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## Assessment of Rigour in Published Nursing Intervention Studies that Use Observational Methods

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## Assessment of Rigour in Published Nursing Intervention Studies that Use Observational Methods

### Abstract

Unstructured observation involving “going into the field” to describe and analyze what is seen and heard, may be an underutilized method in nursing research. The role of the observer, the nature of the observations, data sources, systematic recording and analysis of observations, appropriate analysis of the data, and corroboration of findings are important considerations when ensuring rigour in observational methods. However, the description of observational techniques and methods provided in published accounts of qualitative research is sparse, and it is therefore difficult to evaluate the truthfulness, credibility, and trustworthiness of many research studies. Observational methods can address discrepancies between what people say and what they actually do, and they can capture the context in which nurses practice. Little is known about the oral hygiene care practices of nurses caring for hospitalized older adults with longer lengths of stay, despite the link between poor oral hygiene and systemic illness. To date, the oral hygiene care provided by nurses has not been directly observed, nor have unstructured observational techniques been used to observe any caregivers providing such interventions. In the absence of studies related to oral hygiene care, an integrative review of the literature has been undertaken to critically analyze how rigour was ensured in qualitative or mixed - methods studies in which observational methods were used to study nurses as they provided other types of basic nursing interventions. Whittemore and Knafll’s revised integrative review method was utilized, and criteria that would indicate rigour in a study were gleaned from the literature to create a framework for analysis.

### Keywords

Observational Methods, Participant Observation, Nurses

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## Assessment of Rigour in Published Nursing Intervention Studies that Use Observational Methods

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*Unstructured observation involving “going into the field” to describe and analyze what is seen and heard, may be an underutilized method in nursing research. The role of the observer, the nature of the observations, data sources, systematic recording and analysis of observations, appropriate analysis of the data, and corroboration of findings are important considerations when ensuring rigour in observational methods. However, the description of observational techniques and methods provided in published accounts of qualitative research is sparse, and it is therefore difficult to evaluate the truthfulness, credibility, and trustworthiness of many research studies. Observational methods can address discrepancies between what people say and what they actually do, and they can capture the context in which nurses practise. Little is known about the oral hygiene care practices of nurses caring for hospitalized older adults with longer lengths of stay, despite the link between poor oral hygiene and systemic illness. To date, the oral hygiene care provided by nurses has not been directly observed, nor have unstructured observational techniques been used to observe any caregivers providing such interventions. In the absence of studies related to oral hygiene care, an integrative review of the literature has been undertaken to critically analyze how rigour was ensured in qualitative or mixed-methods studies in which observational methods were used to study nurses as they provided other types of basic nursing interventions. Whittemore and Knafl’s revised integrative review method was utilized, and criteria that would indicate rigour in a study were gleaned from the literature to create a framework for analysis.*

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Observational methods in qualitative research are used to provide factual, accurate, and thorough descriptions of the observed setting, the activities that took place there, the people involved in the activities, and their perspectives on the meaning of what was observed (Patton, 2002). Observations can be *structured* and systematic in their approach utilizing a checklist of activities, or they may be *unstructured*, where the observers go “into the field” to describe and analyse what is seen and heard (Mulhall, 2003, p. 306). There are a number of terms that refer to methods for gathering observational data including “participant observation, fieldwork, qualitative observation, direct observation, and field research” (Patton, 2002, p. 262). Observation, as a method, has its roots in anthropology and has been used interchangeably with its offshoot, participant observation. It is one of the methods utilized in ethnographic fieldwork as well as with other qualitative approaches used by nurses.

When the “field” is the hospital setting, observational methods can be valuable approaches to (a) address discrepancies between what nurses say when interviewed or surveyed and what they actually do, (b) provide insights into interactions, (c) see things that may escape conscious awareness among nursing staff because routines may be taken for granted, and (d) capture the context and physical environment in which nurses practise (Mays & Pope, 1995b; Mulhall, 2003; Paterson, Bottorff, & Hewat, 2003; Patton, 2002). For

example, it is thought that the state of oral hygiene in dependent older adults in care settings is poor. However, our current knowledge of oral hygiene practices by nurses and their delegates who care for frail older patients is based almost exclusively on their own reports. Only two published studies have reported on staff, in these cases health care aides, being observed providing oral hygiene care. (Coleman & Watson, 2006; Gammack & Pulisetty, 2009). In those structured observational studies, there were discrepancies between what staff did and what has been reported as being done.

Nurses' oral hygiene practices and the challenges they face have not been studied, and use of observational methods may be an appropriate way of shedding light on those practices. A desire to learn how others have addressed rigour in studies where nursing practice interventions were observed was the impetus for this integrative review.

There are some shortcomings and controversy associated with observational methods. They include potential ethical problems related to informed consent and deception, participants' changing behaviour in the presence of the observer, and assuming the role of observer including gaining entry and trust (Mays & Pope, 1995b; Polit & Beck, 2006). However, the biggest criticism of observational methods has to do with validity (Adler & Adler, 1994), though there are ways to overcome the problem. The purpose of this paper is to critically analyse how rigour has been addressed in published nursing intervention studies using observational methods.

## **Background**

Morse, Barrett, Mayan, Olson, and Spiers (2002) have raised the concern that qualitative researchers focus on reporting the outcomes of their research to the neglect of demonstrating how verification strategies, used to ensure "reliability and validity", shaped the research as it developed. Nursing intervention studies using observational techniques could easily be criticized as being subject to researcher bias if the integrity of the research process is not protected throughout (Mays & Pope, 1995a).

Although it has been established that "rigor is essential to any scientific endeavour to assure validity, what this is called and how to measure it is not so clear" (Whittemore, Chase, & Mandle, 2001, p. 527). The debate surrounding the use of the terms validity and its qualitative alternative, credibility, in qualitative research has been the subject of numerous discussions (Creswell, 2007; Long & Johnson, 2000; Morse et al., 2002; Whittemore et al., 2001), but is without resolution.

Patton (1999) was practical in his suggestion that "the qualitative researcher has an obligation to be methodical in reporting sufficient details of data collection and the process of analysis to permit others to judge the quality of the resulting product" (p.1191). Giacomini and Cook (2000) suggested that judging the methodological rigour of a research report involves critically appraising the study's design and approach to analysis while asking the question, "Are the results of this study valid (or credible)"? (p. 358). Aspects of the research design they and others suggested should be critiqued are (a) sampling of study participants, (b) data collection methods, (c) comprehensiveness of data collection, and (d) procedures for analysing the data and corroborating findings (DeWalt & DeWalt, 2011; Giacomini & Cook, 2000; Mays & Pope, 1995a).

