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Weight Management in a Rural Community: Creative Strategies to Improve Patient Outcomes

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Abstract

Aim

To assess if incorporation of weight management education and resources in the electronic health record of a rural community clinic and the utilization of these resources for a patient-provider goal setting conversation has any effects on patient outcomes.

Background

Obesity continues to be a global epidemic whose effects can be seen in patient outcomes, health systems, and global health expenditure. The effects of obesity do not affect all populations the same. Rural populations have additional obstacles that make weight management more difficult.

Design

An evidence-based quality improvement project approach was developed.

Methods

A total of five patients were recruited in a community clinic in rural western Virginia. Utilizing the electronic health record, baseline weight, body mass index, and demographic information was obtained. Post-intervention data was collected at approximately three months and analyzed using a paired sample t-test.

Results

There was no statistically significant decrease in body mass index or weight at three months post-intervention. However, in a post-intervention survey all participants found the intervention helpful. Potential factors contributing to the null findings include small sample size and several participants were unable to follow up in person due to the COVID-19 pandemic.

Conclusion

The incorporation of resources and educational information into the EHR and a patient-provider conversation were found to be helpful by the patients in their weight management journey. Patients in rural settings need resources specific to their population and barriers to weight loss. The utilization of the EHR can aid providers in having resources at their disposal, and future options may include telehealth coaching.

Relevance to clinical practice

Understanding the unique obstacles overweight and obese patients in rural settings face is important for tailoring interventions to their specific needs. Providers must come up with creative solutions to address their patients weight management goals.

Keywords

Obesity, overweight, rural, electronic health record, patient-provider relationship, body mass index, weight

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Outcomes

It has been just over two decades since the World Health Organization released their report, *Obesity: Preventing and Managing a Global Epidemic*, in which they discussed the toll obesity is having on the global population (2000). Fast forward 20 years to our current healthcare landscape and we can see that obesity continues to be a pressing health problem affecting all ages, genders, and socioeconomic statuses. Obesity as a disease does not discriminate based on any of the aforementioned factors, yet prevention and management of the disease are more difficult in communities with limited access to resources and medical care, as seen in rural communities.

Definitions of obesity vary between organizations and in brevity. The World Health Organization defines obesity simply as the "abnormal or excessive fat accumulation that presents a risk to health" (World Health Organization [WHO], n.d., para. 1). The Obesity Medicine Association, however, defines obesity as a "chronic, relapsing, multi-factorial, neurobehavioral disease, wherein an increase in body fat promotes adipose tissue dysfunction and abnormal fat mass physical forces, resulting in adverse metabolic, biochemical and psychosocial health consequences" (Obesity Medicine Association [OMA], n.d., "What is Obesity" section). Regardless of definition, one thing all organizations can agree on is the propensity sufferers of obesity have towards the development of negative health outcomes.

According to the Centers for Disease Control, obesity increases an individual's risk for hypertension (HTN), hyperlipidemia, coronary artery disease (CAD), stroke, sleep apnea, and even some cancers (Centers for Disease Control [CDC], 2015). The serious, if not fatal, consequences of these diseases can leave lasting effects on the affected individuals and their families, and this does not account for the psychological and emotional impact on health. Stigma

and misunderstanding surrounding obesity places patients at an increased risk of developing

depression and other mental health issues. The American Medical Association's 2013 decision to

identify obesity as a disease helped to dispel much of the stigma surrounding the illness, and

recognized that complex factors, such as environment and economics, also play a role in its

development (OMA, n.d.).

People that live in rural parts of the world face complex external barriers to living a

healthy life. Geography, food insecurity, and poverty influence the decisions they make about

their own health. For members of this vulnerable population, it is not as simple as cooking

healthy, getting regular exercise, or tracking calories. Making healthy lifestyle choices is made

more difficult when patients have limited access to resources and care. Equipped with the right

knowledge and tools these patients can empower themselves and their community to make better

decisions with the resources that are available, and possibly discover resources they did not

know they had. Rural providers must get creative and think outside the box to provide reasonable

and realistic weight management solutions to their patient population.

Background

To understand the significance of obesity on the health outcomes of rural populations it

helps to take a closer look at demographics of who it affects. A closer look at how obesity affects

populations shows that its effects across varying socioeconomic communities are not the same.

Obesity's impact is not dictated by determinants such as gender or education level, yet it is hard

to deny that the effects it has on underserved communities is more detrimental. Terms such as

the diabetes belt or the stroke belt are now used to describe parts of the United States (U.S.),

primarily in the Southern U.S., where strokes and diabetes, two illness with a link to obesity, are

more prevalent.

The WHO claims that rates of obesity have tripled in the last four decades, with approximately 1.9 billion adults classified as overweight, and of those 650 million are obese (WHO, 2018). In the U.S. nearly 40% of the population in 2016 was obese (CDC, 2018). Tremmel et al. (2017) note that the incidence of obesity is upwards of 30% of the global population. According to findings from the 2016 Behavioral Risk Factor Surveillance Survey (BRFSS), rates of obesity in rural communities (34.3%) are higher than in metropolitan communities (28.7%) (CDC, 2018a).

A rise in obesity ensures a rise in comorbidities like hypertension, diabetes, coronary artery disease, and stroke. Comorbidities linked to obesity place a burden on the health of individuals, but also healthcare systems, community, and national economies. Complications related to obesity can place an enormous amount of strain on individual and global economies. For individuals it may mean time off work and increased medical spending. Nations experience increased medical expenditure to care for the medical needs of this population. The CDC estimated that 2008 medical expenditure for obesity in the U.S. was $147 billion (CDC, 2018). Katzmarzyk and Janssen (2004) estimate Canada's yearly expenditure at $4.3 billion CAD. These numbers are just an example of the toll obesity takes on economies. Reducing the rates of overweight and obesity would result in subsequent decrease in healthcare spending.

Calculating health spending related to obesity is difficult because it is usually the comorbidities associated with obesity that are the reasons why people seek medical care. According to Stagnitti (2009), in 2001 health spending for individuals with a BMI $\geq$ 30 was approximately $167 billion and nearly $202 billion for overweight individuals. Spending between 2001 and 2006 for overweight and obese individuals increased by 36.3 percent and 81.8 percent. Numbers for small, rural hospitals and clinics are harder to obtain.

Historically being overweight was associated with prosperity and abundance. It was a disease that was mostly associated with high-income countries, but today numbers are on the rise even in developing countries, leaving these vulnerable populations to deal with the "double burden of disease" (WHO, 2021, para. 1). Double burden describes the compounding effect that noncommunicable diseases have on underserved, at-risk communities. These are communities that are already at risk of suffering from adverse health outcomes made worse by socioeconomic factors such as decreased access to health insurance, healthcare, and increase risk behavior. The United States is a developed country with a large obese population, but even within our own country obesity does not affect the entire population the same. The CDC notes that obesity is less prevalent in those with a college education and in the highest income group (CDC, 2018b).

