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Cardiovascular Disease and Health Care System Impact on Functionality and Productivity in Argentina: A Secondary Analysis

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ABSTRACT

Objectives: To examine the impact of cardiovascular disease (CVD) events on patient functionality and productivity on the basis of patient use of public or social/private institution health care. **Methods:** A secondary analysis was conducted of data drawn from records of Argentinian patients, 3 to 15 months posthospitalization after a CVD event, who had originally participated in a multicountry, cross-sectional study assessing the microeconomic impact of a CVD event. Respondents were stratified according to their use of health care institution (public or social/private). Among these groups, pre- and post-CVD event changes in functionality and productivity were compared. **Results:** Participants' (N = 431) mean age was 56.5 years, and 73.5% were men. Public sector patients reported significantly higher rates of decline in ability to perform moderate activities ($P < 0.05$), a greater decrease in time spent at work ($P < 0.01$), a greater limit in the type of work-related activities ($P < 0.01$), and a higher rate of emotional problems ($P < 0.01$). Having health insurance (private or

social) (odds ratio [OR] = 0.55; 95% confidence interval [CI] 0.35–0.85; $P < 0.01$) and a higher income (OR = 0.99; 95% CI 0.99–0.99; $P < 0.01$) were inversely and significantly associated with loss of productivity. Cerebrovascular disease (OR = 2.55; 95% CI 1.42–4.60; $P < 0.01$) was also significantly associated with productivity loss. **Conclusions:** In Argentina, patients receiving care in the public sector experienced a greater impact on functionality and productivity after their hospitalization for a CVD event. Lack of insurance, low income, and cerebrovascular disease event were the major determinants of productivity loss. Further investigation is needed to better understand contributors to these differences.

Keywords: cardiovascular disease, epidemiology, functionality, productivity.

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Introduction

Cardiovascular disease (CVD) is a major contributor to disability and the leading cause of death worldwide, representing 30% of all deaths [1]. Nevertheless, 80% of the mortality due to CVDs occurs in low- and middle-income countries (LMICs) [2–5] where CVD affects patients 10 to 15 years earlier than in high-income countries [6]. For LMICs, the dual burden of disease from communicable and non-communicable diseases puts tremendous strain on a country's health systems [7]. In addition, the growing burden of CVD threatens the macroeconomy and microeconomy of LMICs. Early mortality and disability represents a loss of a nation's productivity and negatively affects household economic conditions [8,9].

In Argentina, CVD, including cerebrovascular disease, has been the leading cause of death for both men and women over

the last decade, with a mortality rate between 229 and 270 per 100,000 or approximately 30% of the total cause of mortality [10–13]. In Argentina, low income accompanied by the lack of private or social health care insurance coverage was associated with a higher risk of impoverishment after a CVD event (odds ratio [OR] = 4.72; 95% confidence interval [CI] 2.56–8.76; $P < 0.01$) and a significantly higher use of distress financing (e.g., borrowing money from relatives/friends, taking loans from banks/other lenders, or selling assets) (OR = 3.08; 95% CI 1.12–8.43; $P < 0.01$) [14]. The Argentinean health care system is divided into three sectors: public, social insurance (“Seguridad Social” in Spanish), and private [15]. The public health care sector (public sector) provides health care services free of charge, regardless of insurance status, and is financed mainly through tax revenues. Although policies are determined by the Federal Ministry of

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Health for the public sector, the public sector is decentralized and has a limited role in national health policy administration. Forty-four percent of the country's population receives health care services from the public sector. The social health care sector provides health care coverage to approximately 45% [16] of the population and is formed by worker unions and financed through compulsory contributions from employees and employers. The social health care sector has its own hospitals and clinics or it makes arrangements with private health care providers to allow its patients to access care from specific health care centers, clinics, and hospitals. Similar to private insurance in other countries, the private insurance health care sector in Argentina consists of prepaid medical plans, allowing patients to seek health care at private health care facilities, and is accessed by about 10% of the population [17]. Because both the social health care sector and the private insurance health care sector are financed through private funds, they will be referred to as one health sector in this article and would be denoted as the "social/private sector." Although only about half of the population has access to social/private sector care, almost 80% of Argentina's health care expenditure is channeled through this sector. Examination of outcomes according to the health care sector in Argentina has not been previously explored [15].