Though the credibility of qualitative findings relies on technical rigour in data collection and analysis, Patton (1999) further proposed that the researcher's own credibility affects the way findings are judged. Information about the researcher such as personal connections to the setting and study, training as an observer of the particular phenomenon under study, and the perspective brought to the setting ought to be reported.

Whittemore et al. (2001) distinguished between *criteria* or standards of validity and the *techniques* or methods employed to diminish threats to validity or credibility. Though the debate around perspectives and terms such as validity vs. credibility has not been settled, Creswell (2007) concluded that eventually the issues have to be “translated into practice as strategies or techniques” (p. 207).

### Development of a Framework to Assess Rigour

Six key areas for consideration when assessing rigour specific to observational methods provided the outline for an assessment framework developed for use in this paper (see Table 1). The six areas are (a) observer, (b) observations, (c) choice of participants, (d) data sources, (e) comprehensive data collection, and (f) data analysis and corroboration of findings.

Table 1: *Indicators of rigour in studies using observational methods*

<b>Observer</b>
A) Who is the observer? (i.e., observer identified along with discipline/qualifications)
B) Observer’s role in research described
C) Insider vs. Outsider perspective discussed
D) Disclosure to participants of role of observer and purpose of observations
E) Observer effect considered
F) Degree and nature of collaboration with other researchers (in observation) described
<b>Observations</b>
G) Number and duration of observations and fieldwork indicated
H) Focus of observations described (e.g., single element vs. holistic)
I) Predetermined sensitizing concepts reported
<b>Choice of Participants</b>
J) Purposive sampling strategy with rationale provided
K) Basic features of participants described
<b>Data Sources</b>
L) Multiple data sources used
M) Real time observation of care
<b>Comprehensive Data Collection</b>
N) Data recording process explicit
O) Data collection and analysis conducted iteratively or concurrently
P) An analysis driven stopping point determined the extent of data collection and analysis
Q) Organization and interpretation of data described
<b>Data Analysis and Corroboration of Findings</b>
R) Analysis method is consistent with specific qualitative research approach
S) Procedures used to corroborate findings are explicit

*(Developed from DeWalt & DeWalt, 2011; Giacomini & Cook, 2000; Giacomini, Cook, & DeJean, 2009; Mays & Pope, 1995a; Patton, 2002, 2003; Russell & Gregory, 2003; Spradley, 1980)*

Indicators of rigour within each area were selected for inclusion in the assessment framework (DeWalt & DeWalt, 2011; Giacomini & Cook, 2000; Giacomini, Cook, & DeJean, 2009; Mays & Pope, 1995a; Patton, 2002, 2003; Russell & Gregory, 2003; Spradley, 1980). Most of the indicators, in fact, are strategies that should be in place to reduce threats to credibility. This framework was applied in the data evaluation phase of the integrative review to follow.

## Methods

### The Integrative Review

An integrative review is distinct from other types of literature reviews such as systematic reviews, meta-analyses, and qualitative reviews in that it may include experimental and non-experimental research and data from both empirical and theoretical articles. These diverse data sources enhance the understanding of the topic of interest and can become a greater part of evidence-based practice initiatives (Whittemore & Knafl, 2005).

**Problem identification.** A key challenge with studies using observational methods is that the reader must be able to judge the credibility of the researcher's account, but the detail provided in published research can be sparse (Harrison, 2011; Mays & Pope, 1995a). The purpose of this integrative review is to critically analyse how rigour was addressed in published articles reporting on qualitative and mixed-methods studies in which nurses were observed providing basic nursing interventions in clinical settings.

**Framework for the integrative review.** Since the integrative review is considered "research of research" it too should meet standards of methodological rigour (Whittemore & Knafl, 2005). Whittemore and Knafl's modification of Cooper's (1998) review framework was used as a guide. This review includes the stages of problem identification, literature search, data evaluation, data analysis, and data presentation.

**Literature search.** Journal articles indexed in electronic databases were retrieved using individual or combinations of the following terms: observational methods; participant observation; observation; qualitative study; non-participant observation; participant observation; observations of care; direct observation; methodology; ethnography; observational study; nurses, nursing; nurs\*; long term care; nursing home personnel; nursing homes; hospital; and rehabilitation. A step-wise approach was taken. Successive searches of the Cumulative Index of Nursing and Allied Health Literature (CINAHL) were followed by a search for additional articles in MEDLINE, Embase, PsycINFO, and Web of Science (specific details available from authors). The web search engine Google Scholar was used to locate any articles that may have been missed in the other databases.

**Search outcome.** Articles were included if: (a) they were published in English; (b) they were qualitative or mixed-methods studies employing unstructured observation of Registered Nurses (RNs) or Registered Practical Nurses/Licensed Practical Nurses (RPNs/LPNs) in an institutional setting, i.e., hospital, long term care, or a rehabilitation setting; (c) they were published since January 2000; and (d) the participating nurses were observed providing basic care interventions to their patients. This progressive narrowing of eligibility produced nine articles for review (see Table 2). Articles in the reference lists of those articles were checked for eligibility, as were articles citing the nine studies. Examples of the types of articles excluded were studies of hand hygiene practices using structured checklists, time and motion studies, and studies of nurses' communication and decision-making.

**Data evaluation stage.** Whittemore and Knafl (2005) recommended that the quality of primary sources be considered in some meaningful way. As the purpose of this integrative review was not to synthesize actual findings of the studies, the following approach was taken in the evaluation phase. The assessment framework developed for this paper was applied to the nine articles to evaluate whether or not the authors had in any way acknowledged the indicators of rigour in their reports. At this stage there was no intent to determine the extent to which they were addressed. None of the articles meeting inclusion criteria had to be excluded later because of a potential inability to critically assess rigour due to no detail being provided, a concern at the outset.

