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Barriers to Effective Personal Protective Equipment use in Public Health Workers

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Walden University
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Abstract

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by

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CNM, Philadelphia University, 2007

MSN, Thomas Jefferson University, 2000

BSN, Thomas Jefferson University, 1999

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Exposure to infections continues to be a significant concern for nursing practice and for other health care professionals. Personal protective equipment (PPE) minimizes occupational exposure; however, their use is subject to variability. This quality improvement project addressed the impact of an educational intervention on attitudes and barriers to proper use of PPE for public health workers at the study site. The health belief model and the literature review provided theoretical support for the project and evidence of current trends in PPE use. There were 44 employees who completed the preintervention survey and 22 who completed the postintervention survey to gauge attitudes and beliefs. A non-parametric test was applied to identify the presence of statistically significant findings ($p < .05$) between pre- and post-intervention responses. Survey responses were coded (1 for correct/positive answers, 0 for incorrect/negative answers), resulting in a continuous data score ranging from a low of 0 to a high of 11; scores closer to 11 represented knowledge acquisition/positive attitudes toward the use of PPE and COVID-19 vaccination. The pre- and post-intervention mean scores were 9.1591 and 9.6364, respectively. The survey analysis did not reach statistical significance for questions specific to mask use; however, statistically significant change was noted in the number of employees interested in receiving the COVID-19 vaccine ($p = .045$). COVID-19 vaccination is crucial to preventing the spread of COVID-19 infection. Enhancing health worker interest in receipt of the COVID-19 vaccine demonstrates positive social change and validates the comprehension of personal, professional, and ethical responsibility to protect the health of oneself and others.

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Dedication

This project is dedicated first to God, through Whom all things are possible and Jesus Christ, my Savior and strength; to my wonderful husband, my children and family who are my support, joy, and inspiration, and to the dedicated public health nurses and workers everywhere, who at the time of this writing continue to serve the public valiantly and tirelessly in an effort to stop the spread of COVID-19 and other communicable diseases.

It is my sincere hope that completion of this project reflects the vision of the founders of Walden University, Bernie Turner and the late Rita Turner, and their commitment to create an accessible, student-centered institution that embodies positive social change, for good.

Acknowledgments

I would like to acknowledge and thank my doctoral committee chairwoman, Dr. Barbara Niedz, for her patience, tutelage, time, and kindness in supporting the completion of this project. Your help and support and encouragement has been invaluable—Thank you!

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To my supportive and loving spouse, Derrick J Mathis, Sr.; children Alena and Desmond Crawley, DJ, and Victoria Mathis; grandchildren Nathan and Naomi Crawley, their soon to be born baby brother, and my entire family. Sharing life, love, and laughter with all of you is the greatest blessing!

To my parents Sydney R. Storr, Sr. and Janet Storr; your examples, lifelong love, support, and encouragement is a gift that I will always cherish. I love you!

In honor of the memory of my mother-in-law, 'professional caregiver and honorary nurse', Bertha L. Mathis. This week marks two years of your departure from labor to reward. Your lessons, love, and legacy will never be forgotten!

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Section 1: Nature of the Project

Introduction

Health care providers are often exposed to blood borne and respiratory pathogens in the workplace. Engineering controls and personal protective equipment (PPE) are provided to protect employees from occupational exposure; however, use of these mechanisms to prevent exposure vary from individual to individual and may represent perceived risk for exposure and acquisition of disease. Inconsistent use of PPE may also reveal barriers to effective use as perceived by the provider. Difficulty donning and doffing, selection of appropriate PPE, and inhibition of communication because a mask prevents facial recognition may be concerns (Broussard et al., 2020).

The purpose of this project was to develop a retrospective program evaluation to determine the effectiveness of an organization strategy designed to address the barriers to effective PPE use in the public health workplace, with the intention of improving compliance. The inconsistent use of PPE is a risk factor for the spread of respiratory diseases, most significantly, COVID-19. It is imperative that steps are taken to maximize employee awareness and use of safety measures to prevent the spread of respiratory infections. Understanding employee attitudes, and the interpersonal dynamics that contribute to inconsistent PPE use are critical to improving compliance and creating social, and behavior change that enhances wellness and safety in the workplace. Thus, this project was developed to positively impact health care personnel and consumers by clarifying the motives that impact the decision for health care workers to use PPE. The quality improvement (QI) initiative was a retrospective evaluation of a comprehensive

program to reduce barriers that prevent public health workers from using PPE consistently and appropriately.

Problem Statement

COVID-19 is a novel corona virus that was confirmed on January 22, 2020 in a patient residing in Washington State. The individual recently traveled from the Wu Han Province of China, where the presence of the virus was documented as early as December 2019 as a rapidly and easily transmitted condition causing upper respiratory and other constitutional symptoms (World Health Organization, 2020). It was quickly noted that the mortality rate for individuals who contracted the condition was high, particularly for those who have chronic conditions. COVID-19 presented a challenging time for the United States and the need to understand the dynamics of the infection as well as quickly mobilizing resources to prevent the spread of this infection (Shaukat et al., 2020). Recommendations to prevent the spread of COVID-19 to frontline health care workers emerged as additional information about the dynamics of COVID-19 infection and its impact were uncovered.

In further attempts to identify the actual risk of health care workers for acquisition of COVID-19 infection, research articles, case studies, and editorials were published to determine the factors involved. For example, Wang et al. (2020) indicated that inadequate PPE and lack of knowledge about the dynamics the infection, in addition to frequent and prolonged contact with infected patients increased the risk of acquiring COVID-19. Additionally, it was identified that inadequate training in infection prevention and control also contributed to the risk for and acquisition of COVID-19.

Despite institution of the Centers for Disease Control and Prevention (CDC) recommended screening protocol for patients and employees, public health workers have the potential to be exposed to COVID-19 through a variety of sources, including direct interface with the public, other staff members in the workplace, at home, and in other community settings such as stores, restaurants, provider offices and worship centers and other locations. Thus, use of masks and other forms of PPE is critical to decreasing the spread of COVID-19 and other respiratory infections (CDC, 2020). But self-contamination resulting from incorrect PPE use has contributed to infection risk in hospital personnel (Krein et al., 2018). This phenomenon can be seen in other health care settings, where inadequate PPE availability or use increases the risk of infection in employees and patients. The risk imposed by these inadequacies is greater than simple acquisition of the disease. The associated morbidity, particularly for individuals with chronic illness, may result in lost personal revenue and the potential for "super spreader" events may have significant impact on community health.

Purpose Statement

Concerns were noted in the project setting regarding sporadic and inconsistent use of PPE, despite attempts to encourage its usage. Evidence of resistance to continuous face mask use was noted to occur during social situations and during episodes of interpersonal engagement in the office setting. An employee survey conducted revealed the challenge of consistent PPE use among workers. Up to one third of the respondents reported that their workflow was impaired due to COVID-19, and nearly the same number expressed concerns about exposure to COVID-19 in the workplace (Personal communication,

August 10, 2020). Thus, a full understanding of the barriers associated with perceptions of the use of PPE, as well as ongoing educational efforts and reassessment of employee's perceptions, were undertaken by the organization to better understand the nature of the issue from the employees' perspective.

The project addressed an area of dissonance in nursing that has significance and relevance because of the COVID-19 pandemic. Despite the emphasis placed on the use of PPE in educational programs, employee orientation programs, scientific organizations and the media, inconsistent use of PPE remains a challenge and gap-in-practice. The practice-focused question for this project was "To what extent has a comprehensive PPE program positively influenced attitudes and reduced existing barriers to proper use of PPE among public health workers?" Change theory guided the project in understanding the decision-making process regarding use of PPE by defining factors that promote behavioral change (Harrod et al., 2020).

