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## **Level of Implementation and Beliefs about Evidence-Based Practice among Respiratory Therapists in Clinical Setting in Saudi Arabia.**

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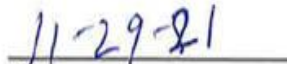
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This thesis, *Level of Implementation and Beliefs about Evidence-Based Practice among Respiratory therapists in Clinical Settings in Saudi Arabia* by Ahmad Alharbi was prepared under the direction of the Master's Thesis Advisory Committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree Master of Science in the Byrdine F. Lewis College of Nursing and Health Professions, Georgia State University. The Master's Thesis Advisory Committee, as representatives of the faculty, certify that this thesis has met all standards of excellence and scholarship as determined by the faculty.

  
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Level of Implementation and Beliefs about Evidence-Based Practice among Respiratory  
Therapists in Clinical Setting in Saudi Arabia.

By

Ahmad Alharbi, BSRT

A Thesis

Presented in Partial Fulfillment of Requirements for the

Degree of

Master of Science

in

Health Sciences

in

the Department of Respiratory Therapy

Under the supervision of Dr. Lynda Goodfellow, EdD, RRT, AE-C, FAARC

in

the Byrdine F. Lewis School of Nursing and Health Professions

Atlanta, Georgia

2021

# LEVEL OF IMPLEMENTATION AND BELIEFS ABOUT EVIDENCE-BASED PRACTICE AMONG RESPIRATORY THERAPISTS IN CLINICAL SETTING IN SAUDI ARABIA.

By  
Ahmad Alharbi  
(Under the Direction of Dr. Lynda Goodfellow)

## ABSTRACT

**BACKGROUND:** Evidenced-based practice (EBP) is applying or translating research findings in our daily patient care practices and clinical decision-making. EBP also involves integrating the best available evidence with clinical knowledge and expertise, while considering patients' unique needs and personal preferences. Since the role of RTs has increased, the importance of choosing the most effective treatment available is vital. Therefore, it is essential to evaluate RTs' EBP beliefs and their implementation level and obtain important information about their daily clinical practice. **PURPOSE:** The purpose of this study was to measure the level of implementation, describe beliefs about EBP among respiratory therapists in the clinical setting in Saudi Arabia. **METHODS:** The study utilized an online, cross-sectional survey with 34 questions administered to a convenience sample of RTs in Saudi Arabia. The survey is divided into three sections: belief and implementation, and demographics questions. Data were analyzed using descriptive statistics and one-way ANOVA tests. A significance level was set at 0.05. All analyses were performed in SPSS version 26. **RESULTS:** The total sample consisted of 49 respiratory therapists consisting of three experience levels: less than 5 years (n=38, 77.55%), 5 to 10 years (n=6, 12.24%), and more than 10 years (n=5, 10.20%). The majority of the respondents were males (57%, n=28), while the females comprised (40% n=20). Most of the respondents in the study are between 25 and 30 years old (59% n=29), under 25 years (32% n=16), and over 35 years old (8% n=4) There were no statistically significant differences between male and female respondents or years of experience in the belief or implementation scales. **CONCLUSION:** In conclusion, the respiratory therapists' community in Saudi Arabia reported their positive beliefs about EBP, but most of them did not frequently implement it in their daily clinical practice. Further research is required due to a lack of literature on evidence-based practice in respiratory therapy, and to assess the correlates of negative EBP' implementation levels among RTs in Saudi Arabia

**KEY WORDS:** Belief, Implementation, Evidence, Evidence-Based, EBP, Practices, Clinical-Setting, Healthcare, Respiratory therapy, and Saudi Arabia.

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Ahmad Alharbi

Fall, 2021

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## **Chapter I**

### **Introduction**

Evidenced-based practice (EBP) is applying or translating research findings in our daily patient care practices and clinical decision-making. EBP also involves integrating the best available evidence with clinical knowledge and expertise, while considering patients' unique needs and personal preferences. If used consistently, optimal patient outcomes are more likely to be achieved (Melnyk, 2019). The EBP implementation has four major components: (1) questions based on a clinical problem, (2) a search for the most relevant literature related to the problem, (3) to critically evaluate the evidence for validity, impact, and applicability, and (4) apply the evidence to clinical decision-making (Melnyk, 2019).

Before the introduction of EBP, most healthcare professionals were dependent on others who were more experienced in the field to make decisions. This decision-making was based on personal intuition, experiences with previous patients with almost similar conditions, personal skills, and knowledge gained as students (Newell & Burnard, 2010). This system of decision-making can be flawed. Relying on things one learned as a student often results in outdated information that may not be reliable in real-time. Additionally, every patient is unique in their own way, so solely relying on past experiences and intuition does not guarantee the best outcome for the patient (Newell & Burnard, 2010). This is why the implementation of EBP in healthcare has gained so much popularity over the years. In EBP, decisions do not solely depend on experience, skills, or intuition; instead, it was based on well-researched and documented procedures and theories (Chrisman, Jordan, Davis & Williams, 2014). EBP are of a wide variety and offer healthcare professionals numerous choices to choose from and ensure their patients the best quality of care.

EBP in healthcare has been acclaimed for improving patient outcomes. This is because EBP employs well-researched data during decision-making and utilizes an individual's experience, skills, and training while using the patient's real-time situation to decide on the best path to promote patient wellbeing (Black et al., 2015). It employs clinical reasoning and critical thinking to combine all the information a healthcare professional gains on a patient's unique set of conditions to ensure the best quality of care. EBP is also significant since it enables healthcare facilities to become more efficient (Chrisman, Jordan, Davis & Williams, 2014). Over the years, healthcare facilities have realized that when EBP is implemented, there is a better utilization of the institution's resources, saving them money. When decisions are based on EBP, there could be hardly any room for mistakes, thus minimizing waste of resources (Chrisman, Jordan, Davis & Williams, 2014). Additionally, EBP allows a healthcare professional to select a strategy that best serves the patient's unique situations and meets the healthcare's financial capabilities.

When looking at EBP, it is essential to note that some healthcare facilities have evidence-based protocols that, even though their significance mirrors EBP, are relatively different. Just like EBP, evidence-based protocols stem from well-researched and documented practices that a healthcare professional can utilize to make decisions (Myers, Pritchett & Johnson, 2001). However, evidence-based protocols are more limiting than EBP. In evidence-based protocols, a healthcare institution has a selected number of practices that they have studied and determined their effectiveness in patient outcomes and cost-effectiveness. Therefore, a patient comes in displaying signs of respiratory complications, the healthcare facility practicing evidence-based protocols has several specific ways a healthcare provider can proceed. In contrast, a facility practicing evidence-

based protocols allows the healthcare professional to choose from the vast array of information available (Myers, Pritchett & Johnson, 2001). The limiting nature of evidence-based protocols denies patients the kind of care they may need and may not be as effective as EBP.

