Development of a Web-based questionnaire to collect exposure and symptom data in children and adolescents with asthma

Clifford P. Weisel, PhD*; Stanley H. Weiss, MD†; Azadeh Tasslimi, MPH†; Shahnaz Alimokhtari, MS*; and Kathy Belby, RN†

Background: Questionnaires are an important component of epidemiologic studies. Maintaining compliance in longitudinal studies is a challenge, particularly from children and adolescents.

Objective: To implement a Web-based questionnaire for children and adolescents with asthma for daily self-completion, minimizing recall bias and maximizing compliance.

Methods: We determined symptoms, exposure to asthma triggers, peak expiratory flow rate, and medications taken, including dose and dose time. The Web-based system can be less time-consuming and a source of fewer errors than paper questionnaires and permits review of the data and compliance during the study. The Web programming of the questionnaire included branching, so that questions deemed irrelevant based on a previous response were not presented to participants, minimizing the completion time.

Results: Sixty-four students with asthma participated nearly daily for between 2 and 4 months. Financial incentives for the participants were calculated in real time based on completion rates. Monitoring of the subject's completion included an extensive administrative hierarchical alert system, enabling the staff to target individuals who fell behind in entries and needed the most encouragement.

Conclusions: Similar compliance and completion rates were obtained using the Web-based questionnaire as reported for smaller paper questionnaires by parents of children. The Web-based system provides a mechanism to obtain daily responses directly from an age group not often accessible by traditional questionnaire approaches.

Ann Allergy Asthma Immunol. 2008;100:112–119.

INTRODUCTION

Questionnaires are a fundamental tool in epidemiologic studies to determine health outcomes and exposure to toxic agents. Traditional approaches for gathering responses have involved either interviewing the participant (in person or via telephone) or leaving a paper copy for the respondent to complete.[1] For longitudinal studies, the former is time-consuming for the study staff, whereas the latter relies on the diligence of the participant without feedback from the investigators until the questionnaire is submitted. Issues related to paper questionnaires include the following: (1) obtaining timely completion of daily questionnaires; (2) relying on long-term recall for completion when the participant completes the questionnaires retrospectively, which can lead to recall bias; and (3) transcription errors when transferring the written responses to an electronic database.

Compliance with questionnaires can be particularly problematic for adolescents and children. Web-based surveys have been used recently to gather information from many respondents about public health concerns,[2–4] to improve recruitment for participation in a survey,[5] to evaluate patient compliance with following medical instructions,[6] and to answer a series of questions about asthma and fruit consumption.[7] Web-based surveys have been as effective as paper surveys in terms of completion rate and successful ascertainment of responses to questions about potentially sensitive personal issues.[7,8] Thus, it seems feasible to obtain information in epidemiologic studies through Web-based systems that have improved confidence compared with paper surveys and can provide rapid feedback about compliance.

We developed and used a Web-based questionnaire in a study of children and adolescents with asthma to construct a database in near real time. This database made it possible to determine if the questionnaire was being completed in a timely fashion or if days were being skipped. Our system also created electronic reminders to alert the study staff to contact a participant about missed days. Some potential advantages

Affiliations: * Environmental and Occupational Health Sciences Institute, UMDNJ (University of Medicine & Dentistry of New Jersey)–Robert Wood Johnson Medical School, Piscataway, New Jersey; † Department of Preventive Medicine and Community Health, UMDNJ (University of Medicine & Dentistry of New Jersey)–New Jersey Medical School, Newark, New Jersey.

Disclosures: Authors have nothing to disclose.

Funding Sources: This study was supported by DSM Nutritional Products Inc (formerly Roche Vitamins Inc) through a Supplemental Environmental Project from the New Jersey Department of Environmental Protection and in part by grant P30ES005022 from the National Institute of Environmental Health Sciences–sponsored UMDNJ (University of Medicine & Dentistry of New Jersey) Center for Environmental Exposures and Disease (C.P.W.).

Received for publication March 29, 2007; Received in revised form August 8, 2007; Accepted for publication August 9, 2007.

