The Role of Early Mobilization in Preventing Postoperative Respiratory Complications

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Abstract

Postoperative respiratory complications are a common occurrence. Studies on early mobilization postoperatively have shown to have prophylactic benefits and incident reduction of postoperative respiratory complications. A review of current literature illustrates the client population at risk for developing postoperative respiratory complications, types of postoperative respiratory complications, types of mobilization, and the perceived benefits and barriers associated with the intervention of early mobilization. In current literature, there is a generalized understanding of what the definition of *early* is in early mobilization. More clarity is also needed to identify the presence of early mobilization resources for healthcare providers. The role of early mobilization is a significant intervention and has preventative measures against postoperative respiratory complications.

*Keywords:* early mobilization, respiratory complications, postoperative, prevention

The Role of Early Mobilization in Preventing Postoperative Respiratory Complications

Respiratory problems such as hospital-acquired pneumonia, atelectasis, pleural effusions, and respiratory failure are some of the potential complications following surgery (Davies, Husain, & Stephens, 2017). These complications may be potentiated by the presence of comorbidities, including hypertension, diabetes, obesity, and chronic obstructive pulmonary disease, and contribute to increased mortality, length of hospital stays, hospital expenses, and use of resources (Cassidy, Rosenkranz, McCabe, Rosen, McAneny, 2013; Epstein, 2014). Early mobilization during postoperative recovery has been studied extensively as a preventative measure by eliciting physiological responses in circulation, ventilation and perfusion, metabolism, and alertness (Gosselink et al., 2008; Eberhardt, 2017). Through adherence to mobilization protocols, it may be possible to prevent postoperative pulmonary complications and their associated consequences.

**Risk Factors for Postoperative Respiratory Complications**

All clients who receive surgical intervention are at risk for postoperative pulmonary complications (Kodra, Shpata, & Ohri, 2016). Clients who are subjected to a surgical procedure are exposed to surgical mistakes and anesthetic blunders (Minto & Biccard, 2013). In addition to surgical errors, a client’s risk can be categorized based on the type of surgery they receive, their comorbidities, age 65 and older, and gender (Minto & Biccard, 2013). Furthermore, clients with pre-existing pulmonary and cardiovascular diseases such as chronic obstructive pulmonary disease (COPD), asthma, heart disease, diabetes mellitus, and hypertension are more vulnerable to such complications. Other factors that increase the risk include smoking, malnutrition, and obesity (Ávila & Fenili, 2017). These factors should be accounted for when considering surgical clients and their risk of developing postoperative respiratory complications.

**Research Problem**

Postoperative respiratory complications can negatively affect the client’s health, increase client mortality, prolong their length of stay in the hospital, and increase hospital expenditures. The risk of acquiring postoperative respiratory complications may be mitigated through early mobilization (Ruscic, Grabitz, Rudolph, & Eikermann, 2017). Inadequate early mobilization of postoperative clients leads to a higher probability of acquiring respiratory complications (Ruscic et al., 2017). While policies and protocols exist to help diminish the occurrence of postoperative respiratory complications by providing guidelines to postoperative management, including early mobilization, pain control, nutrition, and patient teaching , evidence suggests that frontline nursing professionals adhere least to mobilization guidelines when delivering patient care, which can potentiate respiratory complications for postoperative patients (World Health Organization, 2003; Kalisch, Lee, & Dabney, 2013). Current available evidence should be reviewed and analyzed to demonstrate the effectiveness of early mobilization of postoperative patients on decreasing respiratory complications.

**Research Question**

How does early mobilization within the first postoperative day affect the incidence of respiratory complications during postoperative recovery in at risk clients?

**Research Proposal**

The purpose of this research project is to explore the effect of implementing early mobilization techniques, particularly within the first postoperative day, on the incidence of postoperative respiratory complications in at risk patients.

**Thesis Statement**

Early mobilization of postoperative patients within the first postoperative day following surgery decreases the incidence of postoperative respiratory complications.