Nature of the Doctoral Project

The project took place in a public health setting comprised of multiple staff positions and levels of functioning, including clerical staff, clinic support staff, nursing staff, and environmental health employees. The public health setting was in a semirural locality with over 500,000 residents and consisted of five separate district locations with more than 100 employees. Residents who use the public health services available have access to preventative services (i.e., immunizations) and other non-medical services, such as retail licenses, death certificates, building permits, onsite (building) inspections, well water testing, and other services.

Observations of staff members revealed disparities in mask use among public health workers, and the anticipated development and distribution of a COVID-19 vaccine via mass vaccination clinics and other vehicles highlighted the need for consistent PPE use. The incident command (IC) management structure instituted early in the pandemic was designed to address the need to rapidly provide disease surveillance, testing, education, and support of community members ("ICS Organizational Structure and Elements," 2018). Within the health department IC structure, a subgroup was assigned the task of mitigating risks to staff members. Subgroup members were involved with surveillance, drafting, and execution of activities to promote safety in the workplace. The team worked in tandem with the administrative directors securing their assent and support to implement measures aimed at ensuring the safety of personnel. A survey was provided to staff members to query them about concerns surrounding COVID-19 and the workplace. Concerns expressed by staff members included difficulty with work due to anxiety and fear of contracting COVID-19, inability to socially distance, inconsistent mask use by customers and colleagues, and casual attitudes regarding the need to use PPE and the severity of COVID-19 infection. This preintervention survey was followed by an educational program and a subsequent postintervention assessment of attitudes and barriers. This project directly impacted staff by evaluating the extent to which the comprehensive PPE campaign addressed their concerns and whether the goal of effective PPE use has been achieved.

The purpose of the project was to provide an overview of an existing QI strategy at the DNP project site to address the barriers to effective use of PPE in the public health

workplace, with the intention of improving compliance. Pre- and post-intervention surveys were developed to obtain qualitative and quantitative data about the pervasiveness of the problem and employee attitudes toward PPE use. Following analysis of the preintervention data, an educational intervention was launched by the site to assess attitudes and to assist in eliminating remaining personal barriers to effective use with the hope of shaping attitudes and improving PPE use. A postintervention questionnaire was then provided to the same cohort of individuals to determine the effectiveness of the intervention. The nature of the DNP project was to perform analysis of qualitative and quantitative data from all phases of the sites QI strategy, and make recommendations to the IC leadership team on the effectiveness of the QI strategy so that future strategies could then be better tailored to the employee group.

A retrospective analysis of the data was performed to evaluate the program that was created to impact employee attitudes and reduce dissonance about the use of PPE. The survey process, education, and re-survey were all part of the organization's existing QI program, which was implemented to enhance the use of PPE among public health workers to reduce the incidence of exposure to respiratory disease, particularly COVID-19. The first survey was conducted to elucidate the staff members' viewpoint on PPE compliance, and attitudinal barriers that prevented full PPE use as appropriate to the job role. The risk factors associated with the employee cohort and their job duties were reviewed to identify contributory factors with the potential to shape attitudes and beliefs about PPE use. An educational tool was implemented at the site to influence those

attitudes and a re-survey conducted to determine if negative attitudes have shifted and if barriers to PPE use had been addressed.

This DNP project retrospective evaluation afforded the opportunity to ascertain the effectiveness of the educational intervention implemented in creating behavioral change. The retrospective analysis was followed by recommendations designed to address any remaining educational deficits, how to prevent the transmission of disease, the potential risks of not wearing a mask, and ways to attenuate risk in the workplace. The retrospective analysis, education program, and follow-up survey were all part of the organization's active QI initiative. The educational intervention was performed using a remote video platform accessible to all employees that provided 5-minute presentations addressing the identified concerns with consistent use of PPE. The DNP project was a retrospective program evaluation to determine the impact of identifying barriers, providing education, and re-surveying attitudes toward PPE, which addresses a gap in practice.

Significance

The project addressed the mutual concerns of several stakeholders at the study site and their desire to ensure employee health and safety. Stakeholders included the organization's corporate administrative team, the local administrative team, employees, and community members. The corporate administrative team and local administrative team had guidelines regarding employee safety that possibly required modification to address current concerns surrounding safety issues encountered by employees. Organizational liability was also a driver for the need to mitigate risk and potential harm.

Employees were also stakeholders and were the central focus of developed programs and protocols to decrease risk. Lastly, community members rely on a healthy, well prepared, and knowledgeable workforce within the organization to provide services. Employees can emulate positive behaviors for family members and the community, and health maintenance and illness prevention using PPE will ensure that the employees are able to serve the community and support the mission of the organization. Investment in the creation of an approach to address a commonly encountered problem with appropriate use of PPE in the workplace may benefit all stakeholders.

Eliminating barriers to the use of PPE also has relevance in other settings. Educational programs with students receiving training in health care disciplines are required to provide information on the purpose and use of PPE in the clinical setting. One academic institution used unfolding case studies as a strategy to incorporate disease transmission and prevention information to students (Tracy & McPherson, 2020). The case studies required students to use critical thinking to identify appropriate implementation of PPE. Potential barriers or challenges were also incorporated into the learning strategy which enhanced learning and concept retention (Tracy & McPherson, 2020). Evidence-based rationales for the use of PPE and acculturation into the realm of working as a health care professional eliminates knowledge-based barriers to PPE use, and improves the development of critical thinking skills necessary for the appropriate use of PPE.

Positive social change is a concept that embodies the purpose for this project. Improving the safety and well-being of public health workers is impactful to many

disciplines and most notably the profession of nursing. Understanding the barriers that inhibit others from choosing to use PPE provides a foundation for nursing interventions to enhance education and awareness in the community. Risks to nurses and health care professionals may be caused by exposure to individuals with respiratory illness who inconsistently use PPE. De-valuation of others and lack of respect for others health and well-being are often overlooked as a potential source of stress faced by health care workers. These ideas are indicative of the need to apply positive social change concepts to address barriers to consistent PPE use. Cultivating respect for oneself and others is inherent to the decision to protect oneself and others. Positive social change will develop from the process of implementing a strategy to educate and elevate an individuals' consideration of others wellbeing and decision to use PPE.

In addition to social change, The Essentials of Doctoral Education for Advanced Nursing Practice document describes the education and leadership necessary to advance change within the profession of nursing, and the ability to have impact on the health care environment using evidence-based practice. (American Association of Colleges of Nursing,2006). The benefit of PPE use in decreasing the spread of infection is a well-known concept. But new approaches to encouraging compliance with use is required to increase the potential for effectiveness in the prevention of disease. Failure to institute interventions to increase compliance may have deleterious effects in the workplace including increased morbidity and potentially mortality associated with the acquisition of COVID-19 infection.

Summary

This project encompassed a retrospective analysis of data collected by the organization, which will be used to develop an educational strategy to increase awareness and compliance with PPE use in the organization. The data summary was provided to the administrative team, and the educational strategy will be performed and culminated in a post-evaluation to determine the effectiveness.