Table 2: Articles eligible for integrative review

Design	Setting	Who observed	What observed	For what purpose
Barber-Parker, E. (2002). Integrating patient teaching into bedside care: A participant – observation study of hospital nurses. <i>Patient Education and Counseling</i> , 48, 107-113.				
Qualitative	42-bed oncology unit in USA	3 RNs working day shift (from a pool of 9) for 10 hours each	Patient teaching activities of staff nurses while they cared for patients	Nature of integrated bedside teaching by nurses, incentives, barriers
Berg, L., Skott, C., & Danielson, E. (2007). Caring relationship in a context: Fieldwork in a medical ward. <i>International Journal of Nursing Practice</i> , 13, 100-106.				
Interpretive phenomenology	Medical ward at a county hospital in Sweden	10 RNs; 177 encounters; 17 day shifts and 2 night shifts; total 127 hours	Nurses' everyday encounters with patients on their shifts	Caring relationships between patients with long term illness (3 day LOS) and their nurses
Bolster, D., & Manias, E. (2010). Person-centred interactions between nurses and patients during medication activities in an acute hospital setting: Qualitative observation and interview study. <i>International Journal of Nursing Studies</i> , 47, 154-165				
Qualitative	20-bed acute care ward in an Australian tertiary care teaching hospital	11 nurses for 2 hours each	Medication activities	How do patients and nurses interact with each other?
Brown, D., & McCormack, B. (2006). Determining factors that have an impact upon evidence-based pain management with older people following colorectal surgery: An ethnographic study. <i>Journal of Clinical Nursing</i> , 15, 1287-1298.				
Ethnographic approach	Colorectal unit (2 wards/46 beds) in Ireland	39 nursing staff in 2-hour blocks for 32 days (day and night)	Interaction between patients and ward staff	To examine pain management practices (e.g., assessment and pain control)
Clabo, L. (2007). An ethnography of pain assessment and the role of social context on two postoperative units. <i>Journal of Advanced Nursing</i> , 61, 531-539.				
Bourdieu's reflexive ethnography	2 general surgical units in a 700-bed teaching hospital in USA	10/12 day shift RNs on one unit, and 10/13 on another; 1-3 pain assessments each	Conduct of pain assessments by nurses	Nature of nursing pain assessment practice

Design	Setting	Who observed	What observed	For what purpose
Dihle, A., Bjølseth, G., & Helseth, S. (2006). The gap between saying and doing in postoperative pain management. <i>Journal of Clinical Nursing</i> , 15, 469-479.				
Descriptive study	Surgical wards in two hospitals in Oslo, Norway (staffed by nurses and nursing assistants)	9 nurses for 40 hours each: 5 from the unit at Hospital A and 2 from each of the two units at Hospital B	Each nurse observed during 5 shifts	To observe how nurses perform post operative pain management
Jennings, B., Sandelowski, M., & Mark, B. (2011). The nurse's medication day. <i>Qualitative Health Research</i> , 21, 1441-1451.				
Ethnography	One medical and one surgical unit of a 581-bed acute care community hospital in south-eastern USA	143 RNs and 18 LPNs; over 24 hour days totalling 267 hours	Nurses shadowed on their shift	Demands related to medication administration
Pasman, H. R., The, B. A., Onwuteaka-Philipsen, B., van der Wal, G., & Ribbe, M. (2003). Feeding nursing home patients with severe dementia: A qualitative study. <i>Journal of Advanced Nursing</i> , 42, 304-311.				
Qualitative	Nursing home in the Netherlands	46 nurses who helped patients with their meals, and more in-depth with the 11 nurses who regularly helped a subset of patients with severe behaviours	The help provided by nurses with their meals	Problems faced by nurses when feeding patients with severe dementia and how they deal with these problems in daily practice
Popescu, A., Currey, J., & Botti, M. (2011). Multifactorial influences on and deviations from medication administration safety and quality in the acute medical/surgical context. <i>Worldviews on Evidence-Based Nursing</i> , 8, 15-24.				
Exploratory descriptive	A medical ward and surgical ward in Australia	11 Registered Nurses for 30 medication episodes	Nurses' interactions with patients during medication administration rounds	To explore the interplay of environmental, nurse, and patient-related factors on medication quality and safety

**Data analysis stage.** The data analysis stage of the integrative review involved data reduction, data display, data comparison, and drawing conclusions (Whittemore & Knaf, 2005). As there were only nine eligible studies, it was not necessary to divide the primary sources into subgroups to facilitate analysis, but Whittemore and Knaf's subsequent steps were followed.

**Data reduction.** The next step was to extract and code data from primary sources to focus and organize data. Predetermined data, in this case indicators of rigour, were extracted from the primary sources. Although each primary source was originally reduced to a single page for ease of comparison as suggested by Whittemore and Knafl (2005), it became easier to compare data by cutting and pasting excerpts from the primary sources to 4x6 inch colour-coded index cards that could be laid down and arranged for ease of comparison.

**Data display.** In this step, extracted data were assembled into a matrix around particular variables (the indicators of rigour in this case) so visualization of patterns and relationships could be seen. This served as a starting point for comparison and interpretation.

Data comparison was the next step in the process and involved examining the data display for patterns, themes, and relationships. Data from each of the six key areas in the assessment framework (i.e., observer, observations, choice of participants, data sources, comprehensive data collection, and data analysis and corroboration of findings), will be compared in turn.

**Data comparison related to observer.** As the observer is an instrument in qualitative inquiry, the report should contain information to establish credibility of the observer-researcher including: (a) experience; (b) training; (c) the perspective brought to the setting; and (d) personal connections with the people, setting, or topic being studied (Patton, 1999). Reporting any personal or professional information that readers could perceive as affecting data collection, interpretation, and analysis is important as human perception can be selective (Patton, 1999). Preparing one's mind and concentrating during observations, writing descriptively, recording field notes, capturing detail without becoming overwhelmed in trivia, and using rigorous methods to validate observations requires energy, discipline, and training (Patton, 1999).

In all but one study (Brown & McCormack, 2006), the authors identified the observer. In those cases it was the first author, joined on three occasions by another author. All observers were nurses, though this was not always explicit in the report. Borbasi, Jackson, and Wilkes (2005) suggested that nurse observers in such research studies are advantaged because they do not have to enter a foreign cultural environment, and observation itself is familiar. In only one study (Dihle, Bjølseth, & Helseth, 2006), the authors reported their areas of expertise. Only one author (Barber-Parker, 2002) alluded to the observer working in the hospital but not on the study unit. Whether observers in the other studies were connected to their settings in any way was not reported.

**Observer's role in research.** DeWalt and DeWalt (2011) contrasted Spradley's (1980) continuum of participation with Adler and Adler's (1987) membership roles. In the latter conceptualization, preferred because it allows for comparison across the studies in this review, peripheral members are those who become part of the scene, but are not completely drawn in, and they interact enough to be seen as insiders. In active membership, the researcher takes on some or all of the roles of members, and in full membership, the researcher becomes immersed in the group and takes on its identity. No involvement constitutes being in a no membership role.

In the selected studies, the observers' roles were described in terms of being non-participant observers, or observer as participant, or participant observer, but there was little detail provided. Based on the general descriptions provided, the roles of observers in almost all of the studies could be reconceptualized as passive members using Adler and Adler's (1987) frame. The exception is the study by Berg, Skott, and Danielson (2007) where the observer could be described as an active member based on the brief description in the article. Only Clabo (2007) described how she prepared for the observer role in the second phase of her study by gaining entry as a participant-observer in the first phase.