These population-level differences in health outcomes can be attributed to health disparities. Healthy People 2020 define health disparities as differences in health outcomes that are associated with "social, economic, and/or environmental disadvantage" (HealthyPeople.gov, 2020, para. 5). Healthy People 2020 further notes that a determinant, such as geography, can have an impact on an individual's health outcomes. Where you live can affect your access to providers, healthcare facilities, and resources like affordable food or weight management programs. My focus for the purposes of this project are the health outcomes of a rural population and how obesity affects this vulnerable population.

Data from the U.S. Census Bureau (USCB) indicate that approximately 60 million, or nearly 20% of the U.S. population live in rural areas (U.S. Census Bureau, 2020). The USCB (2020) describes rural areas as "sparsely populated, have low housing density, and are far from urban centers" (para. 2). The United States Department of Agriculture note that poverty rates in 2017 for rural areas was 16.4% and unemployment rates were 4.4% (USDA, 2018). Although

these numbers seem low, the relative density of the population suggests that a large part of this population live in poverty.

Many rural areas are classified as medically underserved. This designation identifies parts of the country with limited access to primary care services and is calculated by the Index of Medical Underservice (IMU) (Health Resources & Services Administration [HRSA], 2019). The IMU is a calculation based on population to provider ratio, percentage of population that lives below federal poverty level, infant mortality rate, and percentage of population over the age of 65 (HRSA, 2019). For people living in these areas, accessing medical care can be a difficult undertaking.

These communities face the "double burden of disease" as described by the WHO. Not only are they faced with health problems like obesity and its comorbidities, but they also are at increased risk of drug abuse and negative infant and maternal health outcomes. Socioeconomic status and geography place them at increased risk of negative health outcomes. For members of this population, the already difficult road to overcoming obesity is made even more difficult due to lack of resources such as medical care and adequate food options. These negative health outcomes affect the health of these populations, but also the collective health of our nation.

The Health Wagon is a nonprofit organization based in Wise, VA that provides health care to a rural, low income, underserved communities. It is comprised of two stationary clinics and three mobile health units. In addition to providing primary care, the Health Wagon also offers access to specialties such as pulmonology, cardiology, endocrinology, and dermatology. For patients living in this rural community, many whom are under- or uninsured, having access to specialized care saves them from having to travel hundreds of miles just to reach a specialist-something which may deter or defer care.

The Health Wagon and its mobile units serve thirteen rural counties in western Virginia including: Buchanan, Dickenson, Russell, Lee, Scott, and Wise Counties (Health Wagon, 2019). Providers at the Health Wagon served more than 4,000 patients for the 2018 fiscal year, with just over 40% of those served living on incomes less than 200% of the federal poverty rate (Health Wagon, 2019). According to the Health Resources and Services Administration (HRSA), all the counties served by the Health Wagon are considered Health Professional Shortage Areas (HPSA) (HRSA, 2019).

The statistics stated above place the residents of these counties at an increased risk of poor health outcomes simply because of where they live. It is not surprising that statistics for these counties show poor health outcomes for their residents. America's Health Rankings (2020) ranks Virginia as 25th in the nation with an obesity rate of 31.9%. Obesity rates for 13 rural counties in VA are between 30% and 38% (County Health Rankings and Roadmaps [CHRR], 2020a). The counties served by the Health Wagon rank lowest in health outcomes compared to the rest of the state of Virginia (CHRR, 2020a). Obesity rates for Wise and its surrounding counties are approximately 35% of the population, compared to the rest of Virginia at 30% (CHRR, 2020b).

Rationale

The intended evidence-based practice (EBP) model for project implementation is the revised Model for Evidence-Based Practice Change. The model was revised by authors from the original Model for Change to Evidence-Based Practice to move away from the idea that change is a singular event (Larrabee, 2008). Instead, the author wanted to emphasize that the model can be utilized for numerous practice change projects.

Steps of this model are: "1) assess the need for change in practice, 2) locate the best evidence, 3) critically analyze the evidence, 4) design practice change, 5) implement and

evaluate change in practice, and 6) integrate and maintain change in practice" (Melnyk et al., 2010, p. 52-3). Steps of this EBP model closely align with the Doctor of Nursing Practice curriculum. A closer look at the individual steps help provide the rationale for the selection of this model of EBP for this project.

Step one involved identifying the problem or need for practice change. In the case of the Health Wagon, the need identified was an intervention to help deal with obesity in the community. Step two involved locating the best evidence for dealing with the problem of obesity specific to low resource rural populations. Critical appraisal of the evidence, step three, was done through the Johns Hopkins Nursing Evidence-Based Practice model critical appraisal tools. The design of the practice change project, the fourth step, involves collaboration between the DNP student and the Health Wagon team to ensure successful implementation. The model's fifth step involves determining the success of a project or improvements needed after implementation by collecting data to determine if the patient's experience the desired outcome, in this case adherence to weight loss or weight maintenance goals, and provider utilization of the EHR tool. The sixth, and final step of the change model, includes the incorporation of the practice change into regular practice. It is possible that several trial-and-error cycles are necessary prior to this final step.

An initial meeting with leaders at the Health Wagon helped to determine what the desired practice change would be, in this case to provide patients and providers feasible weight management tools specific to the community. Obesity is not a new topic in healthcare; therefore, finding information and resources on obesity has not been difficult. The abundance of information has made it difficult to critique and analyze all the resources available, requiring a solid PICOT question and refined search strategy to not get lost in the evidence.

Utilizing the interests expressed by leaders of the Health Wagon and the evidence found, the DNP student designed the plan for practice change. Key components of the practice change project were community and educational resources, incorporation of resources into EHR and provider workflow, and a self-monitoring method between appointments. Evaluation of the practice change was through a comparison of retrospective patient data and post-intervention outcome data. Data of interest included provider utilization of education, patient body mass index (BMI), or waist circumference (WC) at baseline and 3 months after intervention, an existing diagnosis of obesity, and patient response to the tool and intervention (see Table 8). BMI measures a person's weight by their height as a possible indicator of percent body fat. Although not always accurate- for example in the case of a tall, muscular football player- it is the gold standard for diagnosing obesity. To increase accuracy, WC is also considered to determine abdominal, or visceral, adiposity- an indicator of obesity.