**Literature Review**

A comprehensive search was performed in the following databases: CINAHL, PubMed, Medline, Ovid, Athabasca Library, and Google Scholar. Literature on early mobilization and preventing postoperative respiratory complications were found through the following key terms: early mobilization, respiratory complications, postoperative, pulmonary complications, and ambulation. Using the key terms, a total of 1154 articles were found. The articles were further selected using the following search criteria: peer-reviewed primary research and secondary articles, published after the year 2000, in English language or translated to English, and related to surgical clients within hospital settings. Articles that were excluded include articles published before the year 2000, written in a non-English language and with no translation, and articles that were not peer-reviewed. Differentiate inclusion and exclusion criteria

**Effects of Anesthesia on the Respiratory System**

The respiratory system may become more vulnerable to complications when anesthesia is introduced to the body. More than 243 million patients per year require intraoperative mechanical ventilation during anesthesia (Mills, 2018). Mechanical ventilation uses pressure and volume control to rebalance acid-base imbalances, correct arterial blood gas levels, decrease work of breathing, and provide sufficient oxygenation (Grossbach, Chlan, & Tracy, 2011). However, general anesthesia and use of tracheal tubes impair the transport functions of mucociliary processes in the airway and therefore resulting in sputum retention, which is a common occurrence that continually persists in clients postoperatively (Miskovic & Lumb, 2017). In addition to sputum retention, general anesthesia alters the respiratory system by causing several side effects and reactions including: central respiratory system depression, decreased ventilation responses to hypercapnia and hypoxia, increased spine curvature, obstructed airway, and reduced lung volumes resulting in atelectasis and lung opacification (Miskovic & Lumb, 2017). These anesthesia-associated changes may compromise the function of the respiratory system as the client transitions into postoperative recovery.

**Postoperative Respiratory Complications**

Postoperative respiratory complications come in numerous types and are unfortunately common and expensive occurrences in surgical clients. Surgeries including upper abdominal, aortic aneurysm repair, vascular, thoracic, neck, or neurological surgery are the procedures with the highest prevalence for developing postoperative respiratory complications (Miskovic & Lumb, 2017). These respiratory complications include: pneumonia, bronchospasms, prolonged mechanical ventilation, respiratory failure, unplanned intubation, pulmonary edema, pulmonary embolism, and atelectasis, with the most common one being respiratory failure (Rock & Rich, 2003; Cassidy et al., 2013; Miskovic & Lumb, 2017; Ruscic et al., 2017). In fact, 2.7% to 3.4% of clients who receive non-cardiac surgical interventions will develop some form of respiratory complication during recovery (Cassidy et al., 2013). Additional hospital expenses for each of these clients can range from an average of $35,000 to $52,466 (Cassidy et al., 2013; Rusic et al., 2017). As illustrated, surgical clients are at risk of encountering different types of respiratory complications, which are consequently detrimental to clients and healthcare system alike.

**Early Mobilization and Associated Benefits**

Generally, early mobilization occurs on the day of surgery, postoperative day one, or soon after that (Epstein, 2014). Early mobilization may even begin as early as 4 to 8 hours post-surgery depending on the surgery performed, the patient’s condition, and anesthetic recovery period (Pusey-Reid, 2014). Mobilization may entail any of the following activities: ambulation, deep breathing and coughing exercises, use of an incentive spirometer, dangling at the edge of the bed, and sitting upright in a chair (Doherty-King & Bowers, 2011). Implementation of appropriate activities may depend on the client’s surgery and postoperative condition and are typically ordered by the surgeon or structured within a clinical pathway or protocol (Chatterley, 2014).