*Insider vs. outsider perspective.* Patton (1999) referred to the tension between the insider and outsider perspective. This does not mean the observer having a prior “insider” relationship with those being observed; rather it refers to the perspective the observer takes. An insider or emic approach takes the perspectives and words of the research participants. The researcher tries to put aside prior assumptions and let themes and patterns emerge. An outsider or etic approach has the researcher bringing themes and hypotheses in from the outside to see if they apply to the group being studied (Lett, 1990). Participation and observation are contradictory processes, so the researcher must be aware of the degree of participation and biases (DeWalt & DeWalt, 2011). None of the authors of the studies specifically commented on either perspective being in play.

*Disclosure.* Disguised or covert research can be viewed as unethical, and fully disclosing one’s role and the purpose of the observation to participants is recommended (Adler & Adler, 1994; Patton, 2002). Bogdewic (1999) added that participants want to hear about the study from the observer even if they are already aware of it. A simple, honest, down-to-earth explanation is best. Only one author (Clabo, 2007) reported that nurses were explicitly told the purpose of the observations, i.e., to learn about the nature of pain assessment practices. All but one other article reported on obtaining consent and notifying staff of study aims through flyers and a presentation, but did not provide content details. It cannot be assumed in these studies that obtaining consent meant that the purpose of the observations was explicitly described.

*Observer effect.* People may behave differently in the presence of an observer. Observers should consider how their presence might influence findings and describe what those effects might be (Giacomini & Cook, 2000; Patton, 1999). Observer effects were considered in six studies, and authors suggested that reaction to the observer was minimized by (a) ensuring confidentiality and asking open-ended questions (Barber-Parker, 2002), and (b) meeting with nurses twice to gain comfort and observing over a prolonged 2-hour time frame so nurses became less aware (Bolster & Manias, 2010). Some acknowledged the potential impact of the observer, but reasoned (a) it would have been difficult for nurses to sustain the desirable behaviour (Bolster & Manias, 2010), (b) nurses were acclimatized to being watched as students were often present and watching (Clabo, 2007), (c) it became normal over time (Pasman, The, Onwuteaka-Philipsen, van der Wal, & Ribbe, 2003), (d) the observers wore appropriate attire (Dihle et al., 2006), and (e) the observers were there for a sustained time frame (Clabo, 2007; Dihle et al., 2006). Three studies did not mention the potential for observer effect.

*Degree and nature of collaboration during observation.* The degree and nature of collaboration with other researchers in the observation phase was mentioned in only two studies (Dihle et al., 2006; Popescu, Currey, & Botti, 2011) where an observation guide was tested. In these studies, two observers ensured validity of one guide, and reliability of the other.

*Data comparison related to observations.* The length of time spent in the field depends on the purpose of the study and the questions being asked, and is not based on any particular standard (Patton, 2002). The number of nurses observed, with some reporting the length of time each was observed, the number of observations, and the period of time over which the observations occurred were reported. How long each nurse was observed was reported in two studies: Eleven nurses were observed for two hours each (Bolster & Manias, 2010) and nine nurses were observed during five shifts for a total of 40 hours each (Dihle et al., 2006).

*Focus of observations.* Spradley (1980) described observations as progressively narrowing from descriptive, through focused, to selective. Patton (2002) described the focus of observations on a continuum from a holistic view with multiple elements to a single

component. A decision regarding what will be observed must be made. Five of the studies could be described as taking a view toward the holistic end of the continuum as they observed care provision in general but focused on teaching activities (Barber-Parker, 2002), caring encounters (Berg et al., 2007), pain management (Brown & McCormack, 2006; Dihle et al., 2006), and medication management (Jennings, Sandelowski, & Mark, 2011). Four studies were situated on the continuum toward the single element end: Bolster & Manias (2010) and Popescu et al. (2011) observed nurses giving medications; Clabo (2007) observed episodes of pain assessment; and Pasman et al. (2003) observed nurses feeding patients with swallowing difficulties. Only Jennings et al. (2011) explicitly described the progressive narrowing in Spradley's (1980) terms.

**Sensitizing concepts.** Patton (2002) recommended against going into the field with a blank slate. Although it is important to be open, he described the use of sensitizing concepts to provide a framework to highlight the importance of certain events, activities, and behaviour so that observing reality becomes manageable. These concepts, extracted from the literature by the researcher ahead of time, are sensitizing in that they alert the observer to what to record. Some researchers use a combination of field notes along with more structured observation tools based on those concepts to collect supplementary data (Casey, 2004). Two of the studies (Bolster & Manias, 2010; Popescu et al., 2011) utilized an observation schedule comprising such concepts. Another study (Clabo, 2007) referred to literature-based concepts, but it was not clear whether they were predetermined or compared with the source later.

**Data comparison related to choice of participants.** A number of purposeful sampling strategies, with an aim for information-richness have been recommended in observation research (Kuzel, 1999). These include maximum variation, confirming/disconfirming, snowball, stratified, and typical case sampling (Dewalt & DeWalt, 2011; Kuzel, 1999; Patton, 2002; Russell & Gregory, 2003). "It is the investigator's responsibility to make explicit the ethical, practical, and logical rationales for the sampling strategy employed so the audience for the work can judge its quality" (Kuzel, p. 45). Sampling method was discussed in only three of the nine studies. Barber-Parker (2002) sought volunteers from staff who were already deemed eligible and three participated. Dihle et al. (2006) utilized stratified sampling by unit, choosing experienced staff familiar with the routine and their sample consisted of nine nurses across three units in two hospitals. Bolster and Manias (2010) stratified the sample by years of experience and studied 34 staff on one unit. Four studies relied on convenience sampling (Brown & McCormack, 2006; Clabo, 2007; Pasman et al., 2003; Popescu et al., 2011), and the sampling process was not addressed in two others.

**Basic features of participants.** Sources of diversity within the group of participants should be understood in fieldwork (DeWalt & DeWalt, 2011; Giacomini, Cook, & DeJean, 2009). All articles reported that the participants were nurses and all but two indicated whether the nurses were RNs or a combination of RNs and LPNs. Five of the nine studies (Barber-Parker, 2002; Berg et al., 2007; Bolster & Manias, 2010; Jennings et al., 2011; Popescu, 2011) reported the nurses' years of experience. Educational background and shifts worked were reported in two studies (Barber-Parker, 2002; Bolster & Manias, 2010); gender was reported in five studies (Berg et al., 2007; Bolster & Manias, 2010; Dihle et al., 2006; Jennings et al., 2011; Popescu et al., 2011); and age group along with employment history on the ward was reported in three studies (Bolster & Manias, 2010; Dihle et al., 2006; Jennings et al., 2011). One study did not describe any features of the nurse participants (Brown & McCormack, 2006).