EBP in a healthcare setup has been adopted in numerous fields to ensure the best outcome for patients. A respiratory therapist (RT) actively participates in the diagnosis, treatment, care, and follow-up of patients with heart and lung diseases. (Peters & David, 2016) Respiratory therapists are urged to use the EBP approach while assessing respiratory care management support and clinical decision-making within their daily practice. (Robert M, 2013). Several studies have stated a positive perception towards the EBP from physicians, nurses, and other health professions, but there is a lack of knowledge in implementing EBP (Lafuente, et al 2019 & Li, et al 2019 & Cruz, et al 2016). Nevertheless, a few studies have described the beliefs and implementation level among respiratory therapists toward EBP (Weng et al., 2014).

The RT role is growing and expanding, especially within the current health care environment. RT's attendance has become crucial in ICUs, and for asthma and COPD clinics, for community-based pulmonary rehabilitation, community health centers, and assessing home bedridden patients (Rickards & Tracey et al. 2018). To enhance respiratory care services and quality, utilizing EBP and acquiring relevant information regarding their clinical practice at a precise time is essential to facilitate effective management (Kuo KN et al., 2013).

## **Purpose of the Study**

This study aims to measure the level of implementation and beliefs about EBP among respiratory therapists in the clinical setting in Saudi Arabia. Research questions that will guide the study structure include:

1. What are the levels of implementation and beliefs about EBP among respiratory therapists in Saudi Arabia?
2. Are there differences in personal factors with regards to the levels of implementation and beliefs among respiratory therapists in Saudi Arabia?

## **Statement of problem**

Respiratory therapists face challenges in implementing evidence-based practices because they do not have adequate knowledge, and some have different beliefs about EBP. Also, there is an inadequacy of studies on how respiratory therapists' beliefs and implementation level toward EBP.

## **Significance of the research question**

As the profession of respiratory therapy has grown, RT's have had a more significant role in the field of respiratory therapy. Nowadays, RT's can be seen in hospital ICUs, asthma and COPD clinics, communities offering home care, and emergency rooms. Since the role of RTs has increased, the importance of choosing the most effective treatment available is vital. Therefore, it is essential to evaluate RTs' EBP beliefs

and their implementation and obtain important information about their daily clinical practice.

### **Hypothesis**

As proposed by Melnyk and Fineout–Overholt's model (2015) of Advancing Research and Clinical Practice Through Close Collaboration (ARCC), we expect “more positive beliefs about the value of EBP would be associated with better implementation.”

### **Chapter Summary**

Evidence-based practice entails using the best available evidence to make the most suitable treatment decisions for patients. The healthcare practitioner uses the best available evidence, including expert opinions, research, theory, and previous experiences. Evidence-based protocols are health care standards and recommendations made by a healthcare institution supported by the best available evidence. As shown in past studies, evidence-based protocols have several advantages, such as ensuring the best treatment is given to the patients and decreasing unnecessary costs for healthcare facilities. Evidence-based protocols are similar to evidence-based practice in that they are all based on research on the best practices. However, they are different in that the practitioner is allowed to choose from different practices that have been studied and determined to be effective. Evidence-based practice has now been adopted in various fields to ensure that the best patient outcomes are attained. An example of practitioners who are increasingly relying on evidence-based practices for better patient outcomes is respiratory therapists.

## **Chapter II**

### **Review of the Literature**

The present chapter of the dissertation aims to generate a detailed literature evaluation of the current study topic. The chapter will explore similar studies or previously conducted studies on knowledge, implementation, and EBP beliefs among RTs. The chapter will also look at prior studies on the success factors and barriers to EBP implementation. Before making the empirical findings of this study, literature analysis of sources published in the past was done, where the results are reported in this section of research. The Sources were derived from PubMed and Google Scholar.

The literature review is organized as introduction, evolution of evidence-based practice value, empirical literature findings regarding the level of implementation and beliefs about EBP, conceptual framework, and finally sums up the literature. A review of literature will be essential to help highlight knowledge gaps and research gaps that can be filled when conducting this research.

### **Introduction**

### **Evidence-Based Practice**

The incorporation of Evidence-Based Practice (EBP) into the health care profession has received a lot of interest in practice and research in the healthcare profession. EBP refers to a form of health care practice guided by the latest scientific discoveries, integration of expertise gained through years of service, and one that conforms to a



patient's preference (Mackey & Bassendowski, 2017). As the name suggests, EBP is thus a practice model rooted in evidence gained from research or experience. By devising an EBP, the medical professionals ensure that patients receive the best treatment available. By choosing the most effective treatment available, the quality of healthcare will be enhanced by alleviating the possible risk of complications resulted from previous trials and errors. Nurses who want to devise an EBP must be oriented to reading recent publications, conversing with current clinical trials, and conversing with recent and undergoing research in medicine and nursing (Dolezel et al., 2021).

### **Evolution of evidence-based practice value**

EBP was first established in medicine as a technique to promote critical evaluation skills to increase physicians' scientific bases for decision-making (Sackett et al., 1997). The definition has been extended to “the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients” by Sackett et al. (1997) (p.71-72). The definition expanded to include not only using the best evidence available for decision making, but also evaluating both the personal experiences and external evidence when treating patients.

The term "best evidence" referred to practically relevant research on diagnostic tests, therapeutic, and preventive measures, as well as their efficiency and safety. Further, practitioner accountability is critical in the health field, and it is produced through a standardized process that requires attempts to follow precise standards when administering

a treatment. For example, medical trials that used the same intervention at the same symptoms repeatedly ensured that the treatment or intervention was effective for patients.

This evidence-based medicine concept was subsequently incorporated into psychotherapy care, giving rise to the empirically supported treatment (EST) movement (Reynolds, 2000). EST refers to specific therapies that have been shown after numerous randomized trials to be effective in treating specific problems (Waehler et al., 2000).

In response to the need for justification for therapeutic procedures, the American Psychological Association (APA) established the Task Force on Promotion and Dissemination of Psychological Procedures in 1993 (Madson, 2005). After proposing the Task Force by the APA in 1993, a strong disagreement with ESTs has been made by several professionals in the medical field, stating that the proposed interventions did not incorporate characteristics of psychotherapy that were important to effective client outcomes (Garfield, 1996). As a result, the APA has coined the term "evidence-based practice" to involve the best available research with clinical expertise and client values when treating patients (Zlotnik et al., 2004).

