

Knowledge and Attitudes of the Out-Of-Hospital Emergency Care Consumers in Santo Domingo, Dominican Republic

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EMS = emergency medical services

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Abstract

Introduction: Prehospital emergency services are a vital public service, and consumer access to the system is an important factor in their use. The Dominican Republic recently experienced "the epidemiological transition" leading to increased morbidity and mortality secondary to traumatic and cardiac conditions—thus, increasing the need for prompt and adequate delivery of emergency medical care.

Methods: A survey was administered to 90 subjects from diverse backgrounds, all living in Santo Domingo. Survey items included questions on emergency medical services (EMS) systems knowledge (i.e., access numbers), confidence in the system, first-aid education and prior experience with the EMS system. Chi-square was used to measure statistical significance for categorical variables and Student's *t*-test for continuous variables (JMP 2.0 software was used for statistical processing).

Results: A total of 90 subjects were surveyed. The average age of respondents was 36 ±12 years SD. More than one-fifth (22.2%) of respondents did not know the established universal emergency number (9-1-1), and 37.8% responded that they would access a different telephone number in case of a medical emergency.

Conclusions: Important deficiencies and access-to-care concerns were interpreted from the results. An adequate understanding of the current state of prehospital care could lead to creation of policies by system administrators to further improve the delivery of emergency medical care. This study will assist system administrators in future design and policy issues.

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Introduction

Hispaniola is the second largest island in the Caribbean. With an area of 48,511 square kilometers, the Dominican Republic occupies approximately two-thirds of the westernmost part of the island. The remaining third is the country of Haiti. The Dominican Republic's economy is heavily dependent on sugar production, tourism, and other rapidly growing industries.¹ In 2002, the population of the Dominican Republic was estimated at 8,562,541, with a density of 173.3 inhabitants per km². Santo Domingo is the largest and the most urbanized city in the Dominican Republic. It has a geographic area of 1,400.79 km², which is 2.9% of the country's territory. This city is home to 2,731,294 Dominicans;² 31.9% of the country's total population. The Dominican Republic recently has experienced "an epidemiological transition," and has seen the economy shift from an agricultural focus to one of industry and tourism. Paralleling its rapidly growing economy during the last four decades, the country has experienced an increase in industrialization and population. Increased urbanization and changes in demographics has resulted in increased death rates from traumatic and cardiac conditions, which have become major public health concerns.

Data from 1998 (Pan-American Health Organization (PAHO)/WHO) indicate that although the all-cause mortality rate has decreased in the country, there has been a rise in the number of deaths from external causes, such as accidental injuries and violence.⁶ Currently, trauma is the leading cause of death for individuals 15–59 years of age, as well as the leading reason for seeking emergency care for adults, and the fourth ranking cause for hospitalization nationwide. Data from the Dominican National Police and National Commission on Emergencies estimate an average of 11 deaths per day as a result of motor vehicle trauma.⁴ In 2003, a total of 701,302 emergency department visits were reported in Santo Domingo, equivalent to 251 cases per 1,000 inhabitants. Of these cases, injuries from trauma accounted for 13.4% of all diagnoses.

The Dominican Republic has witnessed an increase in the size and number of ambulance services. Data from the Dominican Office of Statistics demonstrate an increase of 37.9% in the number of registered ambulances from 1997 to 1998.⁵ Telephone company data from 2005 show that >15 ambulance services are operating actively within the city, compared to only four in 1995, demonstrating a nearly four-fold increase over 10 years. As the emergency medical services (EMS) system continues to grow, it has become necessary to better understand the current state of EMS and prehospital care in Santo Domingo. In addition, an assessment of the needs and demands for prehospital care is essential.

Prehospital Care and the Dominican Republic

Health historians believe that the initial EMS organizational efforts in the Dominican Republic began after the San Zenon hurricane in 1930. In 1931, the newly elected president, Dr. Rafael Leonidas Trujillo, created the first local Red Cross chapter, which operated a basic ambulance service. It was not until 50 years later that modern prehospital care efforts began with the establishment of both public and private services as well as the implementation of a universal emergency access number.⁶ In the early 1990s, the telephone company, Verizon (formerly CODETEL), implemented a universal emergency number; initially 7-1-1. Later, as a result of United States media influence, the number was changed to 9-1-1.⁷ The 9-1-1 service functions as a referral line, where the nature of call (e.g., fire, robbery, medical) and priority are identified and then transferred to the dispatch service of the appropriate response agency: National Police, fire department, Civil Defense, or Red Cross.

Prehospital emergency services are a vital public service. Adequate functioning of this system is dependent on the availability and the coordination of a variety of elements. These elements include: (1) an informed public capable of recognizing medical emergencies; (2) a universal access number; (3) a network of ambulances and transport units appropriately situated and staffed with well-trained prehospital providers capable of providing high quality care to the most seriously ill or injured; and (4) receiving emergency departments capable of providing ongoing care.

For the past 30 years, access to early and appropriate definitive care has been a fundamental tenet in planning related to

the US prehospital care systems. Prompt and efficient care of these patients has been the hallmark of out-of-hospital trauma systems. In the US, time has been noted as the central component of this chain of care, with a special emphasis on the “Golden Hour” concept.^{8,9}

Methods

This study employed a cross-sectional, descriptive design. A survey was administered to 90 subjects from diverse backgrounds, all living in Santo Domingo. Volunteers from the Secretariat of Health’s Directorate of Emergencies and Disasters were deployed to multiple sites to ensure a sample with an adequate mix of age, gender, and socio-economic status.

