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# Event Analysis Techniques

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Event analysis (EA), a qualitative research technique adapted from the fields of anthropology and sociology, can be used to describe and explain social interactions and behaviors associated with complicated clinical situations. Event analysis is useful in limiting the focus of data collection in complex settings and in obtaining and managing multiple perspectives about an event of interest while situating the event within appropriate social and environmental contexts. This article reviews contemporary uses of EA in clinical nursing research, describes the modification and application of EA techniques to common methods of data gathering (observation, interview, and document review) in clinical settings, and presents recommendations for conducting EA in clinical settings by using exemplars from a current study. **Key words:** *event analysis*, *observational research methods*, *qualitative methods*

EVENT ANALYSIS (EA) techniques, borrowed and modified from anthropological and sociological research methods, have become useful to describe and explain social, behavioral, and technological interactions associated with complex clinical problems. Event analysis is a technique traditionally used by ethnographers to document and analyze critical events, such as festivals, celebrations, holidays, religious rituals, or rites of passage in the lives of a group.[1] Certain key or focal events may reveal a great deal about the way of life, social values, and functioning of a culture or social group.[2] The terminology used in qualitative research methodology texts to describe this form of focused data collection and analysis varies (eg, critical events, focal events, key events, critical incidents, and major events). *Critical incidents* or *major events* have been defined by sociologists as those seen as influential turning points or milestones in the process or phenomenon under investigation.[3] In sociological research, critical events have been analyzed chronologically or in order of importance.[3,4]

Event analysis was first adapted from anthropology for use in nursing research by Kayser-Jones[5] in a study to identify and describe factors contributing to the hospitalization of nursing home residents. In this context, EA offers a method of managing observations around a critical event that occurs repeatedly in the clinical setting and is especially useful in limiting the focus of observations and data collection in complex settings such as the intensive care unit (ICU).[6] Event analysis techniques can be used within case analysis, grounded theory, ethnography, and other qualitative and mixed method approaches.[7] The methodological advance presented in this article is the application and modification of these techniques to discrete

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situations or occurrences in clinical research settings. This article reviews applications of EA in nursing research, addresses unique methodological features of clinical EA, and presents recommendations for conducting EA in clinical settings. Event analysis procedures from a study in progress are used as an exemplar.

## EVENT ANALYSIS IN NURSING RESEARCH

Kayser-Jones[5] introduced EA to nursing, as a strategy for collecting data related to an event that when compiled and analyzed, provides an explanation of more than the event itself. Rather, the product of EA includes the event's precursors, its consequences, relationships between and among key participants, and how they are connected to or influence the event. Kayser-Jones has consistently employed EA in her work since 1989, and in recent years, other clinical social scientists have also begun to use the technique. A closer look at this small but valuable body of literature shows that EA can be applied to a variety of events in diverse settings. Event analysis emerges as a flexible, effective, and valuable strategy for collecting data, especially when the goal is to achieve thick description and explanation of a phenomenon in a complex clinical situation.

The events to which EA techniques have been applied in nursing research vary in temporal and contextual boundaries and levels of abstraction. For example, Kayser-Jones[8,9] applied this strategy to study factors related to eating behavior among nursing home residents. She and her team observed mealtime, a relatively brief, concrete event, in 2 nursing homes over a period of several years. In addition to observational data, dentists and speech language pathologists performed dental examinations and bedside sleep evaluations were conducted to identify physiologic factors that may influence eating behaviors.[8,9] The team also collected physiologic data such as weight, height, and body mass index to track the consequences of eating behaviors among this population. Therefore, EA techniques applied to mealtime in the nursing home were used within a longitudinal case and focused ethnography design. In other studies, Kayser-Jones and her team applied EA to more prolonged events such as acute illness[5,10] and the process of death and dying among nursing home residents.[11] In addition to descriptions of the events of interest, data surrounding the events were important in constructing contextual and process-oriented analyses.

