Does Self-reporting Facilitate History Taking in Food Poisoning Mass-casualty Incidents?

Ya-I Hsu, RN, PA;[1] Ying C. Huang, MD, MS[1,2]

1. Department of Emergency Medicine, Chiayi Christian Hospital, Chiayi City, Taiwan
2. Department of Emergency Medicine, Medical Center & School of Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

Correspondence:
Ying C. Huang, MD, MS
Department of Emergency Medicine
Chiayi Christian Hospital
539 Chuan-Hsiau Road
Chiayi City 60002, Taiwan
E-mail: Galaxy.bear@msa.hinet.net

Abstract

Introduction: Medical history is an important contributor to diagnosis and patient management. In mass-casualty incidents (MCIs), health care providers are often overwhelmed by large numbers of casualties. An efficient, reliable, and affordable method of information collection is essential for effective health care response.

Hypothesis/Problem: In some MCIs, self-reporting of symptoms can decrease the time required for history taking, without sacrificing the completeness of triage information.

Methods: Two resident doctors and a number of seventh graders who had previous experience of abdominal discomfort were invited to join this study. A questionnaire was developed to collect information on common symptoms in food poisoning. Each question was scored, and enrolled students were randomly divided into two groups. The experimental group students answered the questionnaire first and then were interviewed to complete the medical history. The control group students were interviewed in the traditional way to collect medical history. Time of all interviews was measured and recorded. The time needed to complete the history taking and completeness of obtained information were compared with students' t tests, or Mann-Whitney U tests, based on the normality of data. Comprehensibility of each question, scored by enrolled students, was reported by descriptive statistics.

Results: There were 41 students enrolled: 22 in the experimental group and 19 in the control group. Time to complete history taking in the experimental group (163.0 seconds, SD=52.3) was shorter than that in the control group (198.7 seconds, SD=40.9) (P=.010). There was no difference in the completeness of history obtained between the experimental group and the control group (94.8%, SD=5.0 vs 94.2%, SD=6.1; P=.747). Between the two doctors, no significant difference was found in the time required for history taking (185.2 seconds, SD=42.2 vs 173.1 seconds, SD=58.6; P=.449), or the completeness of information (94.1%, SD=5.9 vs 95.0%, SD=5.0; P=.601). Most of the questions were scored "good" in comprehensibility.

Conclusion: Self-reporting of symptoms can shorten the time of history taking during a food poisoning mass-casualty event without sacrificing the completeness of information.

Introduction

Medical history has been proven to be an important contributor to diagnoses and patient management.[1,2] In response to mass-casualty incidents (MCIs), health care providers often have to care for large numbers of victims in settings of limited resources, poor communication, inaccurate and fragmented information, and potentially damaged infrastructure with personal risks. In a chaotic MCI environment, an efficient, reliable, and affordable method of information collection is essential for patient management and successful response.[3-5]

Obtaining a medical history takes the pattern of one-medical-provider-to-one-patient. This pattern is a problem when the medical provider is overwhelmed by victims. In some MCIs of a medical nature, symptoms are less obvious, and significant numbers of victims are able to help themselves. A modified method for history taking may facilitate information acquisition to improve the efficiency of data collection and medical management. This study was designed and performed to investigate whether self-reporting of symptoms can decrease the time required to obtain medical histories in response to food poisoning MCIs, without sacrificing the completeness of information.

Number	Question and Subquestions	Type of Question	Score of Importance
0	Time of Symptoms Onset	MCQ/SA	10
1	Abdominal Pain[a]	T/F	10
1.1	Location of Abdominal Pain	MCQ	5
1.2	Characters of Abdominal Pain	MCQ	5
2	Nausea	T/F	5
3	Vomiting	T/F	5
4	Diarrhea[a]	T/F	10
4.1	Stool Characters	MCQ	5
4.2	Mucus or Not	T/F	2
4.3	Blood or Not	T/F	3
5	Fever	T/F	10
6	Other Discomforts	SA	10
7	Drug Allergy	SA	10
8	Systemic Illness	MCQ/SA	10

Hsu © 2014 Prehospital and Disaster Medicine

Table 1. Questions Used in the Questionnaire for Self-reporting of Symptoms, Essential Medical History, and Scores for Each Question
Abbreviations: MCQ, multiple choice question; SA, short answer question; T/F, true or false question.
[a]If yes, goes to subquestions.