Participants were selected randomly and invited to participate in the survey, an incentive of RD \$50.00 (US \$1.50) was given to those who completed the survey.

Seven items were used in this consumer-directed survey. These items included questions on systems knowledge (i.e., access numbers), confidence in the EMS system, first-aid education, and prior experience with the EMS system.

Statistical Processing

Chi-square was used to measure statistical significance for categorical variables and Student’s *t*-test for continuous variables. Relative risk and 95% confidence intervals were calculated to measure strength of association between the peak hour and the off-peak hour deployments (JMP 2.0 software (SAS Institute, 2003) was used for statistical analysis).¹⁰

Results

Group characteristics are presented in Table 1. A total of 90 subjects were surveyed. The average age of respondents was 36 ± 12 years (± 1 SD). Fifty-four respondents (60%) reported having a high school education, while 19 (21.1%) had obtained a university degree. More than one-fifth (22.2%) of respondents did not know the established universal emergency number (9-1-1), while 34 (37.8%) responded that they would call a different number in case of a medical emergency.

Twenty-one of 80 (26.3%) respondents demonstrated knowledge of the universal emergency number. (Only 80 responded to this question.) Knowledge of the universal emergency number did not correlate with an educational level equal to or above a high school diploma (Relative Risk = 0.70; 95%CI = 0.29–1.66; *p* = 0.43). In this survey, 46.3% subjects responded that they would call a different number. When surveyed about participation in first-aid and cardiopulmonary resuscitation (CPR) courses, only 18 (20.0%) respondents stated they had participated in a course, whereas 35 (38.88%) reported that they had administered first aid to another person. Eighty-one (90%) respondents stated they would stop at the scene of an accident to help a stranger. Of the nine persons that stated they would not, eight cited a concern of being held responsible for the accident while one expressed fear of being robbed.

Discussion

Modern, western prehospital care systems were developed from the need to respond and provide immediate care to traumatic and cardiovascular emergencies. Multiple publi-

| Variable | Results | |
|---|---------|--------|
| | n | (%) |
| Age (years) | 36 ±12 | |
| Education | | |
| Primary | 17 | (18.9) |
| Secondary | 54 | (60.0) |
| University | 19 | (21.1) |
| Would utilize a different number in case of medical emergency | | |
| Yes | 34 | (37.8) |
| No | 56 | (62.2) |
| Taken first aid or cardiopulmonary resuscitation course | | |
| Yes | 18 | (20.0) |
| No | 72 | (80.0) |
| Had administered first aid | | |
| Yes | 35 | (38.9) |
| No | 55 | (51.1) |

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Table 1—Results from Santo Domingo Emergency Medical Services Consumer Survey (2006; n = 90)

cations suggest that early access to prehospital emergency care improves outcomes of traumatic^{11,12-15} and cardiac emergencies.¹⁶⁻¹⁹ One consequence of modern globalization is an increased incidence of traumatic and cardiac emergencies, as developing countries struggle with rapid urbanization and industrialization. Early access to and public participation in the emergency care system is of great importance to these nascent prehospital care systems.

During the past 40 years, the Dominican Republic experienced an epidemiological transition as the economy has shifted from agrarian to industry-based. This has led to an increased incidence of traumatic- and cardiac-related illness, imposing the need to offer optimal prehospital care services to the citizens of this country.

Multiple EMS agencies operate within the city of Santo Domingo, some private, others public and non-profit. In this assessment, significant differences among these institutions were noted. Emergency services systems in the Dominican Republic are not identical to North American systems. Operations are heterogeneous, with multiple and diverse levels of providers staffing the ambulances, including nurses and physicians. Fees range from free access to expensive and exclusive fee-for-service programs. There is an overall lack of standardized protocols and guidelines.

Consumer participation is an important element of any public EMS system. In the Dominican Republic, a law was passed that mandates the completion of 60 hours of community service prior to high school graduation. This time can be allocated for various types of activities, including first-aid training. This has made layperson first-aid education readily available, offered by various agencies. The most popular of which is provided by the Dominican Red Cross. The findings of this are

of concern as they suggest that only a small percentage of surveyed subjects have participated in first-aid training.

Early access to the EMS system is one of its most important functional elements.¹⁸⁻²² Citizens must activate available resources in a timely manner to maximize the benefit of early medical interventions and mitigate the potential consequences of life-threatening emergencies. The results of this survey suggest problems with knowledge and utilization. Only one-fourth of the surveyed subjects reported knowledge of the universal emergency number.

Nearly 50% of respondents reported they would utilize a different access number such as private company direct telephone line, fire department, and police in the case of an emergency. This might be a reflection of trust in and reliability on the system.

As in the US, the current universal number for emergencies is 9-1-1. This survey found several issues of concern. One issue related to the change in the universal emergency number from 7-1-1 to 9-1-1, in accordance with North American standards. While more "universal", this change led to confusion among citizens as to which number to actually call in an emergency.

Limitations of this study are those primarily associated with the number of subjects enrolled, the possibility of a self-selection bias as participants voluntarily enrolled for the study, and the issues related to the adequacy and truthfulness of the data collected. These potential limitations were reduced by obtaining a comprehensive sample and adequate mix of subjects.

Conclusions

A comprehensive assessment of out-of-hospital emergency care consumer perspectives of the current state of prehospi-

tal care in Santo Domingo was conducted. The results exemplified important systematic issues and deficiencies. Consideration of these could lead to the development of

policies that could improve the delivery of emergency medical care. We trust that this study will aid system administrators with future system design and policy development.

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