Shawler et al[12] incorporated EA techniques in a study to examine the shifting levels of family participation in decision making related to the care of nursing home residents. These investigators defined the study event as "a specific episode requiring a decision," but did not explicitly specify contextual boundaries of the decision-making event; the published work emphasized interview rather than observational data.

Happ[13,14] applied EA techniques in a grounded theory study to explore treatment interference (ie, "device disruption") among older adults hospitalized in a medical ICU. In this study, EA was used to examine a concrete event, any unplanned disruption, disconnection, or discontinuation of a technological device, an occurrence that may happen repeatedly during a shift, or intermittently over the course of several days in the ICU. Data collection for the study included participant observations, interviews with patients, nurses, family members, and physicians, clinical record review, and review of policy and procedure manuals, all focused on aspects of treatment interference.[13,14] The observational data that were focused on treatment interference events provided a fulcrum from which the larger sociotechnical process of the use of medical technologies with critically ill older adults, "technological access," was constructed.[15]

Similar data collection techniques were applied in 2 mixed-method studies using a complementary design[16] to explore the feasibility of electronic voice output communication

aids with nonspeaking hospitalized patients in which patient communication was the observed event of interest.[17,18] Use of EA techniques in these mixed-method observational studies demonstrated the applicability of EA beyond traditional qualitative research methods. Event analysis techniques may serve to connect quantitative and qualitative data in complementary research designs.

The methodological advance evident in this literature review is the application of EA techniques to discrete clinical occurrences or events in naturalistic clinical settings. Most of the studies reported here applied the same general data collection techniques of participant observation and interviews combined with some type of document review.[5,8,10–14] In each application of EA, the researchers tailored data collection to the specific phenomenon or event of interest. Despite some variation in data collection methods and structure, an applied definition and common features of EA in clinical nursing research can be extracted from the research literature and our present experience in using this technique.

## Features of event analysis

Anthropologists suggest that critical event observations should include description of the physical setting, equipment, key participants, and patterns of behavior.[1] Primary data collection techniques used in EA include observation, interview, and document review. As adapted for use in nursing research, *EA* is a qualitative research technique focused on a specific incident (defined by the research topic or question), using observation and associated data gathering techniques to describe and explain that incident. Clinical events studied in this manner are usually those of human interaction and have circumscribed boundaries of time, place, and participants. Observations are conducted prospectively in the natural setting; this differentiates EA from historical EA. Event analysis also differs from event monitoring, which refers to techniques of remote surveillance or frequency counts of an event of interest.[19–21]

### *Observation*

Observation is the primary mode of data collection in EA. Observation times and length of observations depend on the occurrence or likelihood of occurrence of the event being studied. In clinical nursing research, events are likely to be at least partially defined or delimited a priori, rather than discovered as part of exploratory fieldwork as in anthropological or sociological research. For example, in a current study of the processes of care and communication during weaning from long-term mechanical ventilation (LTMV),[22] the weaning event was defined qualitatively as any time patients were not receiving assist control ventilation mode and were considered to be weaning by respiratory therapy and nursing staff. Typically, this was supported by quantitative ventilator setting parameters, continuous positive air pressure (CPAP) of 12 or less and pressure support of 10 or less or T-piece or tracheostomy mask oxygen, with some theoretically justified variations. Observations of weaning events were conducted on consecutive days at varying times during the morning, afternoon, and evening when weaning was expected to occur. Although observations were focused primarily on weaning trials, observations of daily physician rounds, patient care interactions, family meetings, and care conferences provided important information regarding decisions about and planning for weaning as well as patient, family, and clinician reactions to the weaning process. Glass doors and windows facing the corridor permitted observation without full entry into the patient's room. Closer observation in the patient's room was conducted in conjunction with care activities provided by clinicians (acute care nurse practitioner [ACNP], physicians, nurses, respiratory therapists), when appropriate. In other words, the researcher followed or "shadowed" clinicians into the room during mechanical ventilation (MV) or in preparation for a weaning trial.