## **Empirical Findings**

### **EBP is Vital for Treating Respiratory diseases**

GOLD has continually worked to ensure that the COPD management strategy guidelines are consistent with the most recent published research (Michael W Hess., 2017). Hess (2017) reports in a systematic review of the Global Initiative for Chronic Obstructive Pulmonary Disease (COPD) that the treatment of obstructive lung diseases has been

heavily reliant on the so-called Global Initiative for Obstructive Lung Disease (GOLD) strategy. GOLD traditionally diagnoses and stratifies pulmonary ailments based on postbronchodilator spirometry values. However, continued reliance on diagnoses based on traditional and fixed measures emerged to be a big caveat of COPD treatment following the research by Hess (2017).

The research by Hess (2017) recommends the management of diseases using evidence garnered from research instead of managing episodic flares that seem to be managed based on traditional and rigid strategies. Hess posits that pulmonary diseases are very complicated and cannot be managed using a single treatment model to not achieve much for COPD. Instead, research has to be combined with the adoption of combined therapy with long-acting bronchodilators. This research thus indicates that the incorporation of knowledge into practice is essential in managing COPD.

Even then, health care organizations are not well prepared to adopt EBP as most of them are faced with a myriad of challenges. The most highlighted challenges to evidence-based practice adoption were staff's lack of knowledge, attitude toward implementing evidence-based practice, lack of resources and training, time mismanagement, and lack of motivation (Dagne, A. H., 2021).

### **Factors influencing adoption of EBP**

Barnes (2012) conducted a study to gain an insight into current trends, attitudes, skills, barriers, and facilitators of implementing an EBP in nurses who serve at various school health facilities. A descriptive cross-sectional survey was then deployed amongst

50 nurses in Central and Eastern North Carolina. The respondents of Barnes's study were female (100%). The majority (86%) had earned a Baccalaureate degree, while 10% had earned a graduate degree and the rest had earned an Associate degree (4%). All the sampled population had between 4 and 40 years of experience. Emerging were several factors that influenced the adoption of EBP. This included the nature of published research content, perception of the importance of research finding, perception of one's skills relative to findings in new research, and perception of the importance of utilizing research skills. Nurses demonstrated a better understanding of the barriers to research utilization that individual nurses face. As a result, professional nurses were highly likely to adopt EBP when published content was easy and clear to read, when research findings were perceived to be very informative and following a comprehensive time of research or interaction and when they considered that the findings of research-informed specific knowledge gaps in their skills and practice.

In a similar study by Fathimath, David & Helen (2014) sampled 198 Maldivian nurses to investigate the barriers to EBP practice. The majority (87.4%) of the respondents were female with mean age (30.5 years). Most of the respondents were RNs (64.1%), followed by ENs (19.3%). Overall, nurses had been employed in the nursing profession for almost 7 years. Three levels of barriers to the adoption of EBP emerge. The first level was organizational factors. These factors included the failure of health organization leaders to inspire change. There were also time constraints; people were not given enough time to read new findings from research or lacked the time altogether. The lack of support to adopt new practices by an organization for its staff was also cited as a probable reason for not adopting EBP. Second, individual factors were also identified as a barrier to the adoption

of EBP. They included poor awareness of research findings, the lack of conception of the research methods, and the overall research process followed to arrive at findings and negative attitudes towards research. Further, Fathimath, David & Helen (2014) cite the lack of skills to evaluate research, unfamiliarity with research language, and low self-confidence to adopt change as probable causes of low interest in EBP amongst nurses.

Even after realizing that EBP has been proposed as a core competency that would improve health care outcomes, respiratory therapists in Taiwan have not implemented this change. Wenget al. (2014) embarked on a study to discover why. Eighty-six questionnaires were issued to respiratory therapists through postal offices. Fifty were returned. Unlike in the past, where therapists had been cited for failing to adopt EBP due to lack of knowledge in such, Weng and his colleagues discovered that there was a high knowledge level toward EBP practices by 88% of the respondents. However, respondents reported that no designated personnel would help them incorporate new evidence into practice. Another 45.5% stated the lack of time to scrutinize and implement evidence was the problem. Another 40.9% cited the lack of literature searching skills, with another 34.1% facing difficulties forming answerable questions. The lack of organizational support was mentioned by 13.6% of the respondents, and the lack of support from superiors mentioned by 9.1% of the respondents.

A similar study was conducted in Ontario, Canada, by Martins & Kenaszchuk (2013) among respiratory therapists. A descriptive cross-sectional survey was conducted in six academic hospitals in Toronto, Ontario. The survey was distributed to all 416 RTs via departmental mailboxes and was completed by 112 RTs. Out of 112 respondents, 80% agreed that research in respiratory therapy was important as it would improve the quality

of health care. Of the respondents, 59% cited time constraints as a reason why many therapists never adopted EBP. Also, 70% of the respondents were interested in conducting research and for any new evidence. The willingness to carry on research and discover new knowledge was positively correlated with the level of education. Another 20% identified the presence of organizational barriers and a lack of organizational leadership as factors limiting their ability to implement EBP. Martins and his colleagues found out that the absence of systematic exposure to research during respiratory therapy training and within colleague networks and work settings is one of the most significant challenges to respiratory therapy research.

The evidence from Weng et al. (2014) and Martins & Kenaszchuk (2013) is very important in this study as it relates to respiratory therapists. Most other studies use nurses as the study subject and replicate the findings to respiratory therapists where they may not be applicable.

### **Current Knowledge and Appreciation of Evidence-Based Practice**

Li et al. (2019) conducted a systematic literature review that summarizes the level of knowledge, attitudes, implementation, facilitators, and barriers to EBP in registered nurses. The literature search was conducted using three keywords in English, where data was probed from 3 Chinese databases of peer-reviewed publications published between 1996 and 2018. Twenty articles were included in the study. It emerged that clinical nurses had a positive attitude towards EBP. However, they did not have sufficient knowledge to fully implement EBP. The precursors to this were cited as limited academic knowledge, management functions being very complex, and being very young in the profession.

Inadequate time was also mentioned as a possible barrier to the implementation of organizational EBP in nursing. Li et al. (2019) also stated that the study focuses on knowledge facilitation rather than the elimination of barriers in an organization. In comparison to the enhanced attitudes toward EBP, the findings of this study show a strong need for development in CNs' knowledge and implementation of EBP.

