A LONGITUDINAL ASSESSMENT OF OCCUPATIONAL INJURIES AND ILLNESSES IN THE UNITED STATES TERRITORY OF PUERTO RICO

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ABSTRACT

Each year, workplace injuries and illnesses cost United States business owners more than $125 billion. This study was a longitudinal descriptive analysis of the number of non-fatal workplace injuries and illnesses of the major economically developed United States Territory of Puerto Rico. Puerto Rico is an economically developed microstate; it has a population of approximately 4 million and a GDP of more than $74 billion [5]. The study creates valuable knowledge for businesses operating in the United States Territories and provides foundation knowledge for international businesses operating in other small island development states. The United States Territories have a special characteristic that the mainland United States does not; they are part of the Small Island Development States (SIDS) network of the United Nations.
Each year, there are 6,000 workplace fatalities, 50,000 deaths from workplace-related illnesses, six million non-fatal workplace injuries, and the cost of injuries alone to United States business owners is more than $125 billion a year [12]. In 1970, Congressional members passed the Occupational Safety and Health Act to “assure safe and healthful working conditions for working men and women; by assisting and encouraging the States in their efforts to assure safe and healthful working conditions…” [16, para. 1]. The Occupational Safety and Health Administration (OSHA) bestowed the responsibility of maintaining a safe and healthy working environment upon employers. Since that time, the topic of safety and risk management has become an integral part of business operations. Safety has direct and indirect effects on operations, productivity, quality control, employees, external stakeholders, and profits [3][7][9].

The study of workplace risk associated with injuries and illnesses in the United States Territory of Puerto Rico creates valuable knowledge for businesses operating in the United States Territories and provides foundation knowledge for international businesses operating in other small island development states. The United States Territories have a special characteristic that the mainland United States does not; they are part of the Small Island Development States (SIDS) network of the United Nations. However, the United States Territories are unique amongst SIDS in that they fall under most of the United States regulatory guidelines enforced by United States governmental agencies. Yet, the United States Territories face the same distinctive challenges other SIDS face; lack of resources, small domestic markets, limited infrastructures, lack of skilled labor [18][19], and diseconomies of scale.

The dearth of information available regarding the safety of workplace environments contributes to management’s inability to make informed decisions on the amount of resources needed to operate comparable businesses in the United States Territories safely. The lack of information on the number of workplace injuries and illnesses in the United States Territories results in an increase in uncertainty as to the amount of resources required for business operations, thereby increasing the risk of relocating operations to the United States Territories. The findings of this research will assist managers in answering the question of whether or not relocating operations to these limited access areas is financially beneficial.

This study was a longitudinal descriptive analysis of the number of non-fatal workplace injuries and illnesses of the major economically developed United States Territory of Puerto Rico. The study period was from 1996 through 2006. For the purposes of this study, the secondary source data has been mined and analyzed from the Bureau of Labor and Statistics Survey of Occupational Injuries and Illnesses (SOII). Earlier research conducted by Smitha, et al. [14], Subramanian [15], and Ussif [20] utilized secondary data from the Bureau of Labor and Statistics SOII report. Officials with the Bureau of Labor and Statistics first used the SOII instrument in 1972 [17]. The SOII instrument is used to measure non-fatal injuries and work-related illnesses that are recognized, diagnosed, and reported during the year in private industries. The SOII survey does not include non-fatal injury and illness rates for the following: self-employed, farms with fewer than 11 employees, private households, federal government agencies, and for national estimates employees in state and local government agencies and therefore is not included in the study. The SOII survey categorizes non-fatal injuries and illnesses as those cases with lost workdays, cases with days-away-from-work, and non-fatal cases without lost workdays [17]. Approximately 230,000 private industry employers [17] respond to the SOII survey. Businesses provide the number of non-fatal injury and illness as reported on their OSHA record keeping logs.
Puerto Rico was chosen as the focus of this study for three reasons. First, Puerto Rico falls under United States regulatory guidelines for workplace safety and health. Second, Puerto Rico adheres to the standardized reporting procedures required by OSHA. The standardized reporting procedures will normalize the data for future comparisons to the states and other territories. The lack of standardized reporting procedures can result in data limitations, as was the case in the Giuffrida, Iunes, and Savedoff [6] study in 2002. Third, Puerto Rico is an economically developed microstate; it has a population of approximately 4 million and GDP of at least 74.15 billion [5].