Selection or sampling of events for observation and data collection should be determined in accordance with the dominant research method from which the study is designed. "Nested," or layered, sampling may be used in qualitative case study methods.[3] In this method, events are sampled using specific selection criteria. These events are nested within study cases that are selected for study inclusion based on a different set of criteria. In our study of weaning from LTMV, patient cases were selected based on criterion-sampling for variability on likelihood to wean from the ventilator. Study participants were selected using purposive and theoretical sampling techniques to enhance variability on characteristics of age, ethnicity, medical diagnoses, and level of cognition-interaction. Within and across cases, weaning events were selected to obtain good representation of the range of events and the scope of the phenomenon. For example, observations were designed to record the starting, maintaining, and stopping of weaning trials, successful and unsuccessful weaning trials, intubations, extubations, and all modes of weaning (ie, tracheostomy mask, T-piece, CPAP and intermittent mandatory ventilation [IMV] settings).

Recording of event observations can take several forms: audiorecording, videorecording, photograph, semistructured observation tool, or descriptive field note. In the study of weaning from LTMV, we used a semistructured observation tool to guide consistent data collection on key elements of the event (such as sedation, analgesia, ventilator settings, patient level of consciousness, mood, weaning start time, ventilator adjustments, patient position, persons in the room, information given to patient, etc) in addition to written descriptive field notes. The observation guide was developed in a previous study of patient communication during MV[17,18] and modified according to the literature on MV weaning.[23–25] Condensed field notes were written using medical abbreviation shorthand during observation, with the goal to record interactions as close to verbatim as possible. Notes were expanded via dictation after leaving the field.[2,26] Field notes include diagrams and drawings of the room, patient position, equipment, number of people present, and their positions (Fig 1). Selective audiorecording of key clinician informants was also used during weaning events to accurately document clinician's interpretations of the weaning event and its consequences. During observations, clinicians were invited to "think aloud" in describing clinical decision making related to weaning or deferral of weaning trials.[27,28]

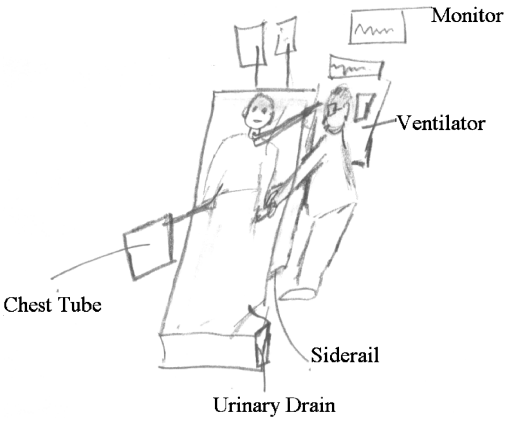


**Figure 1.** Patient-visitor diagram.

To overcome the challenges of studying clinical events that have indefinite timeframes, such as ventilator weaning or acute illness, investigators apply specific inclusion criteria and set clear boundaries around the event. For example, to capture the event of "acute illness" in nursing home residents, the researchers began observations when the resident showed a decline in health that was accompanied by specific signs and symptoms and ended when the patient left the nursing home for admission to the hospital.[11]

In our study of weaning from LTMV, weaning event observations did not have preset time limits because weaning trials are variable in length and frequency. Observations involved short periods (10–20 minutes) of close scrutiny of the patient's situation, followed by a shift in focus to contextual features such as clinician behaviors, unit environment, and clinical documentation, with

subsequent returns to more focused patient observation.[13,14] In addition, we collected data on the consequences of the weaning event by noting the total length of the weaning trial, and reasons for returning to ventilatory support (such as fatigue, anxiety, rapid heart rate, or planned time limitation).[6] These data (length of weaning trial and reasons for return to ventilatory support) were obtained prospectively during observations and retrospectively from chart review and interviews with clinicians.