Section 2: Background and Context

Introduction

Barriers to mask use can increase risk factors for disease acquisition. The QI initiative at the site was developed to address the barriers perceived by staff members which were expressed on an employer generated survey. The survey identified that approximately 94% of respondents used masks and internalized the belief that masks were beneficial in preventing the spread of infections. However, a percentage of staff members responded that they believed that mask use was "useless" in preventing COVID-19 (3%), and others responded that mask use was "uncomfortable" (3%). (Personal communication, November 2020). The goal of the comprehensive PPE use program was to change attitudes among the 6% whose attitudes were contrary to relevant science to prevent the spread of COVID-19 to each other and to the public at large. Even a small percentage makes a difference in the spread of this highly contagious disease.

Using the results of the survey, the employer generated an educational intervention that was carried out during scheduled virtual staff meetings and included a brief introduction and demo of the effectiveness of mask use using a disclosing product to demonstrate the protection afforded by using mask. Masks were made accessible to staff members and distribution plans were developed so that staff members were better informed about how to obtain additional masks. The purpose of this DNP project was to evaluate the impact of the campaign on employee attitudes and to determine whether the barriers were addressed, and negative attitudes were changed.

Concepts, models, and theories that clarify the purpose of the project will be presented in the following section. Further, a review of PPE use globally demonstrates the international challenges associated with the use of PPE. This section also addresses benefits, barriers, and strategies to establish the need for PPE, the challenges associated with consistent PPE use, and potential opportunities to address them.

Concepts, Models and Theories

Health care workers, particularly hospital-based workers, comprise an occupational group at high risk for injury (Dressner, 2017). The Office of Occupational Safety and Health (2021) provided guidelines for minimizing risks to employees in the health professions. Employers implement the strategies recommended and provide education and guidance regarding correct use of PPE. But the individual employee must then decide if use of PPE is appropriate or warranted in a particular situation. This concept is congruent with the health belief model (Hodges & Videto, 2011), which postulates that a person's readiness to modify their health behaviors is primarily due to their personal health perceptions. One potential challenge faced by organizations is the variation in individual assessment of risk from employee to employee (Pyrek, 2011), which contributes to inconsistent use of PPE and subsequent increase in employee risk. The employee's individual decision to use or not to use PPE may be largely dictated by perceived risk of exposure. Other barriers to effective and consistent PPE use may be communication difficulties, physical discomfort, fitting difficulties, visual issues, and other concerns (American Public Health Workers Association, 2020). These barriers may pose an even greater challenge than perceived risk because frequently, employees believe

that use of a protective measure "most of the time" equates with reliable protection "all of the time" (Pyrek, 2011).

Use of PPE Globally to Prevent the Spread of COVID-19

Review of available literature sheds light on the various challenges involved with the use of PPE, including personal perception of risk, perception of PPE benefits, educational deficits, and lack of understanding regarding the dynamics of communicable disease transmission. The origins of inadequate use of PPE may differ; however, the outcomes are the same: increased risk for disease acquisition. Understanding how these factors influence PPE use can provide the foundation necessary to develop interventions to address them, thereby improving employee safety.

Barriers

The individual factors that have contributed to inconsistent PPE use include comprehension of the guidelines, the method used to communicate them, managerial support, workplace culture, breadth of training, physical space limitations, access to needed equipment, trust in equipment efficacy, and motivation to provide good patient care (Houghton et al., 2020). Behavioral factors are also known to have an impact on PPE use, which can be impacted by the institutional system's messaging and modeling of appropriate behaviors by those in leadership (Broussard et al., 2020). Another barrier to effective PPE use is concerns surrounding depersonalization imposed by the use of masks such as misinterpretation of communication, the perception of detachment, or the inability to fully express feelings due to limited facial visibility (Reidy et al., 2020). Additionally, researchers have determined gender-related differences in use of PPE, with

females more likely to use PPE consistently, and personal belief is important in the effectiveness of PPE in preventing disease (Clark et al., 2020).

Knowledge deficits may also contribute to inadequate PPE use. Based on a study in Germany, there was a significant difference in the rates of health care workers appropriately donning and doffing of PPE, use of hand hygiene, and respiratory protection when the provider had prior awareness of the patient's COVID-19 status (Neuwirth et al., 2020). In this prospective observational analysis, 127 episodes of care requiring PPE were noted in 87 nurses, 22 physicians, and 18 other health care workers. The observations revealed a higher rate of adherence for COVID-19 units with personnel who were experienced in caring for patients with respiratory tract infections compared to non-COVID-19 units, particularly regarding hand hygiene and donning/doffing of PPE. Further, health care workers' understanding of specific disease entities and absorption in their work may prohibit adequate usage of PPE; thus, providing opportunities to anticipate workflow activities that could result in exposure is a possible solution to the concern of inadequate use of PPE (Harrod et al., 2020).

Assessment of risk imposed by caring for patients with various conditions can also enhance or diminish consistency of PPE use. Greater caution has been exercised in the use of PPE when caring for patients with conditions perceived to have greater potential for pathogenesis (Zaheer et al., 2 020). But despite health care worker awareness of PPE use and preventing the transmission of COVID-19, protocols for specific work situations require greater emphasis to improve adherence (Zaheer et al., 2020). The perception of risk may then dictate the choice to use PPE and types of PPE

used. Research on risk perception in Pakistani health care workers indicated that dental staff members perceived themselves to be at risk (84.2%), whereas only 40% ($n = 48$) doctors considered themselves to be at high risk (Tanveer et al., 2020). Of the physician group, 61% perceived themselves to be at the greatest risk of exposure.

Noncompliance with PPE use may also stem from other causes that are not easily discerned from casual observation. Environments that are supportive of PPE use and have willingness to invest in the task of uncovering barriers to PPE use in the workplace will gain greater understanding about how to foster its use. Less obvious motivators of PPE use include the effect of colleagues' opinions, the effect of patient opinions, personal perceptions, risk appraisal, level of prior experience, risk tolerance, and level of professional education about PPE use (Neo et al., 2012). Thus, a social environment promoting teamwork and collegiality, access to PPE supplies, and the provision of staff education may be all beneficial in promoting consistent use of PPE.

Barriers that result in suboptimal PPE use may be multifactorial and may involve groups, individuals, circumstances, and situations. Individual and interpersonal factors contribute to ineffective PPE use (Broussard et al., 2020; Houghton et al., 2020; Neo et al., 2012; Reidy et al., 2020) as well as knowledge deficits related to disease transmission, use of PPE, and level of risk (Clark et al., 2020; Neuwirth et al., 2020; Tanveer et al., 2020; Zaheer et al., 2020). Behavioral factors have also contributed to ineffective PPE use (Harrod et al., 2020). The barriers identified signal the need for a multifaceted approach to enhancing PPE use that deals with the unique circumstances of the setting in which they occur.

Benefits of Using PPE

Exposure to COVID-19 infection and other respiratory pathogens is a constant concern to health care workers in various settings. Identifying factors contributing to the risk of infection is paramount to the development of strategies to mitigate risk. Masks and other forms of PPE are protective (Xiaoquan et al., 2020), but having appropriately sized and properly fitted PPE is necessary (Gordon & Thompson, 2020). Safe donning and doffing are also emphasized with the recognition that self-contamination can be avoided when proper technique is used. Further, risk stratification should be employed, and PPE should be selected with an understanding of the employee's role, risk profile, and work setting to maximize the potential effectiveness (Bajwa et al., 2020).

The benefit afforded by masks in a variety of different health care settings is well documented. Ogo et al. (2020) performed a systematic review of four databases (CINAHL, Medline, EMCare and Cochrane Library). The results of this analysis demonstrate the benefit of mask use in the surgical suite in preventing exposure to aerosolized contaminants, wound infection, and mucosal exposure to blood borne pathogens. However, the dynamics of communicable disease demands awareness of and compliance with protective measures to mitigate transmission. The *American Journal of Nursing* reported that 30% of individuals with COVID-19 infection were asymptomatic ("The Importance of PPE and Regular Testing," 2020). Colonization of the virus in the pharynx and nares has the potential to transmit infection to patients and others. Use of well-fitting PPE such as face masks has the potential to prevent transmission of respiratory infections like COVID-19.