Evaluations of outcomes for patients diagnosed with CVD are needed to identify major determinants associated with impoverishment that can be targeted for interventions and preventative treatment strategies. Despite the significance of CVD in Argentina, there is a dearth of population-based research on mortality and morbidity outcomes impacting individuals at the household level, functionality and productivity changes after a CVD event, and outcome evaluations according to the health care service provider accessed. Long-term consequences of CVD-related events, such as functionality and productivity changes, may influence disease progression as well as individual and societal economic well-being.

The purpose of this study was to explore the impact of CVD on physical function and productivity and to understand outcomes according to the health care (public or private/social) used for medical attention for a CVD event.

Methods

Study Design

The study was a secondary analysis of data gathered in Argentina as part of a multicountry, cross-sectional survey assessing the microeconomic impact of CVD events resulting in hospitalization [14]. The study was approved by local ethics boards for each recruitment site in Argentina. Signed informed consent was obtained from each participant.

Selection of Hospitals, Sample Size, and Participant Recruitment

Inclusion criteria for hospital recruitment sites included having specialized cardiology and neurology services and providing care to patients with a range of socioeconomic status. The Province of Buenos Aires has nearly 50% of the country's total population and includes the Ciudad Autónoma de Buenos Aires, the largest city in the country. Three public sector and four social/private sector hospitals met the criteria and were included as recruitment sites for this study. An estimated sample size of about 500 participants from each country was calculated on the basis of detecting a 20% difference between economic groups, an α of 0.05, and a power of 90%. The Argentinean cohort sample consisted of 431 participants. Participant recruitment was performed using a stratified

random-sampling process on the basis of age (<55 years old and ≥ 55 years old) from seven hospitals [14]. Participants were recruited if they had been hospitalized because of one or more of the following diagnoses: acute coronary syndrome (including unstable angina or myocardial infarction), stroke, acute heart failure, or peripheral vascular intervention (including amputation). Exclusion criteria were any of the following: active malignancy, end-stage renal disease requiring dialysis, solid-organ or hematopoietic transplant, HIV infection, or severe mental illness.

Data Collection and Analysis

Survey data were collected in the outpatient clinic or in the household by trained personnel. Health care personnel were trained by research staff in person, with written protocols, and by providing ongoing feedback after the survey data were reviewed by the research staff. Data were obtained from participants using a questionnaire at 3 to 15 months after the CVD-event-related hospitalization. The standardized surveys were developed by experts from the Initiative for Cardiovascular Health Research in Developing Countries and translated from English into the local language and culturally adapted by country sites. The questionnaire items included baseline demographic characteristics, socioeconomic conditions, comorbidities, and types of interventions, expenditures, and functionality and productivity changes associated with the CVD event(s). Specific items within the survey related to physical function were adapted from the 36-item short form health survey [18]. Questions from the 36-item short form 36 focusing on functionality and productivity had three- or five-point scales. For example, health status was rated as *excellent* (1), *very good* (2), *good* (3), *fair* (4), or *poor* (5).

For analysis, functionality and productivity rating scales were dichotomized into two groups, "affected" (participant ratings of fair and poor) and "not affected" (rating of excellent, very good, or good), to distinguish individuals who had diminished functionality or productivity post-CVD event. To assess the differences by health care sector, respondents were stratified according to the health care institution from which they received treatment for the CVD event: the social/private sector or the public sector. Comparisons were conducted to assess differences by group in participants' functionality and productivity. Continuous variables, such as age, were reported as means \pm SDs and categorical variables, such as sex, as proportions (%). Continuous variables were analyzed using analysis of variance and categorical variables using chi-square tests. Univariate and multivariate logistic regressions were used to analyze the determinants of productivity loss associated with a CVD event. Multivariate models were constructed using variables found to be significant ($P < 0.1$) in the univariate models. Sample representativeness was evaluated by comparing survey data with those from a nationally representative survey, the Encuesta de Utilización y Gastos en Servicios de Salud [19].

Definitions

Functionality was defined as the ability to perform daily activities needed to maintain personal well-being, such as walking, walking briskly, or walking up the stairs [18]. *Productivity* was defined as an individual's physical and mental capabilities needed to be productive in general, including for work-related activities [18].

Results

Table 1 presents the demographic characteristics, median household income, and tobacco use of the study population. Participants who sought care from a social/private sector institution tended to be older ($P = 0.02$), more likely to be married ($P < 0.01$),

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