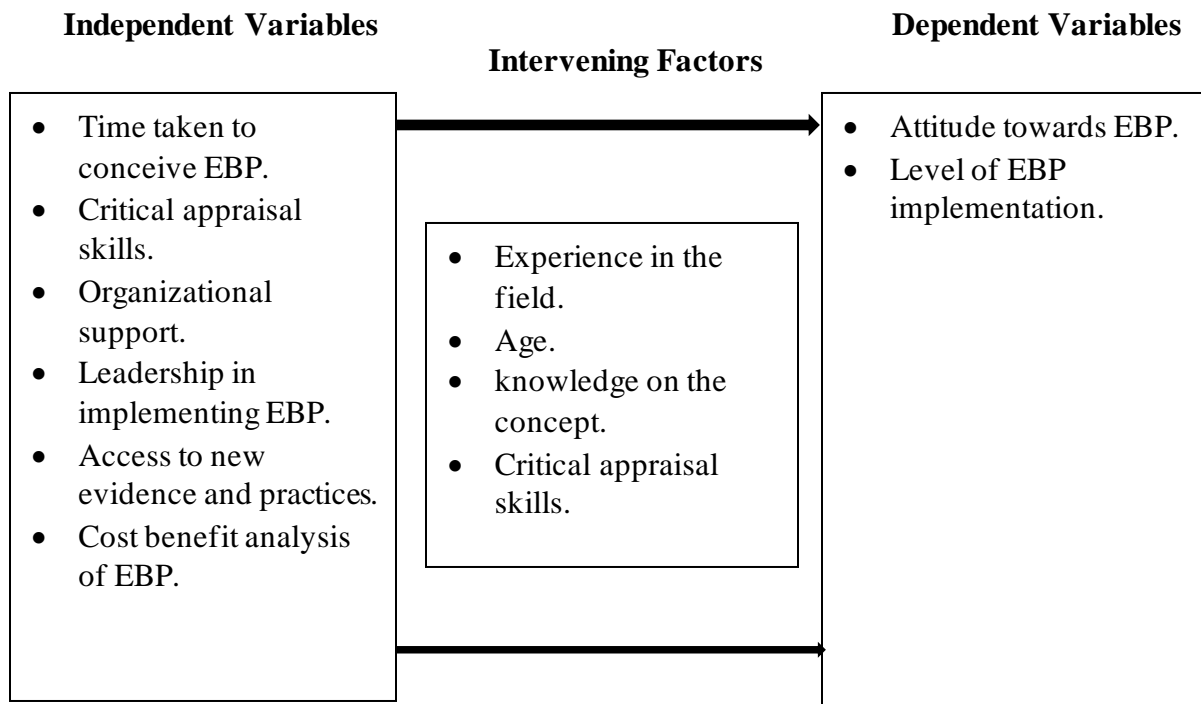
A similar study was also conducted by Toney (2018). In a cross-sectional and published study, Toney (2018) sought to examine the current knowledge and attitudes towards EBP in registered nurses at a single organizational hospital in the Piedmont region of North Carolina. Ninety surveys were distributed among nurses, and 34 nurses have completed the survey. No demographic information was collected in the study. Results show that nurses appreciate evidence-based practice and have a good attitude toward it. However, results also show that nurses' research skills and knowledge of the evidence-based practice process of developing research questions are not sufficient and need to be improved. Toney (2018) found that many nurses argued that their workload would not facilitate the process of implementation EBP. Therefore, Toney (2018) cited that to ensure that nurses understand the importance of research, they need to understand the EBP process better and put research skills into practice. Especially the nurses appear to have a positive outlook and are willing to learn more about evidence-based practice.

Inspired by the lack of publications on the role and frequency at which EBP is adopted, Susanne et al. (2011) embarked on a study to investigate the perceived benefits and attitudes influencing the adoption of EBP. Susanne sampled 306 nursing students at a Swedish hospital, and a cross-sectional survey was deployed. Those who responded to the survey were 227. The results of the study showed that nurses have a positive attitude

towards EBP. Literature publications and research conducted within an organizational setup were mentioned as the primary sources of EBP information. The majority of the study population was found to be able to easily understand EBP. There were also clinical guidelines present to help in the adoption and use of EBP. EBP that was perceived to be the most impactful considered patient issues. The lack of time was perceived as the number one barrier to EBP. The sampled population also reported knowing the benefits that would arise from the adoption of EBP. Most of the respondents said it would improve efficiency that would benefit a health care organization while enhancing healthcare quality in patients.



## Conceptual Framework



The independent variables show factors operating autonomously to influence how individuals perceive evidence to adopt change in practice. The independent factors identified in this literature review will determine how the EBP is adopted: the time needed to adopt EBP, organizational support, leadership in implementing EBP, access to new evidence, and a cost-benefit analysis of EBP. Alongside the autonomous factors, experience in the field, practitioner age, knowledge, the possession of critical appraisal skills, from the perspective of medical practitioners, showed as problems for why EBP is not adopted and was addressed as intervening factors for EBP implementation. EBP is adopted in an organization if the change has been applied in daily practice to solve a clinical problem, the practitioners' beliefs toward the EBP concept, or the extent of EBP implementation.

## **Overview and Summary of Literature**

From the literature review above, respiratory therapists' EBP beliefs and knowledge, together with their implementation, influence the effectiveness, efficiency, patient outcomes, cost, and treatment time in respiratory care. The effects extend to making the respiratory therapists stay on current standards and improve decision-making. It emerged out that many healthcare practitioners understand the role that EBP would play in transforming their practice. However, several factors emerge that constrain the level of adoption or the failure of the adoption of EBP. Time, lack of leadership, and organizational factors emerged as the most salient barriers to EBP implementation in health care organizations. Even then, most of the studied populations involved nurses and other health care professionals, with only a few studies focusing on respiratory therapists regarding the beliefs toward EBP and its implementation. To fill these gaps in the literature, this study will focus on studying to measure the level of implementation and beliefs about EBP among respiratory therapists and conduct a time-series study.

## **Chapter III**

### **Methodology**

This research aimed to assess the level of implementation and beliefs of EBP among respiratory therapists in the clinical setting in Saudi Arabia. This chapter will present information on the research questions, instrumentation, population, research design, data collection, and data analysis applied in the study.

#### **Research questions**

The following questions have therefore been addressed and will give guidance to the study structure.

1. What are the levels of implementation and beliefs about EBP among respiratory therapists in Saudi Arabia?
2. Are there differences in personal factors with regards to the levels of implementation and beliefs among respiratory therapists in Saudi Arabia?

#### **Instrumentation**

The questionnaire utilized in this study was the EBP beliefs and EBP implementation scales, containing 34 questions. The EBP beliefs Scale (EBPB) is 16 questions in a 5-item Likert-type scale with a range of 1 (strongly disagree) to 5 (strongly agree). Examples are, "I am clear about the steps in EBP," and "I am sure that I can implement EBP." Higher total scores suggest more EBP beliefs. Face, content, and concept validity have been established, with internal consistency reliabilities above 0.85. (Melnik et al., 2008). EBP implementation scale (EBPI) is a quantitative measurement that provides

participants with an answer to 18 questions in 5-point Likert-type scale items by responding to the number of times they perform specific EBP tasks during the past eight weeks ranging from 1 (0 times) to 5 (8 times or more). EBP implementation scale includes (a) a question of PICO (Population, Intervention, Comparison, and Outcomes), (b) evidence used for changing their clinical practice, and (c) data from colleagues on the result shared. Higher summed values show a higher EBP implementation.