The benefits of PPE use and their role in the prevention of disease transmission are evident. Gordon and Thompson assert that good fit, donning, and doffing assure the protective benefit of PPE is retained. Knowledge about the benefits of PPE in decreasing potential exposure to pathogens is an important factor for availability and use. The concept of risk stratification and greater emphasis in PPE use for those at highest risk is evident in the research conducted by Bajwa et al. (2020) and Ogo et al. (2020). Understanding the dynamics of disease transmission, determining personal and employee risk, and knowledge of application and removal are all critical factors for evaluating the benefits of PPE use. Strategies that seek to encourage PPE use must incorporate what is currently known about the benefits of consistent and appropriate use.

Strategies

Motivational interviewing to overcome barriers related to hesitancy to use PPE has been demonstrated to be of benefit. Luong Thahn et al. (2016) conducted a retrospective literature review to determine barriers to adequate PPE use in a variety of settings. Notably, studies reviewed did not consistently demonstrate increased compliance with traditional education methods. The authors suggested that motivational interviewing may offer greater influence over employees' consistent use of PPE. Additionally, the authors recommended that additional studies be considered to identify and address the barriers surrounding use of PPE such as perception of health risk, use of various types of PPE and the employers' attitude towards PPE use.

The necessity of PPE use is a component of the foundational training received by health care professionals worldwide. Despite knowledge of the importance of PPE use,

disparities in consistent use remain. Morioka et al. (2020) performed a quantitative analysis of barriers to inconsistent PPE use among Japanese nurses. A sequential, two-stage mixed-methods design was employed, and the researchers noted that knowledge of a patient's confirmed infectious disease diagnosis, and understanding of the communicability of the condition, dictated whether PPE was used consistently. The researchers noted that when the perception of risk of communicability was decreased, consistent PPE use was lower among nursing personnel.

Kavanagh et al. (2020) delve into the multidimensional impact on rates of PPE use for health care workers, and the approach to combatting the spread of COVID-19 in the United States. The authors assert that the national response, belief systems, and the effects on frontline health care workers are important variables in addressing the challenges with stemming the spread of infection.

Addressing anxiety and other interpersonal aspects related to PPE use sheds light on possible barriers that exist. Evidence-based research to support the idea of interpersonal involvement to promote PPE use is in its infancy. According to the qualitative study authored by Castro Sanchez et al. (2021), staff who received assistance from a 'PPE Helper' whose role was to assist with using, donning, and doffing PPE expressed greater positivity about the use of PPE and demonstrated receptivity toward those providing the assistance.

Several concepts emerge when reviewing potential strategies to improve PPE use compliance through the elimination of barriers. Luong Thahn et al. (2016) propose that a motivational interviewing strategy may aide in changing perception of health risk.

Kavanagh et al. came to a similar conclusion and determined that belief systems and the impact on health care workers affect PPE use. Perception of risk was identified as a factor in the research by Morioka et al. (2020) who determined that knowledge of the patients confirmed diagnosis and perception of personal risk highly influenced the choice to don PPE. In addition to personal belief about risk for exposure, anxiety generated from the need to correctly don and doff PPE also have an impact on PPE use. Interpersonal relationships and team member support were highlighted in the research by Castro Sanchez et al. (2021) which demonstrated the benefits of having a "PPE helper" available to provide physical assistance and emotional support with use of PPE. Strategies to eliminate barriers to PPE use may have increased success and benefit if the psychosocial aspects of use are taken into consideration, which could potentially address this gap in nursing practice.

Health Beliefs Model

The Health Belief Model postulates that the motivation for change involves consideration of the following: perceived benefits, perceived barriers, perceived susceptibility, and perceived severity. Consideration of perceived susceptibility and perceived severity work synergistically to generate concern and fear about a particular condition. The feelings of threat to personal health may then instigate consideration of barriers and benefits to behavior change. If the considerations result in a favorable perception, then behavior change will ensue (Hodges & Videto, 2011)

This model addresses the need to develop an assessment tool to gauge employee receptivity to use of PPE /masks and to determine attitudes regarding their use. Providing

masks and PPE without assessing employee readiness and ability to use these devices

will likely result in suboptimal usage which puts personnel at risk for exposure to

respiratory pathogens. The employer chose to disseminate a survey to identify attitudes

toward mask use and following analysis of the results, an educational intervention was

developed to demonstrate the efficacy of mask use in decreasing the spread of respiratory

pathogens. The survey identified that a majority of the employees indicated the belief that

masks were effective in decreasing the risk of acquiring respiratory illnesses, such as

COVID-19, however a percentage of employees still expressed reservations about mask

use. (Personal communication, 2020)

Relevance to Nursing Practice

Appropriate use of PPE including masks, is critical for the protection of health

care personnel. Masks are known to prevent the acquisition of respiratory pathogens and

prevents the spread of these infections to others. Nurses are particularly susceptible to

exposure to upper respiratory pathogens due to their proximity to patients who may be

symptomatic or asymptomatic for a variety of illnesses. Understanding the factors that

affect compliance with mask use has the potential to safeguard health and reduce risks to

the wellbeing of nurses and other health care personnel.

The importance of understanding the impact of social influences on nurses and the

use of PPE cannot be understated (Neo, Edward & Mills, 2012). Nurses are trained to

care using a team approach to provide services to promote wellness. The social impact of

the health care team and work setting may influence the decision to use PPE and the

consistency with which it is used. Social determinants affecting PPE use was highlighted

(Rosenbojm et al. 2015). The study was performed via survey of 1,074 nurses in 45

hospitals to gain greater understanding of the social dynamics contributing to PPE use.

The researchers were able to identify key social determinants (peer influence, motivation

toward good performance, desire for safe practice and beliefs about keeping patients safe)

that were contributors to consistent PPE use (Rosenbojm et al. 2015).

Understanding the benefits of PPE use has been touted as critical to equipment

selection and use during patient care episodes. Other factors emerge that create barriers to

PPE use, such as accessibility concerns. In addition to concerns about access, Nichol et

al. (2013) established that in addition to supply availability, staff support and education

about PPE had the potential to improve its use (Nichol et al., 2013).

Thus, the social determinants (Clark et al, 2020), (Gordon and Thompson, 2020),

Kavenaugh, Pare and Pontus, 2020), educational support (Bajwa et al, 2020), (Broussard

et al. ,2020), (Castro-Sanchez et al., 2021), (Morioka et al., 2020), and personal beliefs

(Harrod et al, 2020), Luong Thahn et al. 2016), (Rozenbojm et al. 2015) and (Tanveer et

al., 2020) may all contribute to the choice to use PPE. Nurses entering the health care

workforce need to witness strong leadership and support for use of engineered safety

devices, PPE, and other health preserving measures. The ability to understand, articulate

and implement measures to protect ones' health is critical for all nurses and health care

personnel at all levels of practice. The present doctoral project addressed a gap in practice

regarding the approach used to assess employee beliefs about use of PPE and the

performance of interventions to enhance its use.