**FINDINGS**

The study spanned from 1996 through 2006. The annual number of non-fatal workplace injuries and illnesses ranged from a high of 4.5 per 100 workers to a low of 3.9 per 100 workers. The standard deviation for the annual number of workplace injuries and illnesses per 100 workers was .1809 for Puerto Rico. The standard error for workplace injuries and illnesses per 100 workers was .0545. At a 95% confidence interval for means the lower and upper bounds of the number of workplace injuries and illnesses in Puerto Rico was 4.124 per 100 workers and 4.367 per 100 workers, respectively (see Table 1).

Table 1:

*Descriptive Statistical Analysis for Puerto Rico*

<table>
<thead>
<tr>
<th>Location</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Std. Error</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>PR</td>
<td>11</td>
<td>4.245</td>
<td>.1809</td>
<td>.0545</td>
<td>4.124</td>
<td>4.367</td>
<td>3.9</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Puerto Rico experienced fluctuations in the number of workplace injuries and illnesses during the study period. In 1996, the annual number of workplace injuries and illnesses experienced in Puerto Rico was 4.4 per 100 workers and in 2006 Puerto Rico experienced 4.0 per 100 workers. However, Puerto Rico experienced the highest number of workplace injuries and illnesses in 2002 with 4.5 per 100 workers and the lowest in 2004 with 3.9 per 100 workers. Figure 1 shows the annual number of workplace injuries and illnesses experienced in Puerto Rico during the study period.
CONCLUSIONS AND RECOMMENDATIONS

The objective of the study was to describe and provide a better understanding of the number of non-fatal workplace accidents in the United States Territory of Puerto Rico. The results of the study will enable business managers and decision makers to better assess their allocation of direct and indirect resources for risk management activities; thereby creating a workplace environment with a reduced risk of workplace injuries and illnesses. When resources are properly allocated to risk management and safety activities, businesses can experience not only a reduction in work-related injuries and illnesses, but improvements in morale and productivity and a reduction in workers’ compensation costs resulting in lower operating costs [7][9][13].

Finally, the study bridges a gap that currently exists in the literature with regard to the geographic variability of workplace injuries and illnesses, specifically in the United States Territory of Puerto Rico. This research fills a gap with regard to workplace accidents in Puerto Rico and SIDS by expanding the body of knowledge and providing avenues for future research. The knowledge generated through this study provides researchers with foundation knowledge and enables further research of workplace risk associated with injuries and illnesses in the United States Territories and other SIDS; thus, bridging the gap for analysis of workplace accidents in the SIDS environment.

Recommendations
These research findings establish foundation knowledge for the analysis of workplace injuries and illnesses in limited access environments. The knowledge of a workplace environment can create a competitive advantage for businesses in both domestic and international markets. Business owners and managers should apply the knowledge created from this study to assess the risk associated with operational work environments and strategically align resources to their most efficient use.

Figure 1: Annual Number of Workplace Injuries and Illnesses for Puerto Rico from 1996 -2006
Future research should be conducted to determine if there is a statistically significant difference between workplace injuries and illnesses in Puerto Rico and the number of workplace accidents and illnesses in the United States proper or the other lesser developed territories. The microanalysis of the causes and types of injuries that occur in limited access environments will indicate what operational areas require more specialized risk management techniques and demonstrate the need for increased safety training.

While the focus of this study was on the United States Territory of Puerto Rico, the researcher recommends the study be extended to other economically developed territories such as Guam and the Virgin Islands. SIDS research has established that insular areas, such as the United States Territories, are subject to three fundamental challenges of economic development and sustainability, insularity, remoteness, and a limited labor pool [1][2][4][8][10][11][19]. Future research efforts should attempt to assess and understand the impact of the fundamental challenges faced by the territories on the quality and safety of workplace environments, the role of risk management activities, and the resource allocation needs for international businesses operating in the territories.

**REFERENCES**