Methods

Based on the common symptoms of food poisoning, a questionnaire was created to gather useful information that is usually asked during history taking (Table 1). This questionnaire was validated by experts in emergency medicine and infectious diseases, followed by discussion with nonmedical colleagues and volunteers from the community, to make it easily comprehensible. To measure the completeness of history obtained, each question was scored based on the degree of information required for medical management decisions.

After approval by the institutional review board of the Chiayi Christian Hospital (Chiayi City, Taiwan), two resident physicians and a number of seventh graders of a nearby middle school who had previous experience of abdominal discomfort with alternating bowel patterns were invited to join the study. The students were instructed to recall the most impressive episode of gastrointestinal trouble and use this experience to respond to the questionnaire. Enrolled students were randomly divided into two groups. Students in the experimental group answered the questionnaire first. Then they were individually interviewed by a resident physician to complete the medical history. Students in the control group were interviewed in the traditional way to collect their medical history. The time required for each interview was measured by a trained research assistant. To reduce the influence from inter-rater variability, resident physicians interviewed both experimental and control groups of students.

The time needed to complete the history taking and completeness of obtained information in the two groups of students were compared. Students' t tests, or Mann-Whitney U tests, were undertaken for statistical analysis based on data normality, and a P value of less than .05 was determined to be significant (IBM SPSS Statistics, version 21.0, IBM Corporation, Armonk, New York USA). Comprehensibility of each question was scored by enrolled students and reported using descriptive statistics.

Results

There were 41 students enrolled in the study: 22 in the experimental group and 19 in the control group. In the experimental group, Doctor A interviewed 12 students and Doctor B interviewed 10 students. In the control group, Doctor A interviewed 10 students and Doctor B interviewed 9 students. Between the two resident physicians, there was no significant difference in the time needed to complete history taking (185.2 seconds, SD=42.2 vs 173.1 seconds, SD=58.6; P=.449), and the completeness of information obtained (94.1%, SD=5.9 vs 95.0%, SD=5.0; P=.601).

Time to complete history taking was shorter in the experimental group than in the control group (163.0 seconds, SD=52.3 vs 198.7 seconds, SD=40.9; P=.010) (Figure 1). There was no difference in the completeness of history obtained between the experiment group and the control group (94.8%, SD=5.0 vs 94.2%, SD=6.1; P=.747) (Figure 2). Most of the questions were scored "good" in comprehensibility (Table 2).

Discussion

Disaster casualties can have a diversity of presentation in earthquake, tsunami, or complex terrorism attacks. However, for some disasters, such as food poisoning, flu or other infectious pandemics, bio-terrorism, or leakage of a single chemical agent,
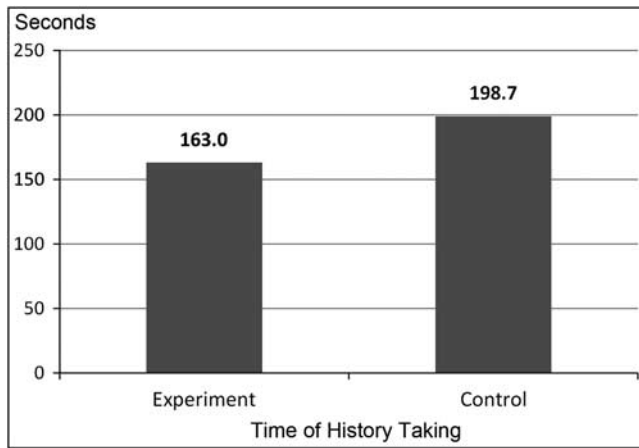
Figure 1. Time to Complete the History Taking Was Lower in the Experimental Group than in the Control Group (P=.010).
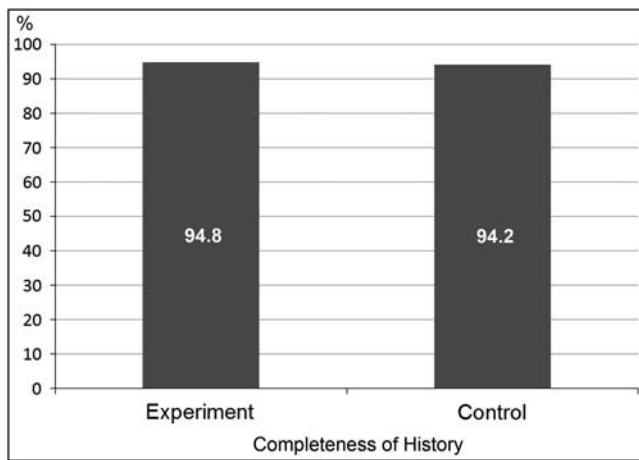