Local Background and Context

The QI initiative took place in a public health district located in a suburban environment comprised of approximately 80 full time personnel filling various roles. The public health setting has multiple staff positions and levels of functioning, including clerical staff, clinic support staff, nursing staff, and environmental health employees. The public health setting is in a semirural locality with over 500,000 residents and consists of five separate locations. Residents who use the public health services available, have access to preventative services (i.e., immunizations) and other non-medical services, such as retail licenses, death certificates, building permits, on site (building) inspections, well water testing and other services.

Observations of staff members revealed disparities in mask use among public health workers. The anticipated development and distribution of a COVID-19 vaccine via mass vaccination clinics and other vehicles, highlights the need for consistent PPE use. The IC management structure instituted early in the pandemic was designed to address the need to rapidly provide disease surveillance, testing, education, and support of community members (ICS Organizational Structure and Elements, 2018). Within the health department IC structure, a subgroup is typically assigned the task of mitigating risks to staff members. Subgroup members are involved with surveillance, drafting of and execution of activities to promote safety in the workplace. The team works in tandem with the administrative directors' securing their assent and support to implement measures aimed at ensuring the safety of personnel. A survey was provided to staff members to query them about concerns surrounding COVID-19 and the workplace.

Concerns expressed by staff members included difficulty with work due to anxiety and fear of contracting COVID-19, inability to socially distance, inconsistent mask use by customers and colleagues, and casual attitudes regarding the need to use PPE and the severity of COVID-19 infection (Personal communication, 2020). This project directly impacted staff by addressing their concerns and achieved the goal of reducing their risk of exposure to COVID-19 infection.

Thus, the purpose of this project was to perform a retrospective review of a previously executed QI strategy at the DNP project site. The goal was to develop a report of the findings for the agency, so that future steps may be taken to address the barriers to effective use of PPE in the public health workplace.

Role of the DNP Student

The role of the DNP student was to evaluate the survey and interventions performed by the organization, and to compare the data obtained to a follow up survey. The intent was to the level of effectiveness of the interventions, and the ability to address the barriers to effective mask use identified in public health workers. I hold an administrative role at the organization; as the DNP student, my role was to perform a retrospective evaluation of the impact of the education and campaign through analysis of the data, and to present a final report to the senior leadership and IC team.

The retrospective program analysis evaluated the survey results for evidence of the concerns expressed by staff members and clarified those factors that were potentially modifiable the organization. Then, the effectiveness of the interventions developed by the organization based on the survey results were evaluated. Lastly, the follow up survey was

reviewed to identify change in behavior or attitudes following the interventions employed by the organization. A report was generated and presented to the organizations leadership team to provide data for future QI initiatives.

Summary

It was anticipated that this retrospective evaluation of the organization's QI initiative would provide insight into the attitudes responsible for employee decisions about mask use. Clarity about the effectiveness of the chosen campaign features were identified and the benefits of the campaign, as relayed by survey respondents was shared with organizational leadership. The evaluative process was used to determine what features of the campaign were most impactful at creating behavioral change within the organization and barriers to consistent PPE use were identified. Thus, it was anticipated that the study would provide additional data for the organization to aid in the future development of improved QI initiatives that address the origin of attitudes regarding the use of PPE.

Section 3: Collection and Analysis of Evidence

Introduction

A retrospective analysis was performed to identify factors contributing to barriers to effective PPE use. I analyzed the intervention provided by a health care organization, which was performed following an assessment of the use of PPE among public health staff members. Organizational leadership initiated the inquiry when it was noted that there was variable compliance with the use of PPE. The organization leadership identified a process for data collection and requested assistance to formulate an action plan to develop an approach to address the problem. Retrospective analysis supported the goal of the organization to improve PPE compliance using previously collected data to craft an intervention strategy. Clarity was gained by the organizational leadership members, which enhanced the planning, implementation, and evaluation that followed the data collection already initiated by the organization. The ability to identify the association between variables and to address the barriers identified in this retrospective analysis, may improve future compliance with PPE use, and decrease the risk of acquiring infectious diseases such as COVID-19. Section 3 will focus on the sources of evidence used for this project.

Practice-Focused Question

The practice-focused question for this project was "To what extent will an educational program influence attitudes and barriers to proper use of PPE among public health workers?" The purpose of this project was to determine what factors in an educational program influenced attitudes and barriers toward the use of PPE. The survey

solicited information from participants to determine motivators and detractors surrounding the use of PPE. For this project, PPE referred primarily to face masks and facial coverings. The project addressed an area of dissonance in nursing that has significance and relevance because of the COVID-19 pandemic. Despite the emphasis placed on the use of PPE in educational programs, employee orientation programs, scientific organizations and the media, inconsistent use of PPE remains a challenge and represents an important gap-in-practice. Change theory has been used to help define what factors promote behavioral change, which may also have utility in understanding the decision-making process regarding use of PPE (Harrod et al., 2020).

Sources of Evidence

Various sources of evidence, starting with the literature, supported the project. Evidence was also collected using the results obtained from an anonymous survey instrument to identify attitudes and beliefs surrounding the use of PPE in the workplace. All results were analyzed to identify the views of participants and to develop a sense of current workplace culture and its impact on the use of PPE.

Published Outcomes and Research

Evidence to support this project was gathered from sources with peer-reviewed research conducted surrounding trends about the use of PPE. CDC, CINAHL, Cochrane Database of Systematic Reviews, PUB MED, and other references were suitable for analysis of the need for the project, clarification of its intent, and its development. This relates to the foundational purpose of the project, which was to elucidate the extent to

which an education program will impact PPE use. The following sources were used

primarily during the investigative phase of the project:

- CINAHL provides and index of nursing and allied health literature.

- The Center for Disease Control and Prevention (CDC) provides disease

  specific data, data about PPE use, infection control and other useful

  information.

- Cochrane database is a compilation of evidence-based research and includes a

  quality rating for the level of evidence provided for the studies published.

- PUB MED provides a searchable data base of national and international

  evidence research articles on a variety of subjects.

The scope of the research reviewed from the sources above was limited to

publications produced within the past 10 years. Ninety percent of the sources used were

published within the past 5 years, with the majority having a publication date of 2020 or

later. The following combinations of terms were used to obtain research data:

- *Nurses*, *beliefs*, *attitudes*, *PPE*

- *Health care workers*, *beliefs*, *attitudes*, *PPE*

- *PPE*, *efficacy nurses*; *PPE*

- *Efficacy*, *health care workers*

- *PPE use*, *PPE barriers*, *PPE beliefs*, *nurses*

- *PPE*, *barriers*, *health care workers*

- *Public health workers*, *PPE*

- *COVID-19*, *PPE use*

- *Masks*, *FPE (Facial Protective Equipment)*, *COVID-19*

Many articles were identified, and the results were evaluated for applicability and pertinence to the project. Detailed and exhaustive selection and review of the research articles was performed, eliminating older articles, literature with a focus on the physical properties of PPE and those that did not address the human element or impact on health care workers. Review of available literature revealed many themes and commonalities with the challenges surrounding appropriate PPE use in a variety of health care settings. Identifying similar issues in the literature demonstrated the potential for the information obtained to be used as a tool for analysis and to aide in the development of an intervention in the project setting. Trends identified in research were contrasted with other similar settings and current practice at the project site. In doing so, the intent of the research, which was to identify the effect of an educational intervention to improve compliance with the use of PPE, was clarified. Interventions that the organization chose to develop and implement in the future could then be customized using the evidence-based data received from the completion of this project, to improve its suitability and efficacy for the organization's workforce.