### **Population**

The final population involved in this analysis were 49 RTs who were working in public or private healthcare facilities at the time of the survey in different regions in Saudi Arabia. The survey link and recruitment material were posted twice on Twitter by local popular RTs accounts and some WhatsApp groups for RTs in Saudi Arabia. Ten of the respondents were excluded after sending the reminders by one week as they had answered only the demographic data. The inclusion criteria are Registered RTs with Saudi Commission for Health Specialties working in clinical settings. The Exclusion criteria are Non-RTs, RTs not practicing in Saudi Arabia, and current RT students who are not actively practicing.

### **Study design**

The study design for this thesis is a descriptive cross-sectional study and a convenience sample. The survey was divided into three sections: beliefs about EBP, implementation of EBP, and demographics questions. EBP` beliefs and implementation consist of 34 questions divided into 16 questions to measure the beliefs about EBP and 18

questions to measure the levels of implementation of EBP. The demographic information was collected to understand better the RT's level of implementation and beliefs regarding evidence-based practice. Conducting an online survey study has some pros and cons. The major disadvantage of using an online survey is that participants may not be RTs or answer accurately or honestly to avoid appearing negatively. However, the advantage of conducting an online survey study is sending reminders to the population more often whenever needed, choosing the targeted population easily, and no costs for the distribution or answering the questionnaire.

### **Data Collection**

The study was approved by the university's Institutional Review Board (IRB). The questionnaire was sent twice to RTs who were working in public or private healthcare facilities in Saudi Arabia at the time of the survey distribution using social media via Twitter and WhatsApp. Local popular RTs accounts on Twitter and several WhatsApp groups in Saudi Arabia have shared the poster for the survey. Reminders were sent to the same RTs after distributing the survey for two weeks. Also, participants were asked to respond to all questions in the survey to collect complete information. Qualtrics through the Georgia State University website was used to administer the survey and collect the data.

### **Data Analysis**

SPSS (version 26) has analyzed and evaluated all statistical investigations in the study. All results of quantitative variables regarding the level of implementation and beliefs have been described either as mean (M), standard deviation (SD), or frequency (percentage

%). Descriptive statistics were used to assess the level of implementation and beliefs about EBP among respiratory therapists. One-way ANOVA tests were conducted to assess the differences in the implementation and beliefs about EBP among the personal factors.

### **Summary**

Overall, the methodology aims to assess the levels of implementation and beliefs towards EBP among RTs in Saudi Arabia. This chapter presented information on the research questions, instrumentation, population, research design, data collection, and data analysis applied in the study. The instrument will assess two subscales: the beliefs toward EBP and implementation levels.

## CHAPTER IV

### Overview

This research aimed to measure the level of implementation and beliefs about EBP among respiratory therapists in the clinical setting in Saudi Arabia. This chapter includes the results of the statistical analysis and the demographic information of the participants. Statistical Package for the Social Sciences 26 (SPSS 26) was employed to conduct the statistical analysis. Descriptive statistics and one-way ANOVA tests were conducted to assess the RTs' beliefs and level of implementation and to evaluate the differences among the other demographics data. This chapter illustrates the methods used to answer the research questions:

1. What are the levels of implementation and beliefs about EBP among respiratory therapists in Saudi Arabia?
2. Are there differences in personal factors with regards to the levels of implementation and beliefs among respiratory therapists in Saudi Arabia?

### Demographic Findings

The demographics data was collected to present a description of the population, Table 1. The sample of this research involves 49 respiratory therapists. There were 57.14% (n=28) male and 40.82% (n=20) female respondents. Also, one of the respondents preferred not to say his/her gender. Almost half of the respondents were between 25 and 30 years old (59.18%), and 32.65% were under 25 years old, while 8.16% of the respondents were more than 35 years old. The majority of respondents (77.55%) have less than five years of experience working in a clinical setting. In comparison, 12.24% have 5

to 10 years of experience, and only 10.20% have more than ten years of experience. Lastly, all respiratory therapists included in the research are registered RTs with the Saudi Commission for Health Specialties.

**Table 1. Demographic Data among Respiratory Therapists in Saudi Arabia.**

<b>Demographics</b>	<b>N (%)</b>
<b>Gender</b>	
Male	28 (57.14%)
Female	20 (40.82%)
Prefer not to say	1 (2.04%)
<b>Age</b>	
Under 25 years old	16 (32.65%)
25 to 35 years old	29 (59.18%)
Over 35 years old	4 (8.16%)
<b>Years of experience</b>	
Less than 5 years	38 (77.55%)
5 to 10 years	6 (12.24%)
More than 10 years	5 (10.20%)

### **Findings Related to Research Question 1**

The first research question asked, "What are the levels of implementation and beliefs about EBP among respiratory therapists in Saudi Arabia?" Table 2 shows mean scores (M) and standard deviations (SD) of 18 questions measuring the level of implementation of EBP among RTs in Saudi Arabia. The ranges were based on a five-point Likert scale based on the number of times they performed specific EBP tasks during the past eight weeks ranging from 1 (0 times) to 5 (8 times or more). The EBP implementation findings showed that the statement "used evidence to change my practice" was the highest mean score ( $M=2.42$ ). In contrast, the statement "generated a PICO question about my practice" was the lowest mean score ( $M=1.77$ ). Therefore, no statements were met with the



medium number (<3). To clarify, the EBP levels of implementation was less than average among RTs in Saudi Arabia. See Appendix A for the EBP implementation scale (EBPI).

Table 3 presents mean scores (M) and standard deviations (SD) of 16 questions measuring the beliefs about EBP among RTs in Saudi Arabia based on a five-point Likert scale (1 strongly disagree, 2 disagree, 3 neither agree nor disagree, 4 agree, and 5 strongly agree). The findings of the beliefs scale about EBP among RTs in Saudi Arabia showed that the statement “I am sure that evidence-based guidelines can improve clinical care” was the highest mean score ( $M=4.65$ ). In contrast, the statement “I believe EBP is difficult” was the lowest mean score ( $M=2.90$ ). Accordingly, the findings from the belief scale showed a positive belief toward EBP among RTs in Saudi Arabia. See Appendix B for the EBP beliefs Scale (EBPB).