Literature Search Strategy

A search of the literature was performed through the databases PubMed, the Cumulative Index of Nursing and Allied Health Literature (CINAHL), and the Cochrane Library. Databases were searched for the purposes of obtaining information towards the PICOT question. Research subject librarians at the University of Tennessee-Knoxville were consulted to initiate and strengthen the search strategy. Keywords, Boolean connectors, and MESH terms were used throughout the search. Keywords used for the first recommendation included (diagnos* OR screen* OR evaluat* OR assess* OR identif* OR test* OR measure* OR decis* OR decid*) AND (obes* OR overweigh* OR body mass index* OR BMI* OR waist circum* OR weigh*) AND (adult*) AND (United States* OR USA*). Keywords used for the second recommendation included (obesity* OR overweigh* OR body mass index OR waist circumference OR obese* OR

BMI* OR WC* OR weigh*) AND (guideline* OR protocol* OR method* OR criteria OR

procedure* OR select* OR goal) AND (adults) AND United States.

Search limits included: 1) English-language 2) between years 2001 to 2020 3) age range

of adults greater than18 years of age, and 4) United States. Initial results for the first

recommendation generated 749 articles on PubMed, 0 reviews on Cochrane, and 149 on

CINAHL. Despite the use of a less restrictive search, the Cochrane Library yielded no results.

After removing duplicates, 574 records remained of which 428 were removed for factors such as:

1) did not discuss elements of PICOT question, 2) not within defined search limits, 3) elements

of PICOT question discussed were inapplicable to proposed project components, and 4) unable

to obtain full-text article. Abstracts for the remaining 146 articles were reviewed, and

approximately 89 full-text articles were reviewed. Inclusion criteria for recommendation one

included: 1) screening for overweight and obesity in primary care setting, 2) screening for

overweight and obesity in adults (age 18 or older), 3) screening in United States. Inclusion

criteria for recommendation two included: 1) guidelines/protocols utilized in primary care

setting, 2) primary care setting located in the United States. The search process can be

summarized through the PRISMA diagram in Figure 1.

Critical Appraisal of the Literature

A critical appraisal of the evidence requires a systematic approach to evaluate a study to

determine the validity, reliability, and applicability (Melnyk, 2011). Validity refers to how close

the study is to the truth, reliability refers to a study's ability to produce the same or similar

results if repeated using the same research method, and applicability refers to how the study in

question can be applied to the population of interest (Melnyk & Fineout-Overholt, 2019). This is

a crucial step in the evidence-based practice model because it gives weight to the evidence for

practice change, therefore enhancing factors such as organizational buy-in and improved patient outcomes.

Critical Appraisal of Research Evidence

Critical appraisal of research evidence was performed using the Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) guidelines and tools. These tools and guidelines aided in the assignment of a level of evidence, a quality rating, and a strength of recommendation to each study examined (See Appendix A). The JHNEBP tool was used to critically appraise each qualitative or quantitative research study, resulting in a level and grade of evidence (see Appendix B). Each research study that met inclusion criteria was appraised using this tool.

Critical Appraisal of Non-Research Evidence

Critical appraisal of non-research evidence was performed using the Johns Hopkins Nursing Evidence-Based Practice Non-Research Evidence Appraisal Tool (see Appendix C). In addition to the JHNEBP tool, non-research evidence was appraised through tools such as the Appraisal of Guidelines for Research and Evaluation (AGREE II) instrument. The AGREE II instrument was used to appraise evidence such as clinical practice guidelines. As Melnyk & Fineout-Overholt (2019) point out, clinical practice guidelines aid in strengthening research evidence because they are the result of systematic reviews performed by expert panels, such as the United States Preventative Services Task Force.

Synthesis of the Evidence

Research Evidence

According to most of the research evidence patient screening for overweight and obesity should include measurement of body mass index (BMI) and can be enhanced with an

anthropometric measure of visceral fat, such as waist circumference or waist-to-hip ratio. The

research synthesized utilized BMI to diagnose overweight or obesity, and only some combined

BMI measurements with waist circumference (Table 1). Therefore, BMI is the most frequently

used and easiest form of diagnosing obesity in a primary care setting. Incorporating a

measurement of visceral fat may be beneficial as well due to the fact that there is evidence to

support a correlation between abdominal adiposity and diseases such as Type 2 Diabetes,

Coronary Artery Disease, and hypertension (Schneider et al., 2007).

Components of an electronic health record (EHR) template geared toward weight

management varied between studies appraised (Table 2). All studies incorporated Nutrition/Diet

and Referral/Resource information into their EHR template, while some included physical

activity and goal setting as components of the EHR template. Only one study discussed a change

in patient outcomes. The Health Wagon expressed a desire for the DNP student to create an

easily accessible resource that could be given to patients to let them know about community

resources that can aid in helping them meet their weight loss goals. Seeing as how resources

were a component in all the EHR's of the studies appraised, it is likely that incorporating this

into the EHR of the Health Wagon would help the patient population.

Clinical Expertise or Non-Research Evidence

Incorporating clinical expertise and non-research evidence is an important component of

the evidence-based practice model. All three components- research evidence, clinical expertise,

and patient preferences- complement each other to make the evidence-based practice change

recommendations stronger. Organizations like as the United States Preventative Services Task

Force (USPSTF), the Obesity Medicine Association (OMA), the American Medical Association

(AMA), and the Centers for Disease Control and Prevention (CDC) are just a few of the

organizations that have statements regarding the treatment of obesity in healthcare, in particular regarding preventative care.

The USPSTF lends valuable information towards making a practice change. The USPSTF is an "independent, volunteer panel of national experts in prevention and evidence-based medicine" that work to "improve the health of all Americans by making evidence-based recommendations" (United States Preventative Services Task Force [USPSTF], n.d., para 1). A letter grade is assigned to each recommendation based on the results of a rigorous systematic evaluation of available evidence, and considers the risks and benefits of the preventative service in question (USPSTF, n.d.). In 2018 the USPSTF released its recommendation statement regarding weight loss counseling to prevent obesity-related morbidity and mortality with an assigned grade of a B. A letter grade of a B indicates that the USPSTF recommends with a high level of certainty that there would be a benefit to providing the preventative service, and its subsequent suggestion for practice is to "offer or provide this service" (Curry et al. 2018, p. 1163).

Additional resources such as the American Association of Nurse Practitioners and the American Medical Association offer insight and guidelines for practitioners in a primary care setting when dealing with patients who are overweight or obese. Many of these recommendations are rooted in patient preference and values with the goal of improving patient outcomes. An example of this is the OMA's definition of obesity as a chronic disease to reduce the bias and stigma that surround the disease and its sufferers (Obesity Medicine Association [OMA], 2020). Stigma and bias reduce positive patient outcomes, and a patient-centered approach is necessary to ensure successful and sustainable outcomes.