Archival and Operational Data

Data for analysis generated by the project site was captured by the project site using an anonymous electronic survey consisting of 12 questions. The survey was distributed to identify employee concerns surrounding employee health and safety, COVID-19 infection, its prevention, and its impact on the daily activities of the staff members in a public health setting. Following the preintervention survey, an educational

intervention was performed. The post-intervention survey consisted of twelve questions, identical in content to the preintervention survey, which the organization distributed electronically to the same cohort of employees. (See Appendix A). The organization provided secure access to the project manager for review of the survey results.

Evidence Generated by the Doctoral Project

Following access to operational data, analysis of the survey results, and the interventions took place to identify responses and trends that clarify the beliefs and attitudes of employees at the project site. Inventory of the interventions provided, which included a short video presentation about proper hand hygiene, appropriate PPE use, educational campaigns to highlight the importance of PPE use, were performed. The survey questions, responses and interventions were analyzed to determine the contribution to attitudes about PPE use, as identified on the survey responses. A report was drafted from the review and the findings were presented to the administrative team and IC leadership to support future QI initiatives at the project site.

Participants

The finalized report was provided to key individuals that comprise the leadership team of the project site. The medical director, nurse manager, IC chief, and IC team members, received the finalized report and had an opportunity to review the information, if needed, with the researcher.

Procedures

The program evaluation report was compiled following analysis of operational data collected by the project site as a part of their QI initiative and synthesized to develop

a summary report of findings that were distributed to the leadership team of the organization. The operational data was obtained from the electronic platform, following the receipt of permission from the IRB. Reliability of the instrument used for data collection was ascertained by evaluating a standardized question in the survey that is likely to have a consistent answer over time. Validity of the instrument was confirmed by determining which questions were congruent with expected benchmarks verifiable from other sources, such as past surveys distributed by the project site.

Protections

The Institutional Review Board of the organization was consulted regarding requirements for execution of this project and an application was filed for an expedited research review and exemption. Human subject protections training was completed, as requested by the organization. The organizations IRB agreed to defer to Walden University as the IRB of record, upon receipt of confirmation that the university would act in this capacity. Pending completion of the proposal phase of the project and acceptance by the Doctoral project committee, a request was be made for a conditional approval from the Walden University IRB, approval number 04-14-21-0232784. Documentation of approval and any additional documents required, was then provided to the organizations IRB.

Data was securely obtained from the survey platform used by the project site using the single user log in and password provided. The data were collated and used for analysis. Deidentified, aggregate data were collated, and analyzed to demonstrate trends in beliefs and attitudes surrounding PPE use. The data was password protected and

secured during analysis of the electronic survey and deidentified printed material was

kept in a locked cabinet. Anonymity and confidentiality were strictly preserved, the data

was secured, and not shared or discussed with employees at the project site prior to final

dissemination of project findings. The names of all participants, organization members

and respondents were concealed to preserve anonymity. Narrative information without

identifying features were used as supplemental data, and presented in summarized form

and then incorporated into the report developed for the project sites administrative team.

Analysis and Synthesis

Systems used for data collection and tabulation included the electronic survey

instrument aggregate data with access provided by the project site, Microsoft Office

applications such as Word and Excel. Other digital media were used, such as online

databases to complete literature reviews and analysis. Following verification of data

reliability and validity, secondary statistical analyses were used to identify relevant trends

indicating impact of the educational intervention and campaign and its effect on attitudes

and beliefs surrounding PPE use.

Summary

In summary, current literature demonstrates the complexity of the factors

associated with PPE use in health care workers. Knowledge of the benefits of consistent

use of PPE such as masks, is insufficient to encourage consistency and diligence in the

use of protective equipment. The organization employed a new approach to engage health

care workers, to reduce knowledge deficits, and to enhance the interpersonal engagement

necessary to cultivate the desire for consistent and appropriate PPE use. The remainder of

this study will provide in depth analysis of the effectiveness of the strategies used and

recommendations for future action to address the stated concerns.

Section 4: Findings and Recommendations

Introduction

Inadequate PPE use is a major contributor to health care acquired infections for health care personnel and the clientele they serve. The organization in this study identified concerns with the consistency of facial PPE use in the employees who often face the public and created a plan to address the concerns by distributing a survey to gauge employee practices and beliefs. The organization implemented educational interventions to address the problem, and later, distributed a post intervention survey to determine effectiveness of the educational interventions. The practice-focused question identified asked whether a comprehensive educational intervention would influence attitudes and reduce existing barriers to proper use of PPE among public health workers. Sources of evidence for the project included review of literature from refereed journal articles, websites, such as CDC, databases such as CINAHL, PUB MED, and other publications. Evidence for data analysis was derived from the survey questions and results provided by the organization. The evidence was then analyzed to compare preintervention survey responses to postintervention survey responses. Survey findings were summarized in tabular form, and an excerpt of the narrative results was also generated for review by the organization.

Findings and Implications

Access to the deidentified electronic survey results were provided by the organization, then analyzed using a non-parametric test methodology that was deemed to have the greatest utility for analysis of the data, and the greatest ability to determine the

variance between the preintervention and postintervention responses. There were 44

respondents who completed the preintervention survey and 22 who completed the post

intervention survey for a total of 66 responses. All respondents were exposed to the

educational interventions and campaigns instituted by the organization. All responses

from Questions 1 through 11 represent nominal data and Question 12 provided the

opportunity for narrative response. Inferential statistical analysis was applied using the

Chi square approach, which was chosen due to the ability to clearly identify the presence

of statistically significant findings ($p <.05$) between pre- and post- intervention responses.

The survey analysis included results from all 66 responses and is summarized in

Table 1. The data analysis was performed using a non-parametric test strategy. Responses

were assigned a numerical key (1 for correct/positive answers, 0 for incorrect/negative

answers). The data were imported into SPSS for tabulation and to facilitate interpretation

of the findings. Questions were coded as to correct, or more positive answers with a score

of 1 and incorrect or more negative attitudes with a score of 0. Questions were evaluated

individually, and also aggregated as they were summed across all 11 items, resulting in a

continuous data score ranging from a low of 0 to a high of 11. Higher scores reflect more

knowledge and positive attitudes. Following this, Chi square analysis on the individual

questions was conducted using SPSS v.27 (see Table 1).

Table 1

Preintervention and Postintervention Survey Results

	Pre	% Correct	Post	% Correct	Fisher's Exact *p* value
Q1 Which statement describes your thoughts about Covid-19 infection?	41	93.2	20	90.9	.544
Q2 Please complete the statement, I think that masks…	42	95.5	22	100.0	.441
Q3 True or False: Cloth face coverings and masks…	42	95.5	21	95.5	.711
Q4 Please complete the following statement. Wearing a mask makes me feel…	37	84.1	21	95.5	.178
Q5 Please select one answer to complete this statement: It is highly unlikely that I could spread illnesses, such as COVID-19 to others at work because…	43	97.7	22	100.0	.667
Q6 Do you think that workplace safety has improved in the past 3 to 6 months	34	77.3	18	81.8	.466
Q7 Mask use has been identified as being helpful in preventing the spread of COVID-19. How often do you wear a mask when you are around coworkers at work?	31	70.5	17	77.3	.390
Q8 Please complete the following statement. I feel that it is my responsibility to…	44	100.0	22	100.0	***
Q9 True or false: I believe that I could be infected with COVID-19 and not have any symptoms	40	90.0	20	90.9	.659
Q10 Did you already receive the flu vaccine this year?	36	81.8	17	77.3	.448
Q11 Do you plan to receive the COVID-19 vaccine when it becomes available?	13	29.5	12	54.5	.045

Note. ***No statistics computed. Question 8 is a constant.