**Data comparison related to data sources.** Observations and other data sources such as informal interviewing are combined so assumptions are not made about observations without acknowledging participants' perspectives about their behaviours (Patton, 2002). Documents, formal interviews, and focus groups are examples of other data sources

(Giacomini & Cook, 2000; Patton, 2002; Spradley, 1980). Focus groups were reported in two studies (Barber-Parker, 2002; Clabo, 2007); informal discussions with nurses were reported in four studies (Barber-Parker, 2002; Clabo, 2007; Jennings et al., 2011; Pasman et al., 2003); and private, semi-structured interviews were reported in all studies. Document reviews were reported in three studies (Jennings et al., 2011; Pasman et al., 2003; Popescu et al., 2011), and questionnaires were reported in two studies (Brown & McCormack, 2006; Jennings et al., 2011). Only two articles (Brown & McCormack, 2006; Jennings et al., 2011) referred explicitly to a diary reporting behaviour and feelings distinct from observations, though such notes could be inferred in some other studies. All articles mentioned real time observation of processes of care.

***Data comparison related to comprehensive data collection.*** Data obtained through observation must be systematically recorded and the researcher keeps a field diary that details events, personal reactions, and changes to views over time (Mays & Pope, 1995b; Spradley, 1980). Condensed notes where key phrases are recorded first, and an expanded account written soon after fills in the details (Spradley, 1980). Keeping a journal or diary that captures the personal side of fieldwork, (e.g., a record of experiences, ideas, breakthroughs, feelings, reactions, and problems) is advocated. Fieldnotes can also contain quotations from people observed, and beginning analyses and hypotheses (Bogdewic, 1999; Patton, 2002; Spradley, 1980).

***Data recording.*** The authors of all nine studies mentioned taking field notes during the observations or immediately after, with five mentioning that the notes were taken at the time of observation. In two studies, the investigators audiotaped the observation periods (Bolster & Manias, 2010; Popescu et al., 2011). It seems that Popescu taped her own commentary, while Bolster & Manias used a tape recorder to capture the participants' voices. Barber-Parker's (2002) account of the process for taking fieldnotes was the most descriptive of the nine. She indicated that she was guided by Schatzman and Strauss (1973) and therefore included observational notes, theoretical notes, and methodological notes. She reported taking brief notes in the presence of others, and taking time alone immediately after to create detailed notes, quotes, context, and thought. She described writing detailed descriptions, including observations, conversations, routines, and nurses' thoughts and reactions to opportunities and situations. She acknowledged that observational statements were written with as little interpretation as possible. Although not presented in as much detail, Clabo (1997) and Jennings et al. (2011) reported that their note taking was guided by authors of fieldwork texts (Emerson, Fretz, & Shaw, 1995; Schatzman & Strauss, 1973).

***Iterative data collection and analysis.*** According to Spradley (1980), analysis is a process of question discovery, so field notes need to be analysed to know what to look for in the next observation period. This recording of data, followed by analysis, and more data collection is cyclical (Giacomini & Cook, 2000; Spradley, 1980). There is a risk of gaps in information if this process is not conducted iteratively. Such analysis was described in four of the nine studies (Barber-Parker, 2002; Clabo, 2007; Jennings et al., 2011; Pasman et al., 2003). In fact, Clabo combined data collection and analysis under one heading in the report.

***Analysis driven stopping point.*** An analysis driven stopping point (Giacomini & Cook, 2000) should influence data collection and analysis, with the iterative cycle of data collection and analysis continuing to the point of informational redundancy. Barber-Parker (2002) reported observing each nurse to the point of redundancy in data, but in that study only three nurses were observed. Jennings et al. (2011) reported that observations, questioning, and time in the field led to redundancy. The remaining seven articles did not address redundancy during data collection and analysis.

***Organization and interpretation of data.*** Giacomini and Cook (2000) suggested that the way data are organized and interpreted should be detailed enough that readers can see the

connection between empirical data and interpreted findings. In all nine studies, authors addressed how the collected data were organized and interpreted and described, or referred to having used a systematic approach for doing so. Some authors described using frameworks to help guide this process. For example, Barber-Parker (2002) relied on Schatzman and Strauss (1973). Brown and McCormack (2006) used the methods of Glaser and Strauss (1967), Johnson (1995), and Spradley (1980). Clabo (2007) used Bourdieu and Wacquant (1992), but did not provide detail. Four articles described reflecting on the field notes (Barber-Parker, 2002; Berg et al., 2007; Brown & McCormack, 2006; Jennings et al., 2011), but were not explicit about how bias in interpretation may have been avoided. In four studies, more than one author collaborated on interpretation (Bolster & Manias, 2010; Brown & McCormack, 2006; Clabo, 2007; Dihle et al., 2006). Jennings et al. (2011) utilized concepts related to time to interpret data. Berg et al. (2007) interpreted their field notes according to distinctions, differences, conditions, and commonalities as all researchers participated in the interpretation.

**Data comparison related to data analysis and corroboration of findings.** Use of a recognized approach to qualitative research enhances rigour because procedures for analysis are followed (Creswell, 2007). The authors of one study (Berg et al., 2007) referred to using Benner's (1994) approach to interpretive phenomenology in the analysis and they reported the steps taken. Three studies reported using an ethnographic approach (Brown & McCormack, 2006; Clabo, 2007; Jennings et al., 2011). In ethnography, data should be analysed for themes and patterns (Creswell, 2007) and from their description in the text, Brown and McCormack did so, using the thematic analysis approach of Ely, Anzul, Friedman, Gardner, and Steinman (1991). Clabo used Bourdieu's approach to reflexive ethnography (Bourdieu & Wacquant, 1992) but the description in the text was minimal. Although Jennings et al. provided some detail about their analysis, they did not report whether they had used a particular published approach to analysis. None of the other authors specified their qualitative approach. Methodological standards and procedures for analysis are not as clear as they are when a known approach is used (Giacomini, Cook, & DeJean, 2009).

**Corroboration of findings.** In all but two articles (Barber-Parker, 2002; Clabo, 2007) there was mention of involvement of another researcher in the interpretation and data analysis. Focus groups were used in two studies to corroborate findings (Barber-Parker, 2002; Clabo, 2007). Interestingly, these were the studies with a sole author as researcher. In three studies, the authors used dialogue with staff to support their observational data (Barber-Parker, 2002; Clabo, 2007; Pasmann et al., 2003). Clabo also used a key informant to corroborate findings. Presentations of findings back to staff took place in two studies (Jennings et al., 2011; Pasmann et al., 2003). In addition, Jennings et al. provided written summaries to managers who indicated findings had captured the complexity. Jennings et al. were most explicit in reporting on the outcomes of the attempts to corroborate.