Early mobilization may pose various benefits to the respiratory system, which may contribute to decreased incidence of postoperative respiratory complications. In fact, Morris, Benetti, Marro, and Rosenthal (2010) found that early mobilization was the most effective and significant nursing intervention in reducing postoperative complications, including those associated with the respiratory system. Physiological responses such as ventilation and perfusion, circulation, metabolism and alertness are all preventative measures stimulated by mobilization (Gosselink et al., 2008; Eberhardt, 2017). Mobilization also promotes movement of respiratory secretions, which may prevent pneumonia associated with lack of mobility occurring postoperatively (Pusey-Reid, 2014). A study by Karube, Ozawa, Watanbe, and Aiba (2010) found that only 11 out of 91 elderly burr-hole surgery clients who ambulated and sat upright in chairs on postoperative day one developed pneumonia, whereas 24 out of 91 others who ambulated and sat upright in chairs on postoperative day two developed pneumonia. Inoue et al. (2014) also found that the incidence of respiratory complications in elderly esophagectomy clients at risk for COPD was 4.3% if they began mobilization on postoperative day one compared to 16.2% in similar esophagectomy clients who did not undergo early mobilization interventions.

Deep breathing and coughing exercises as well as incentive spirometry use have also been demonstrated as effective interventions in strengthening lung capacity, maintaining normal oxygen saturation, reducing postoperative hypoventilation, and promoting expectoration of secretions (Pusey-Reid, 2014; Tripathi & Sharma, 2017). A study by Tyson, Kendig, Mabedi, Cairns, and Charles (2015) found that clients who underwent exploratory laparotomies and participated in incentive spirometry and deep breathing exercises had a decreased mortality rate of 6% compared to clients who did not participate in such activities. A review of these studies demonstrates the prophylactic benefits of early mobilization, especially during the first postoperative day, against postoperative respiratory complications, thereby supporting its effectiveness in decreasing the incidence of respiratory complications.

**Barriers to Early Mobilization**

Despite the benefits, there are several factors that contribute to lack of implementation of mobilization protocols, which may in turn potentiate the occurrence of respiratory complications. Doherty-King and Bowers (2011) found that the most common barriers identified and reported by nurses were a lack of available healthcare providers and nursing staff to assist with client mobilization, client illness and symptoms such as weakness, fatigue, or pain, and restriction due to intravenous devices and urinary catheter lines attached to the client (Doherty-King & Bowers, 2011). Brown, Williams, Woodby, Davis, and Allman (2007) further identified fear of falling, lack of ambulatory devices, and lack of motivation on the client’s part. Similarly, common barriers that clients identified were healthcare provider shortages, medical device obstructions such as the presence of an intravenous line or a urinary catheter, and restrictive symptoms of pain, weakness, and fatigue. (Brown et al., 2007).Such barriers to mobilization may negate its benefits in reducing the incidence of postoperative respiratory complications and therefore must be addressed by the healthcare team and system in a thorough manner.

**Synthesis**

A review of the literature suggests that early mobilization is an important aspect of postoperative recovery to prevent respiratory complications. It is important for nurses to adhere to mobilization protocols for clients undergoing postoperative recovery, however, very few studies thoroughly explore the definition of ‘early*,*’ whether there is a standard timeframe, and how that timeframe may vary among different surgery types. Few studies also deduce the extent to which early mobilization interventions vary across different client populations and surgery types. Despite the effectiveness of early mobilization, the clinical outcomes of the interventions across different surgery types remains partially unclear, since the recovery process may be largely determined by the type and invasiveness of the surgery and individual factors such as age and comorbidities, among others. More clarity is also needed to identify the presence of early mobilization resources for healthcare providers. In addition, more research is necessary to explore the degree of healthcare providers’ compliance to mobilization protocols for postoperative clients. These discrepancies must be addressed to truly understand the impact of early mobilization on the incidence of postoperative respiratory complications, as well as the various factors that influence its implementation in surgical settings.