The preintervention mean and the postintervention mean scores were 9.1591 and 9.6364, respectively. Scores closer to 11 represent knowledge acquisition and positive attitudes towards the use of PPE, about COVID-19 and vaccination. Although the scores did increase, it was not a statistically significant improvement (see Table 2). The small sample size limited the capacity to see a statistically significant change between the preintervention survey and the post intervention survey responses and perhaps resulted in a Type 2 error.

Table 2

Summed Scores on COVID-19 PPE Use, Knowledge, and Attitudes

	Summed Score	Mann-Whitney U Z score	*p* value
Preintervention	9.15		
Postintervention	9.63	-1.354	.176

Evidence of improvement scores was identified in the responses to several questions (Questions 2, 4, 6, 7 and 11) however, only the responses to Question 11 ("Do you plan to receive the COVID-19 vaccine when it becomes available?) reached statistical significance *(p =*.045). The responses to Question 4 ("Please complete the following statement. Wearing a mask makes me feel…") did not achieve statistical significance, however, the responses demonstrated a change between pre- and post-intervention results (84.1% vs. 95.5%). The change noted in the results for Question 4 allude to an improvement in perception or feelings about the use of facial protective equipment. Overall, evidence of benefit in providing an educational intervention to

emphasize the need for PPE use to prevent transmission of disease in this public health setting was observed. The area of greatest improvement was not directly related to PPE use, but one that holds great importance in preventing the spread of the COVID-19: increased interest in receipt of the COVID-19 vaccine. Pre- and post- survey responses confirmed that employees understood the need to institute protective measures such as masking and hand washing, when to perform them and an understanding of personal responsibility for themselves and others. Greater numbers of employees expressed interest in receipt of the COVID-19 vaccine when made available to them, which demonstrates a positive outcome of the educational interventions presented by the organization.

The narrative portion of the survey (Question 12- "What one suggestion do you have to increase consistent mask use in our workplace? ") was also identified as being of interest to the organizations leadership team. A summary of the pre- and post-intervention narrative remarks, both positive and negative, are listed in Table 2. Strong evidence of empowered communication about concerns and improvements that would benefit the employee unit were evident in the comments and suggestions from both surveys.

Table 3

Open-ended Narrative Responses

	Open-ended Survey Response Examples
Preintervention examples	• "Make sure that employees are wearing a mask, it must also cover your nose to be effective." • "... I am frustrated that it is even an issue that employees are not wearing masks-we are the health department and should be modeling safe practices for the community during this pandemic." • "None, I think we know the drill." • "Frequent reminders, but seriously people should know by now-we are the health department!" • "Some employees do not wear a mask until management comes!" "…mask wearing will not work if other regulations are not followed. My answer is-consistent mask use should align with consistent rules…" "None. At this point in the pandemic if people still refuse to wear a mask around others nothing will get them to."
Postintervention examples	• "Just have everyone be more observant and speak up when someone is not wearing a mask." • "None I think we do a good job now." • "I think it is consistent." • "To explain you are protecting other people's family being safe" • "…. I do not think we should be wishy washy about when masks are required-they are required at all times when at work. Period. This should be especially modeled by anyone in a supervisory/leadership position." • "I think more education is still needed…. Also, I know that we can't force someone to telework, but can there be some kind of consequence or something if people refuse to wear masks?...this is so frustrating when people are still mask-less, and I think they do it because they know that no one will say anything to them." • "TRAINING! There are still employees who do not wear a mask unless management comes."

Additionally, narrative responses on the pre- and post- intervention surveys expressed affirmation and acknowledgement of the employees' attempts to use masks appropriately, and suggestions to address inconsistent mask use. Many narrative responses indicated the need for punitive action and reporting colleagues who failed to use masks consistently. Support and modeling of mask use was requested of the leadership and administration team members.

The survey results suggest that the educational intervention had a positive impact on receipt of COVID-19 vaccination for this cohort of public health employees. Evidence of the project's impact on social change within the organization was clearly importable to other settings, such as other nursing and health organizations, schools of nursing and other health care disciplines, and workplaces unrelated to health care. Implications for project outcomes demonstrated the need for future employee engagement to understand their concerns, and a forum for employees to share suggestions to address their concerns. The administrative team and IC team members expressed interest and surprise at the deidentified responses from the survey and committed to a concrete employee engagement plan.

The agreed-upon plan resulted in an employee newsletter with regularly scheduled distribution and a biweekly video conference meeting for employees to receive safety training, updates and to ask questions to address areas of concern. The project reaffirmed the necessity of intentional, purposeful, and consistent interpersonal communication, to enhance all aspects of the workplace experience, and most notably, the transmission of health and safety messaging to employees.

Recommendations

Recommendations for future projects of this nature and QI initiatives in similar settings would include stratification of employee types and elicitation of more detailed qualitative data from individual employees. Narrative responses were identified as being helpful by the organization's leadership team and were instrumental in informing the researcher which improved analysis of the survey results. This approach provided a

holistic view of employee beliefs and attitudes that would have been difficult to ascertain using a survey with prescribed answers.

Strengths and Limitations of the Project

The project provided some insight into the barriers that inhibited the consistent use of PPE in the project setting. The new campaign instituted by the project site was evaluated for efficacy and its effect on current practices surrounding the use of PPE. An identified strength of the project was the ability to generate organizational interest in QI initiatives that directly target employee health and wellness. Incidentally, the organization's leadership team reported that the project appeared to increase employee morale, employee awareness, and interpersonal communication, which in sum appeared to alleviate situational stress in the workplace caused by COVID-19 mitigation efforts. Evidence of this was also seen within the narrative responses to the survey. These strengths have the potential to have longer lasting impact than the currently required annual computer modules about infection prevention, which are currently used by the organization.

Limitations of the study include the size of the study population, question type, and limited ability for more expansive responses. The survey question response options were developed following casual interactions with staff members and were not standardized, thus the use of the tool in other settings would be limited. The strategy and line of questioning is believed to be of use for this organization and others that desire to identify barriers to consistent protective behaviors. The ability to obtain data and to generate motivation to complete surveys presented a challenge in this setting and was

demonstrated by the decrease in the number of respondents noted on the post survey. Consideration of the effect of seasonal and holiday closures, and competing responsibilities due to the COVID-19 pandemic, are also believed to have caused the less robust response to the post intervention survey.

Evaluation of research is an essential and continuous process that is critical to the importation of useful data that will aide in the creation of better evidence-based guidance, improved processes, and improved care. For the chosen project, it is suggested that translation of acquired evidence-based data from evaluation of the research be used to craft a RCPI or Rapid Cycle Performance Improvement QI initiative. RCPI assumes that an individual or organization has the knowledge base necessary to improve performance and requires enhanced motivation to make, sustain and evaluate to effectiveness of change (White et al., 2016, p. 171). The organization is expected to have greater success with introducing the need for change within the organization, when the knowledge base of its members is acknowledged, while simultaneously encouraging execution of and consistency with performance of desired personal protective behaviors.

Additional strengths and limitations of my chosen approach for evaluation of the project is the increased time necessary for data analysis and the ability to identify other interim variables that might affect the responses on the post intervention survey. The effect of these potential variables will be a matter for consideration; however, it is not anticipated that they would have a significant impact on the research results or the development of future QI initiatives for the organization.

Section 5: Dissemination Plan

The data collected from the project was disseminated to the organization's

administrative team and staff members. Plans for more widespread dissemination are

under consideration at local and national professional organization conferences and local

educational institutions. The project and resulting data have demonstrated the need to

address barriers to effective PPE use in public health and other settings. Developing a

plan to share the study findings could have significant benefit to a larger audience and in

a variety of different occupational settings and circumstances.