Table 1. Potential Advantages of a Web-Based Questionnaire vs a Paper Version

Paper version	Web-based version
Administration of daily questionnaires can be time and labor intensive and paper needs periodic retrieval	The Web-based system is accessed by participants at their convenience, entry is often faster, and contact with staff is minimized
Compliance, particularly for children and adolescents, is often low for daily questionnaires	Children and adolescents use computers daily, so there is a smaller intrusion in their lives
Compliance rate unknown until attempting to retrieve data	Compliance checked in real time
Paper questionnaires require subsequent entry, with associated transcription errors	Data are directly added to the database (minimal errors), checks can be made to restrict to valid entries, and data can be reviewed quickly so participants can be contacted to resolve questions about their entries
Review requires that the response on pages be looked at again	Summary table of relevant responses can be displayed for verification at entry
Calculation of completion rates for incentive calculation done can take time, so not optimal to keep participants' interest	Can be updated daily to optimize compliance
Data not usually available until late in the study	Data can be available in real time, so decisions can be made to modify interaction with subject to optimize collection and compliance
Conflicts in medication use or inappropriate medication use cannot be readily ascertained in real time	Data can be monitored on an ongoing basis for issues identified by the investigators, such as medication use or diminution in peak expiratory flow

that we identified in our Web-based questionnaire compared with issues that sometimes are reported in a traditional paper questionnaire are listed in Table 1. The questionnaire inquired about health status, medication use, symptoms, and exposure for use in an epidemiologic study on the association between asthma responses and exposure to air pollution.

METHODS

The same considerations for developing a paper questionnaire (ie, what questions to include, compliance, pilot testing, incentives, and time for completion) and aspects specific to Web-based systems (ie, participants' access to computers; compatibility across different computers, operating systems, and Web browsers; accessing data; and real-time uses of the responses) were part of the method and study design. The study was submitted to the UMDNJ (University of Medicine & Dentistry of New Jersey) institutional review board for human subjects, and approval was received. As part of the institutional review board submission, screen images of all questions were provided with the application.

The questionnaire was designed to be as short as possible, posing only questions needed to answer the study's hypotheses, and the ordering of questions was designed to be compatible with a Web-based presentation. Thus, questions were grouped by topic, and the groups were internally linked as part of our database programming so that a smooth transition between questions and sections would be achieved when displayed on the computer screen (Fig 1).

The Web-based questionnaire was initially evaluated with a month-long pilot study of 10 students to determine if the questions were unambiguous, successfully elicited the required information, and could be completed in a sufficiently short time to make it practical to be completed daily. A parent provided his or her written informed consent for all students who were minors and, in addition, students aged 12 to 17 years provided their informed assent and those younger than 12 years assented verbally.

The Web-based questionnaire was composed of multiple sections (Table 2). Logging onto the system required a user identification number and password, which were selected by the participant. If either or both were forgotten, they could be sent electronically on request to the registered e-mail address associated with the user. The response format was designed with pick lists and check boxes to facilitate completion. Entries for the current day and the previous 3 days were permitted to allow for completion of the questionnaire after a weekend while limiting the length of recall time to attenuate potential recall bias. After completing each section, a summary of the entries was provided to the student for verification, and editing if necessary, before saving the results to the database. The student could stop and restart entries after each major section by signing off and then back onto the system. The time of day when the entry was made was saved, and the next permitted entry was prompted for when the user signed on at a later time. Each reported symptom or medication use required the participant to enter the time of day along with the duration or amount, respectively. The question about general asthma condition ("How would you rate your asthma today?") was asked before and after the individual entries about asthma symptoms as a check on the response and to determine if a different response to the same question was elicited after asking about individual symptoms.

A baseline questionnaire was administered in person by the study staff (S.H.W., A.T., S.A., and K.B.) to obtain personal information and detailed medical information, types of

Download English Version:

https://daneshyari.com/en/article/3193289

Download Persian Version:

https://daneshyari.com/article/3193289

Daneshyari.com