**Research Methods**

A quantitative research study using a randomized controlled trial (RCT) design will be conducted. This research design was selected as the method of choice because RCTs are generally used to evaluate the effectiveness of an intervention (Bhide, Shah, & Acharya, 2018). In this case, the aim of the study is to evaluate the intervention of early mobilization within the first postoperative day and its effect on the incidence rate of respiratory complications during postoperative recovery. RCTs are the gold standard and the better choice amongst experimental research designs (Park, Usher, & Foster, 2014). One reason for this is because RCTs can most effectively demonstrate the cause-effect relation between an intervention and the associated outcomes (Sibbald & Roland, 1998). Furthermore, RCT was chosen as the research design because of its ability to be easily synthesized and systematically reviewed. RCTs support and contribute to the production of high-quality data which can be used to improve patient outcomes and support cost-effective, evidence-based practice (Bhide et al., 2018).   
 Randomized controlled trials have several advantages in their design. RCTs primarily aim to measure, evaluate, and compare the effectiveness of an intervention between a treatment group and a control group (El-Masri, 2014). In this study, the control group will receive standard postoperative recovery care without intervention, whereas the treatment group will receive early mobilization interventions in addition to the standard postoperative recovery care. This ideally allows the researcher to evaluate whether the presence of an intervention had any significant effect on the outcomes. Strict randomization of participants who present with similar but varying histories and comorbidities helps to minimize selection bias in order to isolate and truly evaluate the effect of the interventions (El-Masri, 2014). Manipulation of variables in a controlled environment also benefits the research study by minimizing confounding bias and measurement bias, thereby increasing the accuracy and generalizability of the results (Bhattacherjee, 2012; El-Masri, 2014). The results of the study may consequently be more reliable and valid due to the random and controlled nature of this experimental design. It is important to prevent and reduce the biases as they can lead to invalid assessments of the cause-effect relationship and thereby threaten the legitimacy of the experimental outcomes.

**Participants**

The participant demographic and criteria will include two hundredelderly clients defined as 65 years of age or older, male or female, postoperative day one for same or similar surgery, received general anesthesia, with a history of at least two of the following pre-existing comorbidities: chronic obstructive pulmonary disease, smoking, asthma, heart disease, diabetes mellitus, hypertension, malnutrition, and obesity. The purpose of selecting surgical clients who have received the same or similar surgery is to minimize the variables associated with postoperative recovery. Ideally, the study will be conducted for a different type of surgery each time in order to collect comprehensive data so that the results may overall be more generalizable for surgical clients. Furthermore, assessment of surgical clients with pre-existing comorbidities and risk factors that render them more vulnerable to postoperative respiratory complications will allow for better evaluation of whether early mobilization as an intervention will significantly alleviate the occurrence of postoperative respiratory complications in this at-risk population.

The participants will be randomly assigned to either a control group or a treatment group through computer-generated random allocation and assigned by an independent investigator who was not involved with recruitment or treatment of the participants. In addition, allocation concealment will be used and the independent investigator will receive the participants names in the sequentially numbered and sealed opaque envelopes. This measure will be taken to ensure and improve the odds of balanced sample sizes, increasing the reliability and validity of the selection process (Dettori, 2010). Due to the participant size of two hundred, simple random allocation will decrease the risk of imbalanced sample sizes (Dettori, 2010). Furthermore, the evaluators of the study will complete questionnaires to assess their background characteristics and risk sensitivity.

**Procedures**

**Recruitment and Informed Consent**

Participant recruitment will be performed by a researcher who will carry out daily visits to a large hospital's inpatient surgical unit and identify patients who satisfy the criteria by using a checklist. The checklist will have the inclusion criteria as previously discussed above. Participants who are identified as appropriate for the study will be contacted and invited to participate with the aims of the study explained. Informed consent will subsequently be obtained in the preoperative phase.