Taking patient preferences and values into account is important when dealing with vulnerable populations such as the population served by the Health Wagon. Recommendations that work in one population may not be suitable to others. Patients of the Health Wagon are dealing with the challenges of living in a food desert, poverty, limited access to care, and limited access to technology. Recommending an internet-based weight loss program would isolate those in this population who do not have internet, for example. Evidence suggests that incorporating resources that are easily accessible to patients leads to improved patient outcomes. In addition, creative solutions such as intermittent fasting may be feasible in this population as it would not incur any additional costs or incorporate difficult to access foods.

In summation, it is important to create a program whose benefits are accessible to all patients regardless of circumstance. Not all patient preferences are the same, and what may work for one may not work for another. Like what one may be willing to try may too difficult or out of reach for another patient. Organizations such as the National Rural Health Association can provide insight into how to modify general recommendations and guidelines to better serve rural populations.

Recommendation for Practice Change Based on Evidence

The critical appraisal and synthesis of the literature support the Health Wagon's current practice of screening for obesity with the use of the anthropometric measures of BMI and weight. Further data was necessary to determine if screening and monitoring continued and at what intervals after initial diagnosis. Access to the EHR helped gain more insight into this aspect of current practice. Additionally, evidence suggests that often patients who are overweight or obese do not receive a diagnosis on the EHR. Retrospective data can provide details regarding screening frequency and diagnosis.

Once the patient is diagnosed as overweight or obese, evidence supports the use of an EHR template to make information more accessible to the provider, and subsequently, the patient. Components to include into the EHR include information regarding diet/nutrition, community resources, and physical activity. A survey of the community served is necessary to compile a patient and provider-friendly document outlining the resources available to patients. It is the recommendation of the DNP student that these components be incorporated into the EHR at the Health Wagon (Table 3).

Specific Aims

The purpose of this project was to incorporate evidence-based weight management guidelines, education, and community resources into the electronic health record (EHR) used by providers at the Health Wagon. An additional aim of this project was to give patients creative and easy solutions for self-monitoring and remote weight management with the eventual possibility of EHR interface, thus allowing providers to track patient progress between appointments. Evidence-based research shows that patients tend to show increased progress towards health-related goals when they can monitor their progress and receive feedback between visits (Steinberg et al., 2013).

The COVID-19 pandemic has resulted in innovations in telehealth and remote health monitoring, thereby making connections with patients between appointments easier. Patients with obesity are more likely to suffer the worst outcomes if they contract COVID-19. Lessons from this pandemic can help tailor programs to help this population. Leaders and providers at the Health Wagon indicated that obesity was a major problem in their community and that they were interested in developing a way to make education and resources more accessible to their patients.

The aim of this project is to provide patients of the Health Wagon with easy-to-use weight

management skills and the tools to take control of their health.

Methods

Screening

Patients of the Health Wagon were routinely screened for obesity as part of the Heart

Health 1,2,3 program. BMI and weight were recorded for patients along with the rest of their

vital signs, and this data was used to identify overweight and obese patients. The Health

Wagon's method for screening for obesity adheres to recommendations found within the

literature and expert recommendations, as previously mentioned. Under normal circumstances

follow up after initial screening occurs at three-month intervals, however, due to the COVID-19

pandemic some clinics were unable to see patients in-person at this frequency (Health Wagon,

n.d.). Due to the COVID-19 pandemic, the community counterpart was only able to recruit 5

participants.

Intervention Process and Timeline

Identification of patients that would benefit from this intervention was facilitated by the

EHR, and the community counterpart. Once the patient was identified, the patient presented to

the clinic for their appointment and had their current vitals, weight, and BMI collected by the

registered nurse (RN) or licensed vocational nurse (LVN). The patient then met with the provider

to discuss the patient's weight and weight management goals. During this time, the provider had

at his or her disposal evidence based educational material embedded in the EHR that they could

pick and choose from based on the patient's current goals and current lifestyle circumstances.

For example, if the patient says I wish to eat 4 healthy meals a week, the provider documented

this goal and then provided educational material related to diet and nutrition to help guide the

patient in achieving their goal. Due to COVID-19 limitations, many subjects were unable to return to the clinic in the allotted time or had their follow up visits via telehealth.

Information incorporated into the EHR was based on recommendations found in the literature, as outlined above, such as nutrition/diet, physical activity, and community resources. The DNP student obtained educational material from existing resources from professional organizations such as the Obesity Medicine Association, and the American Association of Family Nurse Practitioners. Educational material included information related to diet/nutrition, exercise, and lifestyle modifications.

The Health Wagon's Heart Health 1,2,3 program includes a three-month follow-up with patients to track weight outcomes. The proposed intervention aligned with this follow-up schedule to determine if there are changes in patient outcomes. Under circumstances outside of a pandemic, aligning with an already established program helps to not add additional work for staff and can help make the intervention more sustainable. The primary use of the program, however, was to identify patients who would benefit from the intervention.

Data Collection and Analysis

Pre-intervention patient data was obtained though the Health Wagon's EHR to obtain the patient's baseline anthropometric measurements and 3-month post-intervention data was collected. Pre-intervention data obtained included patient BMI, weight, intervention eligibility, and overweight/obese diagnosis. Post-intervention data was the same, but also included a two-question patient and provider satisfaction survey (Figure 1).

Figure 1.

Patient

1. Did you find the goal setting conversation with your provider helpful?
   a. Yes
   b. No
   c. Somewhat

2. Did you find the educational information and resources helpful?
   a. Yes
   b. No
   c. Somewhat

Provider

1. Did you find the intervention helpful?
   a. Yes
   b. No
   c. Somewhat
2. What, if any, recommendations do you have to improve this project?

Once data of interest was collected and organized in an excel spreadsheet, the UTK

statistician assisted the project leader in data analysis through SPSS 27.0. A paired sample t-test

was utilized to analyze pre- and post-intervention data.

Results

The outcomes of interest for this project supported the overall goal of the DNP Scholarly

Project of improving patient outcomes. Outcomes of interest included: 1) maintenance or

reduction of patient BMI and/or weight, 2) provider utilization of tools incorporated into EHR

without a disruption in provider workflow, 3) ensuring providers are correctly identifying

patients at risk of obesity-related comorbidities, and 4) utilization of educational information and

resources embedded in EHR to have patient-provider goal setting conversation.

