement in seizure frequency relative to the highest income quintile (OR=0.262, $p=0.046$). The TTS was not uniform across SES in spite of the existence of a universal health care system. This finding highlights the need to address social and economic barriers for epilepsy surgery to improve access to this potentially curative treatment. Those with lower SES had lower likelihood of improvement in seizure control following epilepsy surgery and may require additional support including social and financial support to mitigate the discrepancies in seizure control following surgery between SES levels [13].

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