Figure 2. There Was No Significant Difference in Completeness of History Between the Experimental Group and the Control Group (P=.747).

Question	Score of Comprehensibility	
	Mean	Standard Deviation
0	4.7	0.7
1	5.0	0.0
1.1	4.9	0.3
1.2	5.0	0.2
2	5.0	0.0
3	5.0	0.0
4	5.0	0.0
4.1	4.7	0.7
4.2	4.5	1.0
4.3	4.9	0.4
5	5.0	0.0
6	5.0	0.0
7	4.9	0.4
8	4.9	0.2

Hsu © 2014 Prehospital and Disaster Medicine

Table 2. Comprehensibility of Each Question in the Questionnaire (5, Good; 4, OK; 3, No Comment; 2, Some Difficulty; 1, Abstruse)

there can be patients with similar symptoms. In MCIs, a limited number of responders care first for critical patients. The remained noncritical victims are usually left unattended after initial triage. Results of this study showed that noncritical victim self-reporting can shorten the time of history taking by medical personnel without sacrificing the completeness of needed medical information.

Previous experiences in disasters with MCIs shows that fragmented or incomplete medical information and difficult access to medical records were major impediments to care of victims, especially when the victims were evacuated and displaced.[6-8] In large-scale health crises, demands for data collection, analysis, coordination, and distribution are tremendous.[3] Insufficient, fragmented data or misinformation can compromise not only the safety of patients, but also the effectiveness of the disaster response system.[5,9,10] For good coordination and efficient response, it is vital to collect useful information from the very beginning.[10] Any efficient method to collect medical history from victims should be helpful to disaster responses.

For an efficient collection of medical information, several forms of medical records are suggested to be developed in advance, based on the result of regional vulnerability analyses. Contents of the forms can be modified after encountering a specific disaster. Copy machines or printers, powered by a portable generator, can easily reproduce the forms for history taking. Furthermore, with light-weight, pocket-sized smart devices with longer battery lives, wireless communication techniques and the Internet can be used to upgrade the paper-based record to electronic health records.[4,9,11,12] Deployment of a simple, but uniform, electronic medical record to responders at different locations may allow for better and more consistent information collection. It is also helpful to provide real-time patient data to every medical responder to facilitate continuous treatments from the scene to the hospital.[13,14] Better and more accurate information management can improve overall disaster response, emergency medical care, and also public health surveillance.[7,13-16] Furthermore, electronic data are ready for cross-system and cross-organization information sharing.[16,17] Responders can plan, make decisions, and respond to disasters more efficiently with reduced errors and at lower costs.[18-20]

Limitations

There were several limitations of this study. First, the number of participants in the experimental and control groups was not large. However, the difference in time to complete the history taking was statistically significant. Second, victims in disasters may have great ranges in age, education levels, and socioeconomic and cultural backgrounds. Although a homogenous group of students was

invited for this study, it should be not difficult for citizens to answer the questionnaire because most of them receive 9-year obligational education. Third, memory recalls were used to simulate the food poisoning. In addition, the study situation may not be the same in other disasters. External validation of the study results in other situations, especially in response to a true disaster, is necessary.