The project leader and statistician analyzed the data utilizing a paired sample t-test and found no statistically significant different between pre- and post-intervention weight ($p=.451$) and BMI ($p=.756$). There was a slight decrease in weight, but an increase in BMI over the three-month period. One hundred percent of participants met eligibility criteria. Four out of five participants had a diagnosis of overweight or obese. Waist circumference was not collected by providers therefore no analysis was performed.

Results from the patient satisfaction survey were collected for three out of the five participants. For question one ("did you find the goal setting conversation with your provider helpful?") sixty-six percent found the intervention helpful, and one found the intervention somewhat helpful. For question two ("did you find the educational information and resources helpful?") one hundred percent of the participants found the information helpful. The community leader responded that they found the intervention helpful.

Conclusion

Early in the development of a project question, the Health Wagon expressed a need for easy-to-access weight management information that could be incorporated into their EHR. A review of the literature supported the incorporation of education and resources into an EHR to increase patient access to resources. The aim of this program was to make weight management resources and education more accessible to the patient population served by the Health Wagon. Lessons learned from this project were that tackling the problem of obesity is complex and for some, requires more than just lifestyle changes. Access to resources, experts in obesity, among many other factors can help aid those struggling with this disease.

The COVID-19 pandemic presented significant challenges to many aspects of this project. Patients fell ill, providers fell ill, resources were less accessible or more expensive, and

access to care was limited. All facets of the healthcare landscape faced challenges as a result of this pandemic, but the Health Wagon community faced them with their already present challenges. Patients and providers faced COVID-19 head on, and they faced it bravely.

Obesity is not a disease that discriminates based on gender, race, or socioeconomic status. For those populations that live in underserved areas, such as rural Appalachia, obesity can have a more detrimental effect on the health of these patients. Empowering patients to take control of their own health, armed with the knowledge and resources to make better health decisions is the goal of this project.

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Tables

Table 1. Synthesis Table for Recommendation 1

Anthropometric Measure	Pavel et al. (2012)	Wang et al. (2010)	Romero-Corral et al. (2008)	Taylor et al. (1998)	Okorodudu et al. (2010)	Browning et al. (2010)
BMI	✓ R=0.78	✓ S1:88.3% S2: 79.81	✓ BMI ≥ 30: S1:43% S2: 96%	✓ S1: 83% S2: 94%	✓ S1: 0.50 S2: 0.90	✓
WC	✓ R=0.66	⊘	⊘	✓ S1: 83% S2: 94%	⊘	✓
WHtR	⊘	⊘	⊘	⊘	⊘	✓
WHR	✓ R=0.39	⊘	⊘	✓	⊘	⊘
Sample Size	395	4,907	13,601	98	31.968	66 Studies
Level of Evidence	3	3	3	3	3	3
Quality of Evidence	High	High	High	Good	High	High

Legend: ✓ = discussed, ⊘ = not discussed, R= Pearson's Correlation Coefficient, S1= sensitivity, S2: specificity, BMI= Body Mass Index, WC= Waist Circumference, WHtR=Waist-to-Height Ratio, WHR=Waist-to-Hip Ratio

Table 2. Synthesis Table for Recommendation 2

Components of EHR Template	Baer et al. (2015)	Tang et al. (2012)	Bordowitz et al. (2007)	Gangadhar et al. (2018)	Fitzpatrick et (2017)
Guidelines	✔	⊘	⊘	⊘	⊘
Documentation of Overweight/Obese on Problem List	✔	✔	✔	⊘	✔
Nutrition/Diet	✔	✔	✔	✔	✔
Document Goal Setting	✔	✔	⊘	✔	⊘
Physical Activity	✔	⊘	✔	✔	⊘
Referral/Resources	✔	✔	✔	✔	✔
Additional Outcomes					
▲ BMI or Weight	⊘	✔ Pt reported + weight loss	⊘	✔ b	⊘
Sample Size	12 clinic sites (88,150 patients)	30 Physicians (400 Patient Charts Reviewed)	302 Medical Records Reviewed	5,868 practices 39,761 clinicians	14 clinics 26,471 encounter
Level of Evidence	1	1	3	1	1
Quality of Evidence	High	High	High	Good	High

Legend: ▲ =change,   ✔ =discussed,   ⊘= not discussed, b= not statistically significant

Table 3: Recommendations for Practice Change

Recommendations	References in Support of Recommendation	Rationale	JHNEBP Level of Evidence and Quality Rating
1. Utilize BMI in conjunction with another anthropometric measure, such as WC, to diagnose overweight and obesity *Can add WHtR as additional measure to account for limitation in BMI	Pavel et al. (2010)	Good correlation between BMI and BF%, although there are limitations.	Level 3, High Quality
	Wang et al. (2010)	BMI was correlated with BF%, with a sensitivity and specificity of 88.3% and 79.8%, with limitations found in those with BMI between 24 and 27.9kg/m^2.	Level 3, High Quality
	Romero-Corral et al. (2008)	Good correlation between BMI and BF%, with limitations in individuals in intermediate BMI ranges.	Level 3, High Quality
	Taylor et al. (1998)	BMI and WC provide simple, yet sensitive methods for the estimation of total and central adiposity.	Level 3, Good Quality
	Okorodudu et al. (2010)	Commonly used BMI cutoff values to diagnose obesity have high specificity, but low sensitivity to identify adiposity	Level 3, High Quality
	Browning et al. (2010)	The AUROC analyses indicate that WHtR may be a more	Level 3, High Quality

		useful global clinical screening tool than WC, with a weighted mean boundary value of 0·5,	
2. Components of an EHR weight management tool to include: 1) alert to measure height and weight with each visit, 2) tailored recommendations based on EBP guidelines (nutrition, physical activity, community-based services, etc), 3) provider-patient goal setting, 4) follow-up	Tang et al. (2012)	EHR-based alerts and management tools increased documentation of overweight and counseling frequency;	Level 1, High Quality
	Bordowitz et al. (2007)	After implementation of EHR, documentation of obesity increased from 31% to 71%, and documentation of treatment increased from 35% to 59%.	Level 3, High Quality
	Gangadhar et al. (2018)	BMI recording increased minimally, and documentation of follow-up plans increased 5-fold. Overweight test group gained less weight than the control group.	Level 1, Good Quality
	Fitzpatrick et al. (2017)	Alert was associated with increased physician meaningful-use compliance.	Level 1, High Quality

Legend: BMI= body mass index, WC= waist circumference, WHtR= waist-to-height-ratio, EHR= electronic health record, AUROC=area under receiver operating characteristic, BF%= body fat percentage, EBP= evidence-based practice, JHNEBP=Johns Hopkins Evidence-Based Practice

Figures

Figure 1.