The limitations of participant observation methods of data collection include observer fatigue, potential bias in the selection, recording, or interpretation of observed events, and observer effects on study participants.[6,26] Previous observational research conducted in the ICU and a prolonged (14 months) presence in the setting served to reduce *observer effects* in our study.[26] However, researchers must recognize that their presence may alter the responses of individual patients or clinicians. Comments like "Oh, yeah, I can put Mrs X on a wean now" indicated that our presence occasionally "reminded" clinicians to begin a weaning trial. Instances of investigator "prompts" in the process were noted and coded separately. Patients may be comforted by the researcher's "watchful presence" or may find such a presence anxiety producing. In our study, most observations were conducted unobtrusively from outside of the patient's room; however, the physical setting had inherent limitations of space, visualization, and sound. Patient, family visitor, and clinician responses to the observer's presence were documented and regularly analyzed by the research team.[6]

*Observer fatigue* was minimized by spacing cases over a 14-month period and by rotating observers (J.T., M.B.H.). Weekly research team meetings and more frequent interactions with project staff assisted observers in "debriefing" about intense observations and emotionally charged clinical events. Team meetings and discussions with project staff also prevent the observer from experiencing isolation during fieldwork.[29] The use of strategies such as these to minimize observer fatigue should be an integral part of the research plan.

*Bias* in selection, recording, or interpretation of events can be minimized by the use of multiple observers, continuous review by the multidisciplinary research team, and by triangulated data sources that serve to cross-check interpretations.[26] The investigators from our research team who conducted weaning event observations (J.T., M.B.H.) did not function as clinicians in the research setting, to minimize blurring of role and limit bias.[26,29,30] Rigorously maintained data collection procedures are required to ensure minimal bias and prevent overrepresentation or underrepresentation of certain aspects of observed events in the data set.

### *Document review*

Documents for review can include clinical records, policies, procedures, and care protocols. Progress notes, physiological data, and diagnostic test results and commonly included in EA.[8,10,13] In our study of weaning from LTMV, clinical record review, completed by a trained research assistant, focused on medication and treatment orders, clinicians' documentation pertaining to weaning progress and/or plan, patient and/or family response to weaning, and the process of decision making regarding treatment options. In addition to qualitative textual description, numerical data including ventilator settings, respiratory parameters, APACHE III[31] illness severity scores, and sedation assessment scores using the Motor Agitation Assessment Scale (MAAS)[32] were retrieved and plotted on spreadsheets to construct a portrait or story of weaning events over time for each case.

### *Physical objects or artifacts*

Just as the ethnographer collects photographs or examples of tribal masks and costumes, it is important for nurse researchers to collect and document the visual symbols

and artifacts related to the targeted study events in the clinical setting.[33] We included the following artifacts or physical objects as data: radiographic images, ventilator graphic display screens, electrocardiograph monitor printouts, and photos and drawings of the equipment used (eg, pulse oximetry probes, mechanical ventilators, tracheotomy mask, dialysis machine). These visual artifacts are used analytically to evaluate their roles in the weaning process 'b y virtue of what they are physically and what they become in different user contexts."[33(p110)] They are considered as important as the actors in clinical events. Including objects and artifacts in the EA allows the researcher to explore how machines may act as delegates for clinicians, how they may regulate behavior, and how they may be changing ways of body habitus and communication.[33]

### *Interview and self-report*

The purpose of interviews in EA is to obtain the perspectives of key "players" in the event. Formal, semistructured interviews can be used to obtain information on both the global understanding of the event ("Tell me about weaning patients from LTMV.") or the more specific cases or occurrences of the event ("Tell me about Mr M.'s progress with weaning from LTMV.") Observational or informal interviews are less structured and more casual and occur in the naturalistic setting, usually during or immediately following observation of an event. We interviewed nurses, physicians, respiratory therapists, and other clinicians involved in the weaning process as well as patients and family members, using both types of interview techniques. Diaries and new techniques, such as ecological momentary assessment and experience sampling, offer additional avenues for obtaining participants' immediate experiences of target events in natural settings.[34–37] Questionnaires or established rating scales may also enhance the description of a particular event from the perspective of study participants.

