

A Data Mining Approach on the Structure of Patient Satisfaction in HCAHPS Databases

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I. INTRODUCTION

Patient satisfaction researchers have used inferential statistics to assess the influence of hospital characteristics on hospital services and of hospital services on global rating. To analyze hospital care individually and to focus on global rating, however, have limits to comprehend the complexity of patients' experiences. The development of data mining has introduced a new approach to patient satisfaction. The aim of this study is to discover the similarities in hospital services, that is, the structure of patient satisfaction by analysis using distance with respect to hospital characteristics.

II. METHODS

A. Data Source

The HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) survey scores collected from July 2012 for a year were retrieved online from official Hospital Compare data site [1]. Out of 4677 hospitals, 3711 were selected. The hospitals were divided into groups by hospital characteristics: survey response size (SRS), acute care hospital (ACH) or critical access hospital (CAH) and systematic clinical database registry for cardiac/general surgery and nursing/stroke care. The survey measures used for analysis were overall rating of the hospital, willingness to recommend the hospital, doctor communication, nurse communication, pain control, staff responsiveness, explanation of medicine, quietness and cleanliness of hospital environment.

B. Analysis

Multiple-proportion tests were performed to compare the proportions of hospital characteristics by survey response size ($p < 0.05$). The percentages of each rating for each measure by hospital were cumulated with respect to hospital characteristics. The structure of patient satisfaction was then investigated by correspondence analysis, cluster analysis and multidimensional scaling (MDS), based on the contingency tables of the measures and the ratings.

III. RESULTS

The three SRSs were integrated into two sizes. Hospitals with larger SRS, cardiac/general surgery registry and

nursing/stroke care registry exhibited two clusters. Highly-rated cluster consisted of communication measures, pain control, cleanliness and two global rating measures. The other cluster consisted of explanation of medicine, quietness and staff responsiveness. ACHs, hospitals without surgery/cardiac surgery registry exhibited two clusters. Highly-rated cluster consisted of communication items. The other cluster contained the rest. Hospitals with nursing care/stroke care registry showed similar two clusters, but the communication cluster contained cleanliness. Correspondence analysis and MDS indicated communication, quietness and explanation of medicine were dissimilar to the other measures.

IV. DISCUSSION

At hospitals providing advanced medical care, communication was associated with medical care and global rating. At the other hospitals communication received higher rating than the other items, suggesting that patients principally appreciated humane contact and did not always relate it to hospital care. Patients also undifferentiated communication of doctors and nurses. They basically needed detailed explanation of medicine and quieter environment, which was especially evident at hospitals providing advanced medical care.

The evaluation of the HCAHPS measures vary [2]. This study indicated hospital characteristics changed the relationship between the perception of hospital services and global rating. Communication have been reported association with global rating, but they did not always show similarity.

V. CONCLUSION

A Data mining approach using distance indicated whether a hospital provides advanced medical care or not changed the structure of patient satisfaction. Explanation to patients and quiet environment were the most needed. Communication of doctors and nurses were the most appreciated. This method will enable us to understand patients' response as a whole to provide patient-centered care.

REFERENCES

- [1] <https://data.medicare.gov/> access date, access 04/04/2014
- [2] Jha A, Orav E, Zheng J, et al: Patients' perception of hospital care in the United States, *N Engl J Med*, 359, 1921-31, 2008.