Patient

1. Did you find the goal setting conversation with your provider helpful?
    a. Yes
    b. No
    c. Somewhat

2. Did you find the educational information and resources helpful?
    a. Yes
    b. No
    c. Somewhat

Provider

1. Did you find the intervention helpful?
    a. Yes
    b. No
    c. Somewhat
2. What, if any, recommendations do you have to improve this project?

Appendices

Appendix A

Johns Hopkins Nursing Evidence-Based Practice Evidence Level and Quality Guide

Evidence Levels	Quality Ratings
Level I Experimental study, randomized controlled trial (RCT) Explanatory mixed method design that includes only a level I quaNtitative study Systematic review of RCTs, with or without meta-analysis	**QuaNtitative Studies** A High quality: Consistent, generalizable results; sufficient sample size for the study design; adequate control; definitive conclusions; consistent recommendations based on comprehensive literature review that includes thorough reference to scientific evidence. B Good quality: Reasonably consistent results; sufficient sample size for the study design; some control, fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence. C Low quality or major flaws: Little evidence with inconsistent results; insufficient sample size for the study design; conclusions cannot be drawn.
Level II Quasi-experimental study Explanatory mixed method design that includes only a level II quaNtitative study Systematic review of a combination of RCTs and quasi-experimental studies, or quasi-experimental studies only, with or without meta-analysis **Level III** Nonexperimental study Systematic review of a combination of RCTs, quasi-experimental and nonexperimental studies, or nonexperimental studies only, with or without meta-analysis Exploratory, convergent, or multiphasic mixed methods studies Explanatory mixed method design that includes only a level III quaNtitative study QuaLitative study Meta- synthesis	**QuaLitative Studies** No commonly agreed-on principles exist for judging the quality of quaLitative studies. It is a subjective process based on the extent to which study data contributes to synthesis and how much information is known about the researchers' efforts to meet the appraisal criteria. *For meta-synthesis, there is preliminary agreement that quality assessments of individual studies should be made before synthesis to screen out poor-quality studies[1].* A/B High/Good quality is used for single studies and meta-syntheses)[2]. The report discusses efforts to enhance or evaluate the quality of the data and the overall inquiry in sufficient detail; and it describes the specific techniques used to enhance the quality of the inquiry. Evidence of some or all of the following is found in the report: ■ **Transparency**: Describes how information was documented to justify decisions, how data were reviewed by others, and how themes and categories were formulated. ■ **Diligence**: Reads and rereads data to check interpretations; seeks opportunity to find multiple sources to corroborate evidence. ■ **Verification**: The process of checking, confirming, and ensuring methodologic coherence. ■ **Self-reflection and -scrutiny**: Being continuously aware of how a researcher's experiences, background, or prejudices might shape and bias analysis and interpretations. ■ **Participant-driven inquiry**: Participants shape the scope and breadth of questions; analysis and interpretation give voice to those who participated. ■ **Insightful interpretation**: Data and knowledge are linked in meaningful ways to relevant literature. C Lower-quality studies contribute little to the overall review of findings and have few, if any, of the features listed for High/Good quality.

Evidence Levels	Quality Ratings
Level IV Opinion of respected authorities and/or nationally recognized expert committees or consensus panels based on scientific evidence Includes: • Clinical practice guidelines • Consensus panels/position statements	A **High quality:** Material officially sponsored by a professional, public, or private organization or a government agency; documentation of a systematic literature search strategy; consistent results with sufficient numbers of well-designed studies; criteria-based evaluation of overall scientific strength and quality of included studies and definitive conclusions; national expertise clearly evident; developed or revised within the past five years B **Good quality:** Material officially sponsored by a professional, public, or private organization or a government agency; reasonably thorough and appropriate systematic literature search strategy; reasonably consistent results, sufficient numbers of well-designed studies; evaluation of strengths and limitations of included studies with fairly definitive conclusions; national expertise clearly evident; developed or revised within the past five years C **Low quality or major flaws:** Material not sponsored by an official organization or agency; undefined, poorly defined, or limited literature search strategy; no evaluation of strengths and limitations of included studies, insufficient evidence with inconsistent results, conclusions cannot be drawn; not revised within the past five years
Level V Based on experiential and nonresearch evidence Includes: • Integrative reviews • Literature reviews • Quality improvement, program, or financial evaluation • Case reports • Opinion of nationally recognized expert(s) based on experiential evidence	**Organizational Experience** (quality improvement, program or financial evaluation) A **High quality:** Clear aims and objectives; consistent results across multiple settings; formal quality improvement, financial, or program evaluation methods used; definitive conclusions; consistent recommendations with thorough reference to scientific evidence B **Good quality:** Clear aims and objectives; consistent results in a single setting; formal quality improvement, financial, or program evaluation methods used; reasonably consistent recommendations with some reference to scientific evidence C **Low quality or major flaws:** Unclear or missing aims and objectives; inconsistent results; poorly defined quality improvement, financial, or program evaluation methods; recommendations cannot be made **Integrative Review, Literature Review, Expert Opinion, Case Report, Community Standard, Clinician Experience, Consumer Preference** A **High quality:** Expertise is clearly evident; draws definitive conclusions; provides scientific rationale; thought leader(s) in the field B **Good quality:** Expertise appears to be credible; draws fairly definitive conclusions; provides logical argument for opinions C **Low quality or major flaws:** Expertise is not discernable or is dubious; conclusions cannot be drawn

Appendix B

Johns Hopkins Nursing Evidence-Based Practice Research Evidence Appraisal Tool

Evidence level and quality rating:	_____
Article title:	Number:
Author(s):	Publication date:
Journal:	
Setting:	Sample (composition and size):
Does this evidence address my EBP question?	❏ Yes	❏ No Do not proceed with appraisal of this evidence.

Is this study:

- **QuaNtitative** (collection, analysis, and reporting of numerical data)

  Measurable data (how many; how much; or how often) used to formulate facts, uncover patterns in research, and generalize results from a larger sample population; provides observed effects of a program, problem, or condition, measured precisely, rather than through researcher interpretation of data. Common methods are surveys, face-to-face structured interviews, observations, and reviews of records or documents. Statistical tests are used in data analysis.

  Go to **Section I: QuaNtitative**

- **QuaLitative** (collection, analysis, and reporting of narrative data)

  Rich narrative documents are used for uncovering themes; describes a problem or condition from the point of view of those experiencing it. Common methods are focus groups, individual interviews (unstructured or semistructured), and participation/observations. Sample sizes are small and are determined when data saturation is achieved. Data saturation is reached when the researcher identifies that no new themes emerge and redundancy is occurring. Synthesis is used in data analysis. Often a starting point for studies when little research exists; may use results to design empirical studies. The researcher describes, analyzes, and interprets reports, descriptions, and observations from participants.