**Data synthesis stage.** Whittemore and Knafl (2005) referred to this final phase as the presentation phase. Using the assessment framework as a guide (see Table 3), the extent to which authors considered each of the indicators of rigour in their studies was rated as weak, moderate or strong using a scheme developed for this paper and shown in Appendix A. A system was then developed for assigning a rating of weak, moderate, or strong to each of the six areas or sections of the framework (see Appendix B). A weak section rating was then assigned a value of one point; a moderate section rating was given two points; and a strong section rating was given three points. This was for the sole purpose of being able to rank the

Table 3: *Ratings of the Indicators of Rigour in Each Study*

W/w = weak M/m= moderate S/s = strong ⊙ = not addressed (see Appendices for rating schemes)		Barber-Parker (2002)	Berg et al. (2007)	Bolster & Manias (2010)	Brown & McCormack (2006)	Clabo (2007)	Dihle et al. (2006)	Jennings et al. (2011)	Pasman et al. (2003)	Popescu (2011)
<b>Observer</b>	<b>Section Rating</b>	M	W	W	W	M	W	W	W	M
A) Who is the observer? (i.e., discipline/qualifications)		w	w	w	⊙	w	w	w	m	w
B) Observer's role in research described		w	w	w	w	m	⊙	⊙	w	⊙
C) Insider vs. Outsider perspective		⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
D) Disclosure		m	m	w	w	s	w	⊙	w	w
E) Observer effect considered		m	⊙	m	⊙	w	w	⊙	w	m
F) Degree and nature of collaboration with other researchers		⊙	⊙	⊙	⊙	⊙	w	⊙	w	m
<b>Observations</b>	<b>Section Rating</b>	W	M	S	M	M	S	W	W	M
G) Number and duration of observations and fieldwork		w	m	s	m	m	s	w	w	w
H) Focus of observations described (e.g., single element vs. holistic)		m	m	m	m	m	m	m	m	m
I) Predetermined sensitizing concepts reported		⊙	⊙	s	w	w	s	⊙	⊙	m
<b>Choice of Participants</b>	<b>Section Rating</b>	M	W	M	W	W	M	W	W	W
J) Purposive sampling strategy with rationale		w	⊙	m	w	w	m	⊙	w	⊙
K) Basic features of participants described		m	m	m	⊙	w	m	m	w	m
<b>Data Sources</b>	<b>Section Rating</b>	M	W	W	S	S	W	S	S	M
L) Data Sources		m	w	w	s	s	w	s	s	m
M) Real time observation of care		m	m	m	m	m	m	m	m	m
<b>Comprehensive Data Collection</b>	<b>Section Rating</b>	M	W	W	W	W	W	M	W	W
N) Data recording process		m	w	m	w	m	w	w	m	m
O) Data collection and analysis conducted iteratively or concurrently		w	⊙	⊙	⊙	w	⊙	w	w	⊙
P) An analysis driven stopping point determined the extent of data collection and analysis		w	⊙	⊙	⊙	⊙	m	m	⊙	⊙
Q) Organization and interpretation of data described		m	m	w	s	w	m	m	w	w
<b>Data Analysis and Corroboration of Findings</b>	<b>Section Rating</b>	W	M	W	M	S	W	M	W	W
R) Analysis method is consistent with specific qualitative research approach		⊙	m	⊙	m	m	⊙	w	⊙	⊙
S) Procedures used to corroborate findings are explicit		m	m	m	m	s	m	s	s	m
<b>Total Weak Sections</b>		2	4	4	3	2	4	3	5	3
<b>Total Moderate Sections</b>		4	2	1	2	2	1	2	0	3
<b>Total Strong Sections</b>		0	0	1	1	2	1	1	1	0
"W" scores 1 point; "M" scores 2 points; "S" scores 3 points		10	8	9	8	12	9	10	8	9

studies. When the points were tallied, studies received a total score and were stratified into three groups: a weaker third (n=3) and a stronger third (n=3) with three studies between. The lower scoring studies received eight points and can be considered weaker than the others in terms of their reporting on strategies to overcome threats to credibility (Berg et al., 2007; Brown & McCormack, 2007; Pasman et al., 2003). The studies considered stronger than others (i.e., those obtaining a score of 10 or 12) were Barber-Parker (2011), Clabo (2007) and Jennings et al. (2011).

The section ratings allowed comparisons across studies for each of the six sections of the assessment framework. The areas, in descending order of how well they were addressed were (a) data sources, (b) observations, (c) data analysis and corroboration of findings, (d) choice of participants, (e) observer, and (f) comprehensive data collection.

**Conclusions.** The first of the six key areas, the observer, was generally poorly described, if at all. Little or no detail about the observers except for their identities was provided in the studies, and in some cases their roles as nurses had to be verified by searching the internet. Their backgrounds, competence as observers, what they actually did as observers, and the perspectives they brought to the field were generally lacking. There was no discussion of the observers' roles with respect to the emic and etic perspectives. All studies received ethical approval, but lacked detail about whether participants knew precisely what was being observed. Ways to overcome the reaction of participants to the observer were not reported as being built in to studies. The connection between disclosure processes and the potential for observer effect was not discussed in the studies. In studies involving collaboration by more than one author, the role of others in the data collection phase was not always reported.

The required length of time in the field and number of participants can vary as long as redundancy is achieved, but this connection was not generally made, so it was not possible to critique the number and duration of observations. Few authors reported predetermined sensitizing concepts that might guide their observations.

Sampling methods were not generally described as being purposeful, nor was the goal of sampling, (e.g., information-rich cases) explicit. Participants were adequately described. The use of multiple data sources was the strength of most studies.

The data recording process was described to some extent in every study, and although details varied, the processes described were all appropriate. Although almost half of the studies used an iterative process for data collection and analysis, for the most part authors stopped short of describing how the analysis influenced data collection. Since data collection to the point of redundancy was addressed in very few studies, it brings decisions about the observation time and number of participants into question.

The organization, interpretation, and analysis of data were difficult to assess across studies because few authors declared their qualitative approach. Generally, authors adequately described procedures to corroborate findings.

## Discussion

### Integrative Review Method

This integrative review was a review of methods rather than findings, but Whittemore and Knafli's (2005) framework provided a suitable step-wise approach to the review, and the stages of the review could be adapted accordingly. Methodological rigour of this review was addressed by using an accepted framework and by keeping notes and materials that supported decisions made along the way.

## Critique of the Assessment Framework

The assessment framework developed for this study facilitated comparison across the studies reviewed, and supported the drawing of conclusions. The framework consists of indicators of rigour (sometimes framed as strategies to ensure rigour) in observational methods, but its development was limited by a lack of clarity of the term “rigour” in qualitative methods. Lincoln and Guba (1985) suggested four criteria for establishing the trustworthiness of qualitative data and its analysis. They are (a) credibility (confidence in the truth and a parallel to internal validity), (b) dependability (the stability of the data over time and conditions and a parallel to reliability), (c) confirmability (equivalent to objectivity), and (d) transferability (equivalent of external validity). The framework is not a comprehensive quality assessment tool as it addresses only credibility. The studies in this integrative review have therefore not been assessed for rigour comprehensively. Considering some studies weaker or stronger than the average must be done in context. The ratings received by the studies merely indicate their strength of reporting techniques for enhancing rigour as compared with each other.