Analysis of Self

Completion of this project enhanced my confidence in the ability to work in a

health care system to promote evidence-based change. The greater societal good was a

common theme that began to emerge, and the understanding of my moral imperative as a

provider, clinician, and member of the profession of nursing increased. The ability to

positively impact nurses and other health care workers and to be a source of

encouragement and inspiration are extremely important to me. My nursing career began

over 30 years ago, and when I consider the experiences that I have gained and the lives

that I have been privileged to care for, I am humbled and grateful. I also recognize my

responsibility to continue to give the best, and most current evidence-based care possible,

and to prepare future generations of nursing professionals to do the same. The execution

of this project provided a reminder of the reason that I entered the profession of nursing;

to serve, to heal and to care well for others. My long-term goals following completion of

this project are to become an educator and to continue motivating nursing professionals

by reminding them to hold in highest esteem, the unique privilege that our profession afford us. Challenges and changes are difficult but will surely make us better!

There were many insights that emerged from this project, the first being the need for systematic analyses of basic practices foundational to nursing. The need to keep pace with the technological advances in care and documentation have caused many nursing professionals' attention to be diverted away from basic nursing practice principles. Hand hygiene, infection prevention, optimization of wellness via cleanliness, good hydration, good nutrition, and spiritual, and emotional health are all important to nurses' and patients' well-being. Considering this, I reflected on the future use of the data collected to benefit the organization. The first step in the process would be to "start at the end" with evaluation by completing a post-intervention survey follow-up consisting of a focus group to determine what information was retained, and what attitudes and beliefs changed following the educational intervention. The focus group could identify areas that require addition review and reinforcement of principles shared during the educational intervention. The benefit of this approach is the ability to use the project data and the dialogue from the focus group to develop future educational projects. The focus group could also have direct involvement with future projects, which may improve the commitment of the staff members to promoting and continuing positive social and behavioral change within the organization.

Summary

Barriers to effective PPE use with nurses and health care workers is a modifiable risk that can be addressed with planning by health care organizations. Assessing attitudes,

beliefs, and other barriers to consistent PPE use among health care workers is critical to

the development of a sustainable solution that is both impactful and capable of being an

intrinsic feature of a health care organizations culture. Addressing barriers to the effective

use of PPE will improve workplace safety and enhance the well-being of nurses, public

health workers, and health care personnel in all settings. Additional projects are needed to

identify the factors that contribute to suboptimal PPE use and holds potential to promote

a culture of safety and positive social change within the profession of nursing and other

health care disciplines.

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Appendix A: Educational Program and Campaign Overview

The following campaigns were performed for the organization's employee cohort following the preintervention survey to improve compliance with PPE use, handwashing/hand sanitization and to encourage consideration of receipt of the COVID-19 vaccine.

- Cloth mask/ cloth face covering design contest

- A contest for successful daily health screenings form completion.

- Staff training using narrated power point about the importance of handwashing and PPE use.

- A contest involving the production of a staff directed, performed, and recorded music video championing PPE use, hand washing and the COVID-19 vaccine.

Appendix B: Pre- and Post-survey

Incident Command Employee Health, Safety and Mask Use Survey

Hello_____ team members,

This survey was created to learn more about employee mask use. Please answer all questions

honestly and to the best of your ability. The information that you share will be treated

confidentially and only aggregate data will be shared so that anonymity is protected. We will use

the information collected to develop an activity to benefit our employee health initiatives. Thank

you in advance for your help in making _____the best place to work at _____!

1. Which statements describe your thoughts about COVID-19 infection? Select all that apply:
   o COVID-19 is just like getting the flu.
   o COVID-19 is a serious illness that can cause severe illness.
   o COVID-19 only causes severe illness in people who are elderly or have other illnesses, like diabetes.
   o COVID-19 can cause chronic medical problems.
   o COVID-19 will 'disappear' from our community, if given enough time
   o Eventually everyone will catch COVID, so it is best to catch it early.
   o A person can only catch COVID-19 once in a lifetime.

2. Please complete this statement. Select all that apply I think that masks...

   o are useless in preventing the spread of COVID-19 infection.
   o are easy to use.
   o are uncomfortable.
   o prevent me from expressing myself clearly.
   o keep me from spreading COVID-19 to others.
   o violate my personal rights.
   o make it difficult do my job effectively.
   o are only effective in preventing the spread of COVID-19.
   o are safe, effective to use and prevents the spread of COVID-19 and other respiratory illnesses.
   o may offend or be offensive to others.
   o makes others feel that you do not trust them.
   o makes others feel that you think they are sick.

3. True or false: Cloth face coverings and masks are effective at preventing the spread of COVID-19
   o True
   o False

4. Please complete the following statement. Select all that apply: Wearing a mask makes me feel...
- o Safe
- o Foolish
- o Scared
- o Happy
- o Sick
- o Worried/Anxious
- o Good
- o Important

5. Please select one answer to complete this statement: It is highly unlikely that I could spread illnesses, such as COVID-19 to others at work because...
- o I always wear a mask around others.
- o I always stay home if I am feeling ill.
- o I always wash/sanitize my hands frequently during the day.
- o I always clean commonly used surfaces with disinfectant during the day.
- o I never put a mask that I have been wearing on a commonly used surface.
- o I immediately know when I am sick, and I always avoid being around others when I am sick.
- o I always stay at least 6 feet away from others when I am talking to them, even when I wear a mask.
- o I always sanitize my hands after removing my mask AND before and after putting it back on again.
- o I always wash my reusable mask everyday OR discard my used disposable mask when my workday ends.

6. _____ strives to provide a safe work environment for all employees. Do you feel that workplace safety has improved during the past three to six months? (ex-plexiglass barriers, employee screening, PPE availability, modified work schedules, scheduled patient visits)
- o Yes
- o No

7. Mask use has been identified as being helpful in preventing the spread of COVID-19. How often do you wear a mask when you are around coworkers at work?
- o All of the time- I always wears a mask, even if I am 6 feet or more away from others.
- o Some of the time-I occasionally remove my mask in the presence of others for brief periods (when talking with them)
- o Never -I choose not to wear a mask due to discomfort or other reasons.
- o I remove my mask during meals and when eating or drinking in the presence of others.
- o I remove my mask when speaking to others so that I can be heard more clearly.
- o I remove my mask in the presence of others when I am feeling hot or having difficulty breathing.

8. Please complete the following statement. Select all that apply I feel that it is my responsibility to_____

- o   Wear a mask to prevent the spread of COVID-19 and other respiratory infections.
- o   Protect myself, my family and others from COVID-19.
- o   Report illness or positive COVID-19 results to my employer
- o   Obtain masks and other protective supplies for my personal use while at work.
- o   Notify someone if masks, protective equipment or other necessary supplies tissue, sanitizer) are running low.
- o   Say something if I notice others not doing their part to prevent the spread of COVID-19.
- o   Other _____

19. True or false: I believe that I could be infected with COVID-19 and not have any symptoms.
10. ____encourages eligible employees to receive the influenza vaccine each year. Did you already receive the influenza vaccine this year? If not or if undecided, why?
- o   Yes
- o   No
- o   Comments_____

11. A COVID-19 vaccine will be available soon. Do you plan to receive the COVID-19 vaccine when it becomes available? If not or if undecided, why?
o   Yes
o   No
o   Comments_____

12. What one suggestion do you have to increase consistent mask use in our workplace? (ex-employee health, safety, training)?