  Go to **Section II: QuaLitative**

- **Mixed methods** (results reported both numerically and narratively)

  Both quaNtitative and quaLitative methods are used in the study design. Using both approaches, in combination, provides a better understanding of research problems than using either approach alone. Sample sizes vary based on methods used. Data collection involves collecting and analyzing both quaNtitative and quaLitative data in a single study or series of studies. Interpretation is continual and can influence stages in the research process.

  Go to **Section I** for QuaNtitative components and **Section II** for QuaLitative components

Section I: QuaNtitative

Level of Evidence (Study Design)

A. Is this a report of a single research study?		❏ Yes	❏ No Go to B.
1. Was there manipulation of an independent variable?		❏ Yes	❏ No
2. Was there a control group?		❏ Yes	❏ No
3. Were study participants randomly assigned to the intervention and control groups?		❏ Yes	❏ No
If Yes to questions 1, 2, and 3, this is a randomized controlled trial (RCT) or experimental study.	❏ LEVEL I		
If Yes to questions 1 and 2 and No to question 3, or Yes to question 1 and No to questions 2 and 3, this is quasi-experimental (some degree of investigator control, some manipulation of an independent variable, lacks random assignment to groups, and may have a control group).	❏ LEVEL II		
If No to questions 1, 2, and 3, this is nonexperimental (no manipulation of independent variable; can be descriptive, comparative, or correlational; often uses secondary data).	❏ LEVEL III		
Study Findings That Help Answer the EBP Question			
Complete the Appraisal of QuaNtitative Research Studies section.			

B. Is this a summary of multiple sources of research evidence?		❑ Yes Continue	❑ No Go to Appendix F
1. Does it employ a comprehensive search strategy and rigorous appraisal method? If this study includes research, nonresearch, and experiential evidence, it is an integrative review. See Appendix F.		❑ Yes	❑ No Go to Appendix F

2. For systematic reviews and systematic reviews with meta-analysis (see descriptions below):
  a. Are all studies included RCTs?
  b. Are the studies a combination of RCTs and quasi-experimental, or quasi-experimental only?
  c. Are the studies a combination of RCTs, quasi-experimental, and nonexperimental, or non-experimental only?
 	
A systematic review employs a search strategy and a rigorous appraisal method, but does not generate an effect size.
 	
A meta-analysis, or systematic review with meta-analysis, combines and analyzes results from studies to generate a new statistic: the effect size.
	❑ Level I
	❑ Level II
	
	❑ Level III		

Study Findings That Help Answer the EBP Question			
Complete the Appraisal of Systematic Review (With or Without a Meta-Analysis) section.			

Appraisal of QuaNtitative Research Studies			
Does the researcher identify what is known and not known about the problem and how the study will address any gaps in knowledge?	❑ Yes	❑ No	
Was the purpose of the study clearly presented?	❑ Yes	❑ No	
Was the literature review current (most sources within the past five years or a seminal study)?	❑ Yes	❑ No	
Was sample size sufficient based on study design and rationale?	❑ Yes	❑ No	
If there is a control group: ▪ Were the characteristics and/or demographics similar in both the control and intervention groups?	❑ Yes	❑ No	❑ N/A
▪ If multiple settings were used, were the settings similar?	❑ Yes	❑ No	❑ N/A
▪ Were all groups equally treated except for the intervention group(s)?	❑ Yes	❑ No	❑ N/A
Are data collection methods described clearly?	❑ Yes	❑ No	
Were the instruments reliable (Cronbach's α [alpha] > 0.70)?	❑ Yes	❑ No	❑ N/A
Was instrument validity discussed?	❑ Yes	❑ No	❑ N/A
If surveys or questionnaires were used, was the response rate $\geq$ 25%?	❑ Yes	❑ No	❑ N/A
Were the results presented clearly?	❑ Yes	❑ No	
If tables were presented, was the narrative consistent with the table content?	❑ Yes	❑ No	❑ N/A
Were study limitations identified and addressed?	❑ Yes	❑ No	
Were conclusions based on results?	❑ Yes	❑ No	
Go to Quality Rating for QuaNtitative Studies section			
Appraisal of Systematic Review (With or Without Meta-Analysis)			
Were the variables of interest clearly identified?	❑ Yes	❑ No	
Was the search comprehensive and reproducible?			
▪ Key search terms stated	❑ Yes	❑ No	
▪ Multiple databases searched and identified	❑ Yes	❑ No	
▪ Inclusion and exclusion criteria stated	❑ Yes	❑ No	
Was there a flow diagram that included the number of studies eliminated at each level of review?	❑ Yes	❑ No	

Were details of included studies presented (design, sample, methods, results, outcomes, strengths, and limitations?	❏ Yes	❏ No
Were methods for appraising the strength of evidence (level and quality) described?	❏ Yes	❏ No
Were conclusions based on results?	❏ Yes	❏ No
▪ Results were interpreted.	❏ Yes	❏ No
▪ Conclusions flowed logically from the interpretation and systematic review question.	❏ Yes	❏ No
Did the systematic review include a section addressing limitations _and_ how they were addressed?	❏ Yes	❏ No

Quality Rating for QuaNtitative Studies

Complete quality rating for quaNtitative studies section.

Circle the appropriate quality rating below

A **High quality**: Consistent, generalizable results; sufficient sample size for the study design; adequate control; definitive conclusions; consistent recommendations based on comprehensive literature review that includes thorough reference to scientific evidence.

B **Good quality**: Reasonably consistent results; sufficient sample size for the study design; some control, and fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence.

C **Low quality or major flaws**: Little evidence with inconsistent results; insufficient sample size for the study design; conclusions cannot be drawn.

Section II: QuaLitative

Level of Evidence (Study Design)

A. Is this a report of a single quaLitative research study?	❏ Yes Level III	❏ No Go to Section II. B
Study Findings That Help Answer the EBP Question		

Complete the Appraisal of Single QuaLitative Research Study section.