The sample will be divided into a treatment group and a non-treatment control group using the randomization method described previously. Participants will be studied and observed from postoperative day one until their date of discharge. Patients who have an ongoing respiratory infection, are transferred to another unit, have a medical history of dementia, or are mechanically ventilated will be excluded from the study. The treatment group will receive early mobilization interventions on postoperative day one, including ambulation defined as walking more than 10 meters from the bed, deep breathing and coughing exercises five times per hour, using an incentive spirometer every hour, sitting upright in a chair when not ambulating or sleeping, and dangling the legs at the edge of the bed when waking up in the morning. Physiotherapists and rehabilitation assistants will mobilize and ambulate the participants for three 20-minute sessions a day, and nurses will be responsible for initiating deep breathing and coughing exercises and incentive spirometry. The purpose of these interventions is to promote the discussed benefits of mobilization and physical activity, including increased circulation, tissue perfusion, metabolism, and mobilization of secretions. In contrast, the non-treatment control group will receive standard postoperative recovery care with no additional mobility interventions.

**Instruments and Measures**

Participant data collection will begin postoperative day one and will be performed on both the control group and treatment group prior to initiating interventions so that data can be compared against baseline to determine the presence of any changes. Data collection will be done through frequent vital signs assessments with emphasis on oxygen saturation, chest x-rays, and pulmonary function tests. Chest x-ray diagnostic tests can detect numerous respiratory concerns such as consolidation, atelectasis, obstruction, and pneumothoraces (Kelly, 2012). Pulmonary function tests including forced vital capacity, forced expiratory volume, and residual volume provide information on overall lung function and status (Ranu, Wilde, & Madden, 2011). Vital signs and respiratory assessments such as lung auscultation will occur every four hours, whereas chest x-rays and pulmonary function tests will occur every two to three days. These frequent assessments and tests will help to determine if there are any progressive improvements or deterioration in their respiratory conditions. Hospital length of stay will also be noted.

**Role of the Researcher**

Possible biases that may occur in this study include selection bias, confounding bias, and measurement bias. Selection bias occurs when the sample demographic is not chosen at random and therefore it does not accurately reflect the target population (Infante-Rivard & Cusson, 2018). To combat this bias, concealed allocation and simple random allocation of participants will be used. Confounding bias occurs when a extraneous variable influences the outcomes of a research study and masks the true effect of the independent variable (Jager, Zoccali, MacLeod, & Dekker, 2008). This study will reduce the effect of confounding variables by setting strict participant inclusion criteria as outlined previously and random allocation of participants in order to ensure a balanced population within each sample group. Measurement bias occurs when there is a misrepresentation of measured outcomes which can favour a particular set of outcomes over another (Pannucci & Wilkins 2010). In efforts to mitigate measurement bias, all measurements and formulas will be double checked for accuracy, and instruments used to measure quantitative values will be calibrated.

**Data Collection and Analysis**

Data such as chest x-rays, lung auscultation assessments, vital signs and oxygen saturation, and pulmonary function tests will be compiled and compared between the two groups with expertise of radiologists and the respective surgeons. To determine the presence of a postoperative pulmonary complication, a tier system will be used to assess new onset or exacerbation of signs and symptoms as per definitions provided by Kroenke, Lawrence, Theroux, and Tuley (1992), and Hulzebos, Helders, Favié, De Bie, Brutel de la Reviere, and Van Meeteren (2006). Tier one postoperative pulmonary symptoms include: dry cough, temperatures greater than 37.5 degrees Celsius, dyspnea, and microatelectasis shown on chest x-rays (Kroenke et al., 1992; Hulzebos et al., 2006). Tier two symptoms will include: productive cough, respiratory wheezes and bronchospasms, hypoxemia with oxygen saturation lower than eighty-eight percent, supplemental oxygenation, atelectasis confirmed by chest x-ray, and temperature greater than 37.5 degrees celsius (Kroenke et al., 1992; Hulzebos et al., 2006). Tier three symptoms will be defined as: pleural effusions, pneumonia, and pneumothorax as confirmed by chest x-ray. Lastly, tier four symptoms will include respiratory failure and intubation (Kroenke et al., 1992; Hulzebos et al., 2006). Participants who exhibit two or more symptoms in tier two, or one symptom in tiers three and four will be considered to have a postoperative pulmonary complication. In terms of this research study, participants who exhibit tier one symptoms are considered borderline regarding pulmonary complications but have not developed significant manifestations to suggest the onset of pulmonary complications. Participants from the control group and treatment group will be closely monitored using the assessments discussed and categorized into their respective tiers.