## DATA ANALYSIS

The event observations, interviews, and documents represent the "story" of the clinical phenomenon under study. Researchers who employ qualitative observational methods report the number of specific events of interest or phenomena observed, such as end-of-life care events,[38] decision-making events,[12] communication interactions,[18] or mealtimes.[8] Quantification of the events observed, documented, or tracked provides a more accurate indication of the magnitude of the *data* sample than do the traditional sample size number of human study participants.

The biggest challenge in analysis of these data lies in retaining speaker and perspective within and across cases and events. For example, although we may focus on interaction among the respiratory therapist, patient, and mechanical ventilator during a particular weaning event, we also want the data to reflect what happens when the respiratory therapist leaves the room. This same respiratory therapist moves back and forth between study patients (ie, more than one case) and among events, accompanies a critically ill patient to a procedure off the unit, confers with the nurse practitioner about weaning parameters, and experiences competing care duties that influence his/her decision making about weaning for the study patient(s). Data documents may be separated by type (such as event observations, general fieldnotes, interviews, etc), case, and/or speaker. Analysis is guided by the research questions, and involves computerized data management, coding, and matrix-formation procedures.

### Computerized data management

Computer-assisted data management is a practical tool for assigning and tracking labels or codes as well as perspective. Qualitative data management software permits organization of a large qualitative database, is constructed to isolate selected parts of the data for identification (coding), and then facilitates rapid retrieval of any portion of the

data according to codes, case, or any other qualifier predetermined by the analysts. For example, ATLAS.TI (Scientific Software Development, Version 5.0), a computerized system for qualitative data coding, filing, retrieval, and review, enabled our research team to apply speaker codes, document codes, and code families to label and track perspective, analytic code, and case. The computerized data management system provides easy access to illustrative examples and quotes for use in the final phase of analysis, the preparation of reports and dissemination of research findings, to give readers clear, actual examples of evidence for the analysis of the data.

### Coding

The principal aim of coding and constant comparative analysis is to identify regularities (or irregularities) in the clinical situations. For example, these regularities may be factors as simple as the number of people in the room during weaning, or more complex behavioral factors such as use of body language (from observation data), certain commonly used phrases, or specific statements about reasons for changing a ventilator setting (from interviews). Thus, data analysis involves reducing the data from lengthy descriptions of real-life situations and participants' perceptions to descriptions of "what is going on" in these particular clinical situations. Sequencing behaviors and responses is a technique used during coding to clarify the interpersonal interactions and therapeutic strategies involved in a clinical event.[39] We use diagrams and theoretical memos to document and analyze behavioral response sequences and variations in the sequences. Figure 2 shows a sample diagram of a sequence of respiratory therapist behaviors in starting a ventilator weaning trial. Using questioning techniques and matrix construction, the dimensions and properties of the clinical process can be identified and described.[4] Dimensionalization helps to reveal the social and environmental factors associated with a particular event. For example, step 3 in Figure 2, "informing the patient," is dependent on the therapist's