Conclusion

This study showed that self-reporting of symptoms and essential medical history using a standardized data collection questionnaire can shorten the time of history taking without sacrificing the completeness of information in MCI food poisoning events.

References

1. Hampton JR, Harrison MJ, Mitchell JR, Prichard JS, Seymour C. Relative contributions of history-taking, physical examination, and laboratory investigation to diagnosis and management of medical outpatients. *Br Med J*. 1975;2(5969):486-489.
2. Peterson MC, Holbrook JH, Von Hales D, Smith NL, Staker LV. Contributions of the history, physical examination, and laboratory investigation in making medical diagnoses. *West J Med*. 1992;156(2):163-165.
3. Teich JM, Wagner MM, Mackenzie CF, Schafer KO. The informatics response in disaster, terrorism, and war. *J Am Med Inform Assoc*. 2002;9(2):97-104.
4. Chan TC, Killeen J, Griswold W, Lenert L. Information technology and emergency medical care during disasters. *Acad Emerg Med*. 2004;11(11):1229-1236.
5. Thieren M. Health information systems in humanitarian emergencies. *Bull World Health Organ*. 2005;83(8):584-589.
6. Choi E. Disaster relief informatics: access to KatrinaHealth.org prescription data via OQO ultra mobile PC and cellular wireless connectivity. *AMIA Annu Symp Proc*. 2006;888; Washington DC, USA.
7. Lurie N. H1N1 influenza, public health preparedness, and health care reform. *N Engl J Med*. 2009;361(9):843-845.
8. Kimura M, Yamamoto R, Oku S. Interim report of healthcare delivery after east Japan earthquake-tsunami disaster–does EHR help? *Methods Inf Med*. 2011;50(5):393-396.
9. Harrison JP, Harrison RA, Smith M. Role of information technology in disaster medical response. *Health Care Manag*. 2008;27(4):307-313.
10. Weiner EE, Trangenstein PA. Informatics solutions for emergency planning and response. *Stud Health Technol Inform*. 2007;129(Pt 2):1164-1168.
11. Fuse A, Okumura T, Hagiwara J, et al. New information technology tools for a medical command system for mass decontamination. *Prehosp Disaster Med*. 2013;28(3):298-300.
12. Prgomet M, Georgiou A, Westbrook JI. The impact of mobile handheld technology on hospital physicians' work practices and patient care: a systematic review. *J Am Med Inform Assoc*. 2009;16(6):792-801.
13. El-Masri S, Saddik B. Proposal of an end-to-end emergency medical system. *Stud Health Technol Inform*. 2011;169:349-353.
14. Caillouet LP, Paul PJ, Sabatier SM, Caillouet KA. Eye of the storm: analysis of shelter treatment records of evacuees to Acadiana from Hurricanes Katrina and Rita. *Am J Disaster Med*. 2012;7(4):253-571.
15. Tang PC, Committee APP. AMIA advocates national health information system in fight against national health threats. *J Am Med Inform Assoc*. 2002;9(2):123-124.
16. Shapiro JS, Mostashari F, Hripcsak G, Soulakis N, Kuperman G. Using health information exchange to improve public health. *Am J Public Health*. 2011;101(4):616-623.
17. McIlwain JS, Lassetter K. HIE: decision support. Building sustainable HIEs. In the aftermath of Hurricane Katrina, the need for a true health information exchange in Mississippi cannot be denied. *Health Manag Technol*. 2009;30(2):8-11.
18. Whittenburg L. Use of metadata registry for nursing: a customer-centered electronic health record. *Stud Health Technol Inform*. 2006;122:854.
19. Lindberg DA, Humphreys BL. Rising expectations: access to biomedical information. *Yearb Med Inform*. 2008:165-172.
20. Case T, Morrison C, Vuylsteke A. The clinical application of mobile technology to disaster medicine. *Prehosp Disaster Med*. 2012;27(5):473-480.