**Statistical Analysis**

Based on the number of participants in each tier, percentages of participants in each tier, with respect to which treatment group they belong in, will be calculated and further analyzed using the Chi-square test of independence to determine whether the incidence rate of postoperative pulmonary complications is affected by the presence of early mobilization interventions (McHugh, 2013). Vital signs, oxygen saturation, and pulmonary function tests will also be compared from the first postoperative day until discharge. Means and medians will be used to visualize and compare respiratory functions of the participants, followed by a t-test to compare quantitative outcomes and determine whether there is a significant relationship between early mobilization interventions and the outcome of vital signs, oxygen saturation, and pulmonary function tests.

**Conclusion**

Postoperative respiratory complications are significant causes of increased length of hospital stay, healthcare costs, and mortality. Several of these complications include pneumonia, atelectasis, respiratory failure, and pleural effusion. Elderly patients and patients with a history of COPD, smoking, asthma, heart disease, diabetes mellitus, hypertension, malnutrition, and obesity are at increased risk of acquiring postoperative pulmonary complications. Mobilization has been regarded as an effective intervention for preventing various postoperative complications due to its capacity to stimulate increased perfusion, ventilation, metabolism, and mobilization of respiratory secretions. This study aims to provide clarity on the benefits of early mobilization as a preventative intervention by conducting a randomized controlled trial with 200 at-risk surgical patients and assessing their pulmonary function through various measures over the course of their postoperative hospital stay. Steps to reduce selection, confounding, and measurement biases will be taken to prevent a misrepresentation of the target population demographic. Statistical analyses will include Chi-square test and t-test to identify whether a relationship exists between early mobilization interventions and pulmonary function outcome. This study may contribute to future considerations for early mobilization policies and interventions on surgical units in order to prevent postoperative pulmonary complications and promote positive patient outcomes in at-risk surgical populations.

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**Grading Rubric for Assignment 3 (Methods)**