**Table 2. The Implementation of EBP among RTs in Saudi Arabia. The Ranges for Implementation Questions are 1 (0 times) to 5 (8 times or more).**

#	Field	Minimum	Maximum	Mean	Std. Deviation	n
1	Used evidence to change my practice.	1.00	5.00	2.42	±1.22	48
13	Accessed an evidence-based guideline.	1.00	5.00	2.23	±1.11	47
4	Informally discussed evidence of a research study with a colleague.	1.00	5.00	2.21	±1.12	48
8	Shared an evidence-based guideline with a colleague.	1.00	5.00	2.15	±1.08	48
11	Read and critically appraised a clinical research study.	1.00	5.00	2.15	±1.08	48

17	Changed practice based on patient outcome data.	1.00	5.00	2.09	±1.06	46
7	Evaluated the outcomes of practice change.	1.00	5.00	2.08	±1.04	48
18	Promoted the use of EBP to my colleagues.	1.00	5.00	2.07	±1.07	46
2	Critically appraised evidence from a research study.	1.00	5.00	2.06	±1.01	48
5	Collected data on a clinical issue.	1.00	5.00	2.04	±1.10	48
15	Evaluated a care initiative by collecting patient outcome data.	1.00	5.00	2.02	±1.06	47
6	Shared evidence from a study or studies in the form of a report presented to more than colleagues.	1.00	5.00	2.00	±0.91	48
10	Shared evidence from a research study with a multi-disciplinary team member.	1.00	5.00	2.00	±1.00	48
16	Shared the outcome data collected with colleagues.	1.00	5.00	1.98	±1.15	46
14	Used an evidence-based guideline or systematic review to change clinical practice where I work.	1.00	5.00	1.91	±0.96	47
12	Accessed the Cochrane database of systematic reviews.	1.00	5.00	1.83	±1.18	48

9	Shared evidence from a research study with a patient/family member.	1.00	5.00	1.81	±1.09	48
3	Generated a PICO question about my practice.	1.00	5.00	1.77	±0.94	48

Note. \* Ranges for Implementation Questions are 1 (0 times) to 5 (8 times or more)

**Table 3. The Beliefs about EBP among RTs in Saudi Arabia. The Ranges for Beliefs Questions are 1- strongly disagree to 5- strongly agree.**

#	Field	Minimum	Maximum	Mean	Std. Deviation	n
5	I am sure that evidence-based guidelines can improve clinical care.	1.00	5.00	4.65	±0.69	49
9	I am sure that implementing EBP will improve the care that I deliver to my patients.	1.00	5.00	4.39	±0.83	49
1	I believe that EBP results in the best clinical care for patients.	1.00	5.00	4.39	±1.01	49
4	I believe that critically appraising evidence is an important step in the EBP process.	2.00	5.00	4.20	±0.73	49
16	I believe the care that I deliver is evidence-based.	1.00	5.00	4.00	±0.97	49
3	I am sure that I can implement EBP.	2.00	5.00	3.94	±0.77	48

6	I believe that I can search for the best evidence to answer clinical questions in a time-efficient way.	1.00	5.00	3.94	±0.91	49
8	I am sure that I can implement EBP in a time-efficient way.	1.00	5.00	3.69	±0.84	49
12	I am sure that I can access the resources to implement EBP.	1.00	5.00	3.65	±0.98	49
15	I am confident about my ability to implement EBP where I work.	1.00	5.00	3.65	±0.94	49
7	I believe that I can overcome barriers in implementing EBP.	1.00	5.00	3.63	±0.92	49
14	I know how to implement EBP sufficiently enough to make practice changes.	1.00	5.00	3.61	±0.99	49
10	I am sure about how to measure the outcomes of clinical care.	1.00	5.00	3.61	±1.03	49
2	I am clear about the steps of EBP.	1.00	5.00	3.55	±1.14	49
11	I believe that EBP takes too much time.	1.00	5.00	3.35	±1.02	49
13	I believe EBP is difficult.	1.00	5.00	2.90	±1.15	49

Note. \* Ranges for Beliefs Questions are 1- strongly disagree to 5- strongly agree

Table 4 represents the sum of mean scores (M) and standard deviations (SD) of implementation and beliefs about EBP among respiratory therapists in Saudi Arabia.

**Table 4. Implementation and Beliefs about EBP among Respiratory Therapists in Saudi Arabia.**

Scale	Minimum	Maximum	Mean	SD	Cronbach's Alpha
<b>Implementation Scale</b>	1	5	2.02	±0.754	.945
<b>Belief Scale</b>	1	5	3.81	±0.463	.789

Note. \* Cronbach's alpha values ranging from .70 to .95 (Tavakol & Dennick, 2011).

### **Findings Related to Research Question 2**

The second research question asked, "Are there differences in personal factors with regards to the levels of implementation and beliefs among respiratory therapists in Saudi Arabia?" Table 5 presents mean scores (M) and standard deviations (SD) of the differences in personal factors regarding the implementation of EBP among respiratory therapists in Saudi Arabia. Table 6 shows mean scores (M) and standard deviations (SD) of the differences in personal factors with regards to beliefs about EBP among respiratory therapists in Saudi Arabia.

**Table 5. The differences in personal factors regarding the implementation of EBP among Saudi RTs.**

<b>Variables</b>	<b>n</b>	<b>Mean (SD)</b>	<b>Test statistics, p-value</b>
<b>Gender</b>			
Male	28	2.08(.824)	p-value = .654
Female	19	1.91(.662)	
Prefer not to say	1	2.44	
<b>Age</b>			
Under 25 years old	16	1.84(.536)	p-value = .234
25 to 35 years old	28	2.05(.688)	
Over 35 years old	4	2.55(1.623)	
<b>Years of experience</b>			
Less than 5 years	37	1.9(.610)	p-value = .109
5 to 10 years	6	2.5(.664)	
More than 10 years	5	2.36(1.468)	

Note. \*Significant at  $P < .05$

**Table 6. The differences in personal factors with regards to beliefs about EBP among Saudi RTs.**

<b>Variables</b>	<b>n</b>	<b>Mean (SD)</b>	<b>Test statistics, p-value</b>
<b>Gender</b>			
Male	28	3.86(.518)	p-value = .144
Female	20	3.80(.344)	
Prefer not to say	1	2.93	
<b>Age</b>			
Under 25 years old	16	3.73(.39)	p-value = .690
25 to 35 years old	29	3.86(.463)	
Over 35 years old	4	3.79(.787)	
<b>Years of experience</b>			
Less than 5 years	38	3.75(.422)	p-value = .167
5 to 10 years	6	4.11(.356)	
More than 10 years	5	3.95(.763)	

Note\*Significant at  $P < .05$

## CHAPTER V

### Overview of the Study

This chapter will present a discussion of the findings presented in chapter IV. The chapter is divided into six major sections: an overview of the study, discussion of findings, any implications for research, recommendations for future research, any study limitations, and conclusion. For evidence-based practice (EBP) to be successful, respiratory therapists (RTs) must understand the purpose and appreciate its findings.

The purpose of the thesis was to measure the level of implementation and beliefs about EBP among respiratory therapists in the clinical setting in Saudi Arabia. The following research questions were posed:

1. What are the levels of implementation and beliefs about EBP among respiratory therapists in Saudi Arabia?
2. Are there differences in personal factors with regards to the levels of implementation and beliefs among respiratory therapists in Saudi Arabia?