The process for determining which studies are weak, moderate, or strong was made challenging by unequal numbers of indicators within each of the six areas or sections, and an inability to assume equal weight for the indicators (or the sections for that matter). Indicators could be collapsed to make the framework more manageable. Some of the indicators were not addressed in any studies (e.g., dominant perspective of observer) and some were present in all (e.g., real time observation of care) and they may need to be reconsidered for inclusion.

According to Patton (2002), the basic criterion for judging a recorded observation is whether that observation permits the reader to enter into the situation described. Adler and Adler (1994) described a style of writing called *vraisemblance* that draws the reader into the world of the participants such that the work is given a sense of authenticity. They regard this as a means to enhance validity and could perhaps be incorporated into the framework. Hammersly (1992) indicated that findings should be judged not only on validity, but on relevance, and this might be considered for inclusion in the framework as well.

## Strengths and Challenges of Observational Methods

Some advantages and possible pitfalls of observational methods were discussed earlier. In addition, the rigour of observational methods is not only enhanced by supplementing with other sources of data, using observational methods can provide rigour if combined with *those* sources. For example, interview data could be more credible combined with observation. The degree to which reliability (dependability) can be assessed is limited as often only one or two views are available (DeWalt & DeWalt, 2011). Finally, as with other qualitative studies, there is a limited amount of space to report details of the study in published reports, and authors must be selective. In many of the studies in this review, rigour was difficult to assess because of lack of detail in reporting. Providing relevant details in on-line supplements to articles would be a solution.

## Limitations of the Study

Generation of a complete and unbiased sample of the literature may have been limited by restricting articles to those written in English, and to those in which only nurses were observed. In addition, eligible studies may have been overlooked if the research method was not identified through the key words used in indexing the articles, or if the abstracts did not reveal the methodology.

## Implications for Nursing Research, Practice, and Education

Studies employing observational methods should be subject to quality assessment using criteria that are relevant to observation. Refinement and testing of the assessment framework developed for this paper, and validation of the scoring scheme are areas for further research. Researchers have an obligation, according to Morse et al. (2002), to ensure rigour during the research process rather than relying on the reader to apply a set of criteria in retrospect, so the framework could serve to guide a study design rather than be used for retrospective evaluation.

Observation of care or nursing practice is an essential component of action research (McCormack, 2010), and ensuring rigorous methods and assessing rigour is important in that arena as well. Rigorous observational methods in fieldwork can enhance the link among clinically relevant concepts and nursing practice realities, thus facilitating concept clarification. This can lead to hypothesis generation and ultimate theory development (Schwartz-Barcott, Patterson, Lusardi, & Farmer, 2002).

In settings where observation of care exercises are carried out, developing a systematic approach to observing practice has led to cultural changes in practice settings (McCormack, 2010). The findings of high quality research studies using observational methods are directly applicable to nursing practice. Training of nurses and nurse researchers so they can participate in peer review and research utilizing observational methods would contribute to the credibility of observers which seemed to be lacking in the studies reviewed.

An area for future research might involve the use of meta-study procedures to investigate this area. Meta-study allows synthesis of the qualitative literature within a selected topic area, that is, an aggregate review for the purpose of comparing studies and developing new understandings (Nicholas, Globerman, Antle, McNeil & Lach, 2006; Paterson, Thorne, Canam, & Jilings, 2001)

## Conclusion

As any nurse can tell any researcher, spending time on a hospital ward observing what nurses do 24-7 and asking about what is being observed, while it is being observed, is a far more valid way to discover what nurses do than to create a focus group of nurses, or interview three of them, and ask them what they do when they are working. (Brink & Edgecombe, 2003, pp. 1028-1029)

Although nurses do rely on observation in their clinical settings, observation as a research method is not of widespread appeal (Mulhall, 2003). If attention were given to ensuring rigour during the conduct of studies using observational methods, those methods would be afforded a more prominent place in the qualitative research arena. This paper has attempted to highlight ways that observers as researchers can improve the reporting of strategies used to ensure rigour in observational methods.

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**Appendix A**

**Data Synthesis Stage: Rating System for Individual Indicators of Rigour**

**OBSERVER**

	<b>A) Who is the observer?</b>	
⊖	Did not identify or describe observer	
weak	Identified observer or indicated the discipline background	
moderate	Identified observer and indicated the discipline background/expertise	
strong	Criteria for moderate (above) + any added features to demonstrate credibility	
	<b>B) Observer's role in research</b>	
⊖	Did not mention observer's role	
weak	Mentioned being an observer	
moderate	Criterion for weak (above) + explained how they entered the system, got situated etc. OR were explicit about how they conducted their role as observer	
strong	Criterion for weak (above) + explained how they entered the system, got situated etc. AND were explicit about how they conducted their role as observer	
	<b>D) Disclosure of role and purpose of observations</b>	
⊖	Did not mention disclosing observer's role or purpose of observations	
weak	Mentioned a consent process which would assume a letter of explanation	
moderate	Criterion for weak (above) + letter, flyer, or meeting to explain study	
strong	Consent + specific explanation to participants about what was being observed and why	
	<b>E) Observer effect</b>	
⊖	Did not mention taking observer effect into consideration	
weak	Acknowledged observer effect could be an issue, and offered ways they attempted to minimize it	
moderate	Criterion for weak (above) + specifically asked participants about impact of observer	
strong	Criterion for weak (above) + demonstrated that observer effect had not impacted outcomes	
	<b>F) Collaboration with other researchers in the observation phase</b>	
⊖	Did not mention	
weak	Pilot tested an observation guide or co-created the guide	
moderate	Criterion for weak (above) and/or collaborated on the actual observations	
strong		

**OBSERVATIONS**

	<b>G) Number and duration of observations and fieldwork indicated</b>	
⊖	Did not mention	
weak	One of:	Total time each nurse was observed
moderate	Two of:	How many episodes
strong	All of:	How long each episode
	<b>H) Focus of observations described (single element vs. holistic)</b>	
⊖	Did not mention	
weak		
moderate	Focus of observations was clear (holistic vs. focused)	
strong		
	<b>I) Predetermined sensitizing concepts reported</b>	
⊖	Did not mention	
weak	Some sensitizing concepts were reported	
moderate	Sensitizing concepts integrated into an observation schedule	
strong	Criteria for moderate above + observation schedule published	