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| --- | --- | --- | --- | --- | --- | --- |
| **Criteria** | **Max. mark** | **Your mark** | **Grade** | **Exemplary** | **Proficient** | **Competent** |
|  |  |  |  | 90% to 100% | 74% to 89% | 66% to 73% |
| **Introduction**  Re-introduce purpose of the study including research problem and question; transition to methods included | 20 | 19 | Exemplary  (+) | Clearly and succinctly re-introduces purpose of the study including research problem and question; smooth transition to methods included. | Re-introduces purpose of the study including research problem and question; transition to methods included. | Re-introduces purpose of the study including research problem and/or question; transition to methods vague, if included. |
| **Research methods**  Type of design: Describes if research is qualitative or quantitative or mixed-methods. | 20 | 19 | Exemplary  (+) | Describes if research is qualitative or quantitative or mixed methods and defines type. Provides clear justification for selection of type of design in relation to research problem and research questions. | Describes if research is qualitative or quantitative or mixed methods and provides adequate justification for  selection of type of design in relation to research problem and research questions. | Vague reference to type of research being conducted. Non-persuasive justification for the type of research used. |
| **Participants**  Identifies participants in the study and provides rationale for their selection; describes sampling methods. | 20 | 19 | Exemplary  (+) | Clearly identifies participants in the study and provides compelling rationale for their selection; describes sampling  methods concisely and clearly. | Identifies participants in the study and provides rationale for their selection; describes sampling methods. | Vague identification of participants in the study and provides non-persuasive rationale for their selection; no sampling  methods included. |
| **Procedures**  Describes the procedures used to conduct the study for sample recruitment, informed consent, maintaining data. Describes the steps that would be taken during data collection and any interventions that would be initiated. Provides rationale for any such intervention. | 20 | 19 | Exemplary (+) | Clearly describes the procedures used to conduct the study for sample recruitment, informed consent, maintaining data.  Describes the step-by-step details of the protocols and steps taken during data collection. Clearly describes protocols for any interventions.  Provides compelling rationale for any such intervention. | Describes most of the procedures used to conduct the study for sample recruitment, informed consent, maintaining data.  Describes most of the details of the protocols and steps taken during data collection. Describes protocols for any interventions initiated. Provides rationale for any intervention. | Describes a few of the procedures used to conduct the study for sample recruitment, informed consent, maintaining data.  Describes only a few of the details of the protocols and steps taken during data collection. Describes vague protocols for any interventions initiated. Provides weak, if any, rationale for any intervention. A few questions remain about the procedures and protocols. |
| **Instruments and measures**  Describes the data collection instruments. Includes rationale for these instruments. Includes copies of actual instruments to be used. | 20 | 19 | Exemplary  (+) | Fully describes the data collection instruments. Includes persuasive rationale for the selection and format of these instruments with reference to other choices. Includes copies of actual instruments to be used in the Appendix. | Describes the data collection instruments. Includes rationale for the selection and format of these instruments with reference to other choices. Includes copies of actual instruments to be used in the Appendix. | Lists the data collection instruments. Includes weak rationale for the selection and format of these instruments with reference to other choices. Does not include copies of actual instruments to be used in the Appendix. |
| **Role of the researcher (qualitative or mixed methods)**  Identifies previous knowledge and any biases. Explains procedures used to suspend bias. | 20 | 19 | Exemplary (+) | Identifies previous knowledge and experience that can lead to biases. Provides persuasive explanation about procedures used to suspend bias. | Identifies previous knowledge and any biases. Explains procedures used to suspend bias. | Identifies previous knowledge or any biases. No information on procedures used to suspend bias. |
| **Data collection and analysis**  Describes data analysis procedures, including coding methods and statistical analysis, if appropriate. Tie these closely to research questions. | 20 | 18.33 | Exemplary  (-) | Clearly describes steps of data analysis procedures, including details of coding methods and statistical analysis, if appropriate. Ties these closely to research questions. | Describes data analysis procedures, including detailed coding methods and statistical analysis, if appropriate. Tie these procedures closely to research questions. | Describes data analysis procedures, including coding methods and statistical analysis, if appropriate. Tie procedures to research questions. |
| **Grammar, clarity, and organization** | 20 | 19 | Exemplary | The paper is well written, and ideas are well developed and explained. Sentences and paragraphs are grammatically correct. Uses subheadings appropriately. | The manuscript effectively communicates ideas. The writing is grammatically correct, but some sections lack clarity. | The manuscript communicates ideas adequately. The manuscript contains some grammatical errors. Many sections lack clarity. |
| **Citations/References: Proper APA format** | 20 | 18.33 | Exemplary  (-) | All needed citations were included in the report. References matched the citations, and all were in APA format (6th ed.). The paper is double spaced in a 12-point serif font, has 1-inch margins, APA-style headings, and includes well-formed 6th ed. APA reference list for all citations. | Citations within the body of the report and a corresponding reference list were presented. Some formatting problems exist, or components were missing. The paper lacks some of the following features: double spacing, 12-point serif font, 1-inch margins, APA-style headings, or a nearly complete 6th ed. APA reference list. | Citations for statements included in the report were not present, or references which were included were not found in the text. The Final paper lacks several of the following features: double spacing, 12- point serif font, 1-inch margins, APA- style headings, or a nearly complete 6th ed. APA reference list. |
| Penalties or bonuses |  |  |  |  |  |  |
| Totals | 180 | 169.7 |  |  |  |  |
| Percentages | 100% | 94.3% |  |  |  |  |
| Mark for this assignment | 30 | 28.3 |  |  |  |  |
| Grade for this assignment |  |  | Exemplary |  |  |  |