### Implication of Findings

The EBP beliefs scale findings among RTs in Saudi Arabia scored an average mean of ( $M = 3.81$ ), While the EBP levels of implementation scale scored less than the average medium number ( $<3$ ). Therefore, we can indicate that RTs in Saudi Arabia have a positive attitude toward EBP. However, RTs in Saudi Arabia did not frequently implement EBP in their daily clinical practices. The highest mean score in the belief scale was with the statement “I am sure that evidence-based guidelines can improve clinical care” ( $M = 4.65$ ,

SD= 0.69), while the highest mean score in the implementation scale was with the statement “Used evidence to change my practice” (M= 2.42, SD= 1.22).

In this study, the score for the EBP beliefs scale expressed positive beliefs about EBP's value. Although most RTs believed that “evidence-based guidelines can improve clinical care,” they were unable to “Use evidence to change their practice.” RTs were more positive about the importance of adopting EBP to provide “the best clinical care for patients.” Like the previous study among RTs, most of the RTs agreed that EBP in respiratory therapy was important as it would improve the quality of health care (Martins & Kenaszchuk, 2013). Regarding the knowledge and skills, RTs scored themselves highly positive as they were “clear about the steps of EBP” and “believed that they can search for the best evidence to answer clinical questions.” Still, a previously cited study among RTs in Taiwan indicated that the lack of knowledge or awareness was the cause of failure to adopt the EBP (Weng et al. 2014).

Regardless of the positive beliefs about the value of EBP among RTs in Saudi Arabia, the findings from the EBP implementation scale were less than the average medium number (<3). Therefore, RTs in Saudi Arabia did not frequently implement EBP in their daily clinical practices. The EBP implementation scale scores showed that most RTs in Saudi Arabia did not frequently formulate PICO questions, share evidence from a research study with a patient/family member, or access Cochrane scientific databases. Furthermore, RTs in Saudi Arabia do not often adopt “evidence to change their clinical practice.” This negative correlation in EBP' implementation has already been reported in previous studies of community acute healthcare settings (Mallion & Brooke, 2016; Verloo et al., 2017). One



of the reasons for not frequently implementing EBP could be that RTs in Saudi Arabia are not urged to adopt EBP in their practice by the respiratory therapy administrations.

Another reason could be that some hospital policies inhibit RTs from practicing effectively by not giving them their opportunities to adopt any changes regarding respiratory care management. In a previous study in 2017, Marin has revealed that the respiratory care profession is at risk of losing practitioners due partly to a lack of opportunities for RTs to practice professionally in their specialty and a limited scope of clinical practice in some clinical settings (Marin., 2017). Also, it could be a reason for not implementing EBP; as mentioned in previously cited studies among nurses, Li stated that clinical nurses had a positive belief towards EBP. However, they did not have sufficient knowledge to fully implement EBP (Li et al., 2019).

The present study's results also showed that the positive beliefs among RTs about EBP were not associated with positive EBP Implementation in Saudi Arabia, contradicting the hypothesis developed in the ARCC model (Melnik & Fineout-Overholt, 2015), which was “more positive beliefs about the value of EBP would be associated with better implementation.”

There were no statistically significant differences between male and female respondents or years of experience in the belief or implementation scales among RTs in Saudi Arabia. However, regardless of the low implementation level among RTs in this study, RTs who are more than 25 years old or have more than five years of experience seemed to have a better level of EBP implementation compared to those who are under 25 years old or have less than five years of experience. As in previously cited studies, being

very young in the profession or having sufficient qualifications are associated with poor adapting of EBP (Li et al., 2019 & Toney, 2018).

The present study' results showed that RTs in Saudi Arabia have a positive attitude for “searching for the best evidence to answer clinical questions in a time-efficient way.” On the other hand, previously cited studies stated the opposite; a lack of time was the most highlighted barrier to the implementation of EBP (Weng et al., 2014 & Martins et al., 2013 & Fathimath et al., 2015 & Toney 2018 & Li et al., 2019). However, the present results indicated that RTs seemed less confident about if “EBP takes too much time.” Furthermore, the previously cited studies stated that the lack of literature searching skills and the lack of conception of the research methods are some of the reasons why the RTs or the healthcare provider cannot adopt the EBP (Weng et al., 2014 & Fathimath, David & Helen, 2014). Nevertheless, our result showed that RTs in Saudi Arabia are strongly able to “access the resources to implement EBP” and “confident about their ability to implement EBP where they work.” Additionally, RTs in Saudi Arabia did not “believe EBP is difficult” and believed that “they can overcome barriers in implementing EBP.” The study results indicated that RTs in Saudi Arabia have a positive knowledge about EBP, and they can overcome the barriers influencing the EBP adoption such as lack of time or resources inaccessibility.

## **Limitations of the study**

This cross-sectional study has some strengths and limitations as previous surveys evaluating beliefs about EBP and its implementation. This is the first study describing EBP beliefs and implementation in the respiratory therapy community in Saudi Arabia to the best of our knowledge. This investigation could be considered a significant milestone in Saudi Arabia's regional EBP research activities. Also, this study used a validated measurement; face, content, and concept validity have been established, with internal consistency reliabilities above 0.85. However, the major limitation of this study is the lack of comprehensive research in respiratory care that addresses the beliefs about EBP and its implementation in the respiratory therapy profession. Second, the minimal number of respondents who responded to the inquiry may increase the margin of error in the study. Third, this study did not explore education levels and how this impacted their beliefs and implementation of the concept. Fourth, the survey was conducted in various regions in Saudi Arabia; the present results cannot be generalized to all RTs in Saudi Arabia. Therefore, collecting the participants' geographical regions would be more accurate. Lastly, the survey was conducted via social media. Accordingly, participants may not be RTs or answer accurately or honestly to avoid appearing negatively.

## **Relevance to Clinical Practice**

The present study's findings emphasize the urgent need to raise awareness about the value of adopting EBP among RTs during their daily patient care practices. Since EBP is not frequently adopted by RTs in many healthcare organizations in Saudi Arabia, seeking assistance from a senior RT champion would help raise awareness regarding EBP adoption.

The champion can greatly enable the RTs to adopt EBP or raise awareness about the value of the concept in clinical settings. For example, some RTs in Saudi Arabia face organizational barriers such as strict policies or standardizations in their daily clinical practices that prevent them from effectively adopting any respiratory patient care management changes. Consequently, the assistance of champions via educating the organizations or healthcare practitioners about the value of RTs adopting EBP in their daily patient care practice is very likely to be appreciated. Above all, RT's attitude in Saudi Arabia was open and responsive to evidence-based practice, which is a positive sign that should be acted upon to incorporate them more in the daily patient care practices. Further, respiratory therapists' competencies and ability to incorporate EBP into daily clinical practice should be strengthened through practical and scientific training while considering their clinical experience and patient preferences in specific community healthcare settings. Furthermore, the findings of this study will help respiratory therapy departments to evaluate the level of implementation and beliefs about EBP among RTs in Saudi Arabia. Lastly, healthcare system communities worldwide must explore ways of empowering and supporting RTs in their attempts to implement EBP in their daily practice.