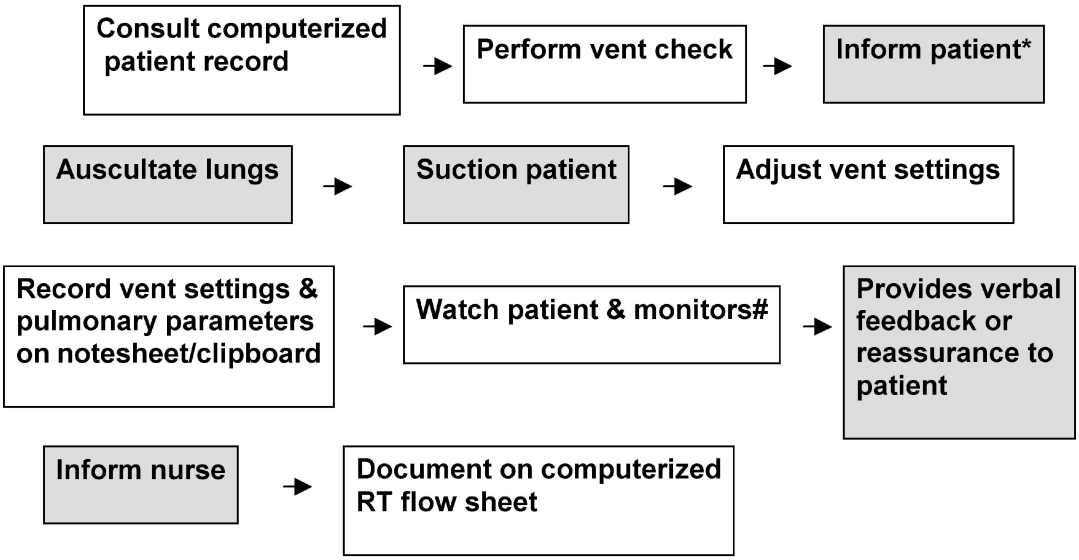


**Figure 2.** Sequence of respiratory therapist (RT) behaviors in starting a ventilator weaning trial. (Shaded boxes: these steps were not consistently present. *If patient is anxious, RT does not inform, but may ask RN to administer anxiolytic medication. #Surveillance time varies depending on patient response).

assessment of the patient's level of awareness, anxiety, and previous response to weaning attempts.

### Matrix display

Decisions may be made to quantify qualitative data or qualify quantitative data for further analysis based on the findings of matrix construction.[40] Matrix construction involves data display to discern patterns or relationships among concepts.[4] These displays may include incidence counts that can provide visual confirmation of an association or trend, such as reasons for termination of a weaning trial. Case trajectories and milestones can be plotted from matrices providing a sequential or chronological ordering of events important in within-case analyses. When a large number of events from multiple cases are aggregated, coding and analysis may involve more data reduction, summarization, and pattern identification. Orderly systematic relationships are confirmed by referring back to the matrix data. Selected data (variables) from matrices can be graphed to visually confirm or refute associations. Use of sophisticated computer software permits hypertext-like marking of data points on matrices and within the original database, allowing the analyst to quickly reference observation notes, interviews, memos, etc. This activity supports "grounding"[41] theoretical assumptions in the data. Concepts and categories may then be arranged and rearranged until the configuration, either descriptively articulated or in diagram form, provides an analytic version of the phenomena being studied.

## SUMMARY

This article reviewed the application of EA techniques to the study of clinical rather than sociocultural phenomena and detailed the resultant methodological modifications and advances in the use of these techniques for clinical nursing research. Event analysis techniques have excellent potential for producing research results that illuminate and, ultimately, enhance clinical care practices. These techniques can be applied in traditional qualitative or mixed-methods research designs and offer the simplicity of focus on events of significance to patient care and nursing practice. Event analysis is a flexible method in terms of time, setting, and data source(s). A major strength of the method is that it facilitates the capture of complex facets of action and communication occurring in natural settings. When multiple disciplines are involved, the actions and perspectives of each type of "actor" in the clinical event can by explored to the extent that the talents of the research team, time, and resources permit. Likewise, related and peripheral incidents can be explored to clarify their impact on the clinical event of interest. The use of multiple methods of data generation (observation, videotaping, interview, document review), triangulation of qualitative and quantitative data, and systematic "trackable" data reduction, including matrix construction, support trustworthiness.[42] Event analysis is new to nursing research, and though the techniques are still evolving, their use, particularly in clinical settings, offers much promise for enhancing the research and practice of the discipline.

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