**CHOICE OF PARTICIPANTS**

<b>J) Purposive sampling strategy with rationale</b>	
⊖	No indication of sampling/ convenience sample or volunteers at outset (volunteers represent less than 50% of staff or not known)
weak	Volunteers from a pool of staff meeting eligibility requirements and volunteers represent greater than 50% of staff
moderate	Participants chosen strategically (stratified for years of experience, unit, etc.)
strong	Purposeful sampling with explanation of rationale
<b>K) Basic features of participants described</b>	
⊖	Did not mention basic features of participants
weak	1-2 demographic features identified
moderate	2+ demographic features identified
strong	Criteria for moderate above + further description beyond demographics

**DATA SOURCES**

<b>L) Data sources</b>	
⊖	Did not mention data sources
weak	1 other data source mentioned
moderate	2 other data sources mentioned
strong	3+ other data sources mentioned

**COMPREHENSIVE DATA COLLECTION**

<b>N) Data recording process</b>	
⊖	Did not mention condensed or expanded notes
weak	Mentioned taking notes, jottings, recordings in the field and expanding on them immediately after
moderate	Criteria for weak + mentioned 2 of the following: types of notes by category (observational, theoretical, methodological) OR reference to a published work that guided recording OR identified types of notes, e.g., observations, conversations, quotes, context, routines, thoughts or referred to a published framework for taking notes or provided examples from own study
strong	Criteria for weak + mentioned all 3 in moderate
<b>O) Data collection and analysis conducted iteratively or concurrently</b>	
⊖	Did not mention
weak	Mentioned data collection and analysis was concurrent or iterative
moderate	Provided a description of above (what that looked like)
strong	Gave examples of how analysis influenced data collection
<b>P) An analysis driven stopping point</b>	
⊖	Did not mention
weak	Nurse observed until saturation
moderate	Observations/interviews/questioning to redundancy in group
strong	
<b>Q) Organization and interpretation of data described</b>	
⊖	Did not mention
	Organization, interpretation/analysis of data is described as a systematic process and includes activities such as deriving meaning, categorizing, coding, etc.
weak	Above BUT the link between this activity and the reported findings is not explicit
moderate	Above AND the link between this activity and the reported findings can be made
strong	Above AND the link between this activity and the reported findings is quite explicit

**DATA ANALYSIS AND CORROBORATION OF FINDINGS**

<b>R) Analysis method is consistent with specific qualitative research approach *</b>	
⊖	Did not mention a qualitative tradition
weak	Analysis approach may or may not be in keeping with tradition
moderate	Refers to being consistent with an analysis approach described in the literature
strong	
<b>S) Procedures used to corroborate findings are explicit</b>	
⊖	Did not mention procedures to corroborate findings
weak	Mentioned procedures to corroborate observational findings only
moderate	Above+ corroborated analysis findings with other researchers OR with participants
strong	Above+ corroborated analysis findings with other researchers AND with participants

## Appendix B

## Data Synthesis Phase: Rating Scheme for Sections

	Barber-Parker (2002)	Berg et al. (2007)	Bolster & Manias (2010)	Brown & McCormack (2006)	Clabo (2007)	Dihle et al. (2006)	Jennings et al. (2011)	Pasman et al. (2003)	Popescu (2011)
<b>Observer</b>	<b>M</b>	<b>W</b>	<b>W</b>	<b>W</b>	<b>M</b>	<b>W</b>	<b>W</b>	<b>W</b>	<b>M</b>
<b>Section Rating Scheme</b>	w	w	w	⊙	w	w	w	m	w
Strong = at least one Strong with no Weak or ⊙	w	w	w	w	m	⊙	⊙	w	--
Moderate = at least two Moderate and no more than one ⊙									
Weak = others	m	m	w	w	s	w	⊙	w	w
	m	⊙	m	⊙	w	w	⊙	w	m
	⊙	⊙	⊙	⊙	⊙	w	⊙	w	m
<b>Observations</b>	<b>W</b>	<b>M</b>	<b>S</b>	<b>M</b>	<b>M</b>	<b>S</b>	<b>W</b>	<b>W</b>	<b>M</b>
<b>Section Rating Scheme</b>	w	m	s	m	m	s	w	w	w
Strong = at least two Strong with no Weak or ⊙	m	m	m	m	m	m	m	m	m
Moderate = at least two Moderate and no more than one ⊙	⊙	⊙	s	w	w	s	⊙	⊙	m
Weak = others									
<b>Choice of Participants</b>	<b>M</b>	<b>W</b>	<b>M</b>	<b>W</b>	<b>W</b>	<b>M</b>	<b>W</b>	<b>W</b>	<b>W</b>
<b>Section Rating Scheme</b>	w	⊙	m	w	w	m	⊙	w	⊙
Strong = at least one Strong with no Weak or ⊙	m	m	m	⊙	w	m	m	w	m
Moderate = at least one Moderate with no ⊙									
Weak = others									
<b>Data Sources</b>	<b>M</b>	<b>W</b>	<b>W</b>	<b>S</b>	<b>S</b>	<b>W</b>	<b>S</b>	<b>S</b>	<b>M</b>
<b>Section Rating Scheme</b>	m	w	w	s	s	w	s	s	m
Strong = at least one Strong with no Weak or ⊙	m	m	m	m	m	m	m	m	m
Moderate = at least one Moderate with no Weak or ⊙									
Weak = others									
<b>Comprehensive Data Collection</b>	<b>M</b>	<b>W</b>	<b>W</b>	<b>W</b>	<b>W</b>	<b>W</b>	<b>M</b>	<b>W</b>	<b>W</b>
<b>Section Rating Scheme</b>	m	w	m	w	m	w	w	m	m
Strong = at least one Strong with no Weak or ⊙	w	⊙	⊙	⊙	w	⊙	w	w	⊙
Moderate = at least two Moderate with no ⊙	w	⊙	⊙	⊙	⊙	m	m	⊙	⊙
Weak = others	m	m	w	s	w	m	m	w	w
<b>Data Analysis and Corroboration of Findings</b>	<b>W</b>	<b>M</b>	<b>W</b>	<b>M</b>	<b>S</b>	<b>W</b>	<b>M</b>	<b>W</b>	<b>W</b>
<b>Section Rating Scheme</b>	⊙	m	⊙	m	m	⊙	w	⊙	⊙
Strong = at least one Strong with no Weak or ⊙	m	m	m	m	s	m	s	s	m
Moderate = at least two Moderate or one Moderate + Strong									
Weak = others									
<b>Total Weak Sections</b>	2	4	4	3	2	4	3	5	3
<b>Total Moderate Sections</b>	4	2	1	2	2	1	2	0	3
<b>Total Strong Sections</b>	0	0	1	1	2	1	1	1	0

### Author Note

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