### **Recommendations for Future Study**

Further research is required due to a lack of literature on evidence-based practice in respiratory therapy and to assess the correlates of negative EBP implementation levels among RTs in Saudi Arabia. Email should be used as a method of distributing the questionnaire to strengthen the credibility of the data collected. Another recommendation would be to replicate this study with a larger sample size and conduct the research over a

more extended period. It would also be helpful to include the level of education to determine if scores improved with education. Also, collecting the participants' geographical regions would be beneficial to seek a better understanding of the factors influencing the beliefs about EBP and its implementation. Lastly, future research should consider including a glossary of terminology to help explain both EBP scales.

## **Conclusion**

The respiratory therapists' community in Saudi Arabia reported their positive beliefs about EBP, but the majority did not frequently implement it in their daily clinical practice. Since the respiratory therapy profession is becoming an ever more important part of modern healthcare systems, implementing EBP deserves a more in-depth investigation of communities' specific needs and expectations to develop the most appropriate strategies for daily patient care practices.

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## Appendix A:

### EBP Implementation Scale

Below are 18 questions about evidence-based practice (EBP). Some healthcare providers do some of these things more often than other healthcare providers. There is no certain frequency in which you should be performing these tasks. Please answer each question by circling the number that best describes how often each item has applied to you in the past 8 weeks.

**In the past 8 weeks, I have:**

	0 times	1-3 times	4-5 times	6-8 times	>8 times
1. Used evidence to change my practice.	0	1	2	3	4
2. Critically appraised evidence from a research study.	0	1	2	3	4
3. Generated a PICO question about my practice.	0	1	2	3	4
4. Informally discussed evidence from a research study with a colleague.	0	1	2	3	4
5. Collected data on a clinical issue.	0	1	2	3	4
6. Shared evidence from a study or studies in the form of a report or presentation to more than 2 colleagues.	0	1	2	3	4
7. Evaluated the outcomes of practice change...	0	1	2	3	4
8. Shared an evidence-based guideline with a colleague.	0	1	2	3	4
9. Shared evidence from a research study with a patient/family member.	0	1	2	3	4
10. Shared evidence from a research study with a multi-disciplinary team member.	0	1	2	3	4
11. Read and critically appraised a clinical research study.	0	1	2	3	4
12. Accessed the Cochrane database of systematic reviews.	0	1	2	3	4
13. Accessed an evidence-based guideline.	0	1	2	3	4
14. Used an evidence-based guideline or systematic review to change clinical practice where I work.	0	1	2	3	4
15. Evaluated a care initiative by collecting patient outcome data.	0	1	2	3	4
16. Shared the outcome data collected with colleagues.	0	1	2	3	4

17. Changed practice based on patient outcome data.	0	1	2	3	4
18. Promoted the use of EBP to my colleagues.	0	1	2	3	4

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## Appendix B:

### EBP Belief Scale

Below are 16 statements about evidence-based practice (EBP). Please circle the number that best describes your agreement or disagreement with each statement. There are no right or wrong answers.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. I believe that EBP results in the best clinical care for patients.	1	2	3	4	5
2. I am clear about the steps of EBP.	1	2	3	4	5
3. I am sure that I can implement EBP.	1	2	3	4	5
4. I believe that critically appraising evidence is an important step in the EBP process.	1	2	3	4	5
5. I am sure that evidence-based guidelines can improve clinical care	1	2	3	4	5
6. I believe that I can search for the best evidence to answer clinical questions in a time efficient way.	1	2	3	4	5
7. I believe that I can overcome barriers in implementing EBP.	1	2	3	4	5
8. I am sure that I can implement EBP in a time-efficient way.	1	2	3	4	5
9. I am sure that implementing EBP will improve the care that I deliver to my patients.	1	2	3	4	5
10. I am sure about how to measure the outcomes of clinical care.	1	2	3	4	5
11. I believe that EBP takes too much time.	1	2	3	4	5
12. I am sure that I can access the best resources in order to implement EBP.	1	2	3	4	5
13. I believe EBP is difficult.	1	2	3	4	5
14. I know how to implement EBP sufficiently enough to make practice changes.	1	2	3	4	5
15. I am confident about my ability to implement EBP where I work.	1	2	3	4	5
16. I believe the care that I deliver is evidence-based.	1	2	3	4	5

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## Appendix C:

**Dear Respiratory Therapist,** you are invited to a research study because you are taken part in a clinical setting as a registered respiratory therapist. The purpose of this study is to measure the extent of awareness, the level of implementation, describe beliefs about Evidence-Based Practice (EBP) among RTs, and indicate the barriers for establishing EBP in Saudi Arabia.

Ahmad Alharbi is conducting this research study as part of the requirements of the master's degree in respiratory therapy from the Department of Respiratory Therapy at Georgia State University, under the guidance of Dr. Lynda T. Goodfellow, Professor and Senior Associate Dean for Academic Affairs.

Although there will be no direct benefit to you from participating in this study, the information gathered will improve healthcare quality for respiratory care services. If you choose to participate, you will be required to complete the following survey, which should take **no more than 10 minutes**.

Your participation is entirely voluntary, and you may refuse or discontinue taking the survey at any time without penalty or loss of benefits to which you are otherwise entitled. Please note that your responses are used exclusively and entirely confidential for research purposes. To protect your privacy, no names or codes will be used to identify you or your survey. Your completion and submission of the survey constitute your agreement to take part in the study.

We look forward to the completion of your survey. However, you may withhold at any time by not completing or sending a blank survey if you decide not to participate in this study. The information from this study may be published in journals and presented at professional meetings. This study does not cost the participant in any way, except the time spent completing the survey.

If you have any questions about this research, now or in the future, don't hesitate to contact Ahmad Alharbi at [aalharbi3@student.gsu.edu](mailto:aalharbi3@student.gsu.edu) or Dr. Lynda Goodfellow at [ltgoodfellow@gsu.edu](mailto:ltgoodfellow@gsu.edu). The department's mailing address can be found at the bottom of this page. You may also contact the Georgia State University IRB at <https://gsu.imedris.net/>. Please note: Completion and submission of this survey implies that you have read this information and consent to participate in the research.

Sincerely,  
Ahmad Alharbi  
Dept. of Respiratory Therapy  
Georgia State University