Appraisal of a Single QuaLitative Research Study		
Was there a clearly identifiable and articulated:		
▪ Purpose?	❏ Yes	❏ No
▪ Research question?	❏ Yes	❏ No
▪ Justification for method(s) used?	❏ Yes	❏ No
▪ Phenomenon that is the focus of the research?	❏ Yes	❏ No
Were study sample participants representative?	❏ Yes	❏ No
Did they have knowledge of or experience with the research area?	❏ Yes	❏ No
Were participant characteristics described?	❏ Yes	❏ No
Was sampling adequate, as evidenced by achieving saturation of data?	❏ Yes	❏ No
Data analysis: ▪ Was a verification process used in every step by checking and confirming with participants the trustworthiness of analysis and interpretation?	❏ Yes	❏ No
▪ Was there a description of how data were analyzed (i.e., method), by computer or manually?	❏ Yes	❏ No
Do findings support the narrative data (quotes)?	❏ Yes	❏ No
Do findings flow from research question to data collected to analysis undertaken?	❏ Yes	❏ No
Are conclusions clearly explained?	❏ Yes	❏ No
Go to Quality Rating for QuaLitative Studies section.		
B. For summaries of multiple quaLitative research studies (meta-synthesis), was a comprehensive search strategy and rigorous appraisal method used?	❏ Yes Level III	❏ No Go to Appendix F.

Study Findings That Help Answer the EBP Question

Complete the Appraisal of Meta-Synthesis Studies section.

Appraisal of Meta-Synthesis Studies		
Were the search strategy and criteria for selecting primary studies clearly defined?	❑ Yes	❑ No
Were findings appropriate and convincing?	❑ Yes	❑ No
Was a description of methods used to:		
▪ Compare findings from each study?	❑ Yes	❑ No
▪ Interpret data?	❑ Yes	❑ No
Did synthesis reflect:		
▪ New insights?	❑ Yes	❑ No
▪ Discovery of essential features of phenomena?	❑ Yes	❑ No
▪ A fuller understanding of the phenomena?	❑ Yes	❑ No
Was sufficient data presented to support the interpretations?	❑ Yes	❑ No
Complete Quality Rating for QuaL_titative Studies section.		
Quality Rating for QuaLitative Studies		

Circle the appropriate quality rating below

No commonly agreed-on principles exist for judging the quality of quaLitative studies. It is a subjective process based on the extent to which study data contributes to synthesis and how much information is known about the researchers' efforts to meet the appraisal criteria.

For meta-synthesis, there is preliminary agreement that quality assessments should be made before synthesis to screen out poor-quality studies[1].

A/B High/Good quality is used for single studies and meta-syntheses)[2].

The report discusses efforts to enhance or evaluate the quality of the data and the overall inquiry in sufficient detail; and it describes the specific techniques used to enhance the quality of the inquiry. Evidence of some or all of the following is found in the report:

- ▪ **Transparency**: Describes how information was documented to justify decisions, how data were reviewed by others, and how themes and categories were formulated.

- ▪ **Diligence**: Reads and rereads data to check interpretations; seeks opportunity to find multiple sources to corroborate evidence.

- ▪ **Verification**: The process of checking, confirming, and ensuring methodologic coherence.

- ▪ **Self-reflection and self-scrutiny**: Being continuously aware of how a researcher's experiences, background, or prejudices might shape and bias analysis and interpretations.

- ▪ **Participant-driven inquiry**: Participants shape the scope and breadth of questions; analysis and interpretation give voice to those who participated.

- ▪ **Insightful interpretation**: Data and knowledge are linked in meaningful ways to relevant literature.

C   **Lower-quality** studies contribute little to the overall review of findings and have few, if any, of the features listed for High/Good quality.

Section III: Mixed Methods

Level of Evidence (Study Design)

You will need to appraise both the quaNtitative and quaLitative parts of the study independently, before appraising the study in its entirety. 1. Evaluate the quaNtitative portion of the study using Section I. Insert here the level of evidence and overall quality for this part:	Level _	Quality _
2. Evaluate the quaLitative part of the study using Section II. Insert here the level of evidence and overall quality for this part:	Level _	Quality _

3. To determine the level of evidence, circle the appropriate study design:
 	
    (a) Explanatory sequential designs collect quaNtitative data first, followed by the quaLitative data; and their purpose is to explain quaNtitative results using quaLitative findings. The level is determined based on the level of the quaNtitative part.
 	
    (b) Exploratory sequential designs collect quaLitative data first, followed by the quaNtitative data; and their purpose is to explain quaLitative findings using the quaNtitative results. The level is determined based on the level of the quaLitative part, and it is always Level III.
 	
    (c) Convergent parallel designs collect the quaLitative and quaNtitative data concurrently for the purpose of providing a more complete understanding of a phenomenon by merging both datasets. These designs are Level III.
 	
    (d) Multiphasic designs collect quaLitative and quaNtitative data over more than one phase, with each phase informing the next phase. These designs are Level III.		

Study Findings That Help Answer the EBP Question

Use the Appraisal of Mixed Methods Studies section.

Appraisal of Mixed Methods Studies[3]			
Was the mixed-methods research design relevant to address the quaNtitative and quaLitative research questions (or objectives)?	❏ Yes	❏ No	❏ N/A
Was the research design relevant to address the quaNtitative and quaLitative aspects of the mixed-methods question (or objective)?	❏ Yes	❏ No	❏ N/A
For convergent parallel designs, was the integration of quaNtitative and quaLitative data (or results) relevant to address the research question or objective?	❏ Yes	❏ No	❏ N/A
For convergent parallel designs, were the limitations associated with the integration (for example, the divergence of quaLitative and quaNtitative data or results) sufficiently addressed?	❏ Yes	❏ No	❏ N/A

Quality Rating for Mixed-Methods Studies

Circle the appropriate quality rating below

A **High quality**: Contains high-quality quaNtitative and quaLitative study components; highly relevant study design; relevant integration of data or results; and careful consideration of the limitations of the chosen approach.

B **Good quality**: Contains good-quality quaNtitative and quaLitative study components; relevant study design; moderately relevant integration of data or results; and some discussion of limitations of integration.

C **Low quality or major flaws**: Contains low quality quaNtitative and quaLitative study components; study design not relevant to research questions or objectives; poorly integrated data or results; and no consideration of limits of integration.

1 https://www.york.ac.uk/crd/SysRev/!SSL!/WebHelp/6_4_ASSESSMENT_OF_QUALITATIVE_RESEARCH.htm

2 Adapted from Polit & Beck (2017).

3 National Collaborating Centre for Methods and Tools. (2015). Appraising Qualitative, Quantitative, and Mixed Methods Studies included in Mixed Studies Reviews: The MMAT. Hamilton, ON: McMaster University. (Updated 20 July, 2015) Retrieved from http://www.nccmt.ca/resources/search/232

Appendix C

Johns Hopkins Nursing Evidence-Based Practice Non-Research Evidence Appraisal Tool

Evidence Level & Quality:_____

Article Title:		Number:
Author(s):		Publication Date:
Journal:		

Does this evidence address the EBP question?	☐Yes	☐No Do not proceed with appraisal of this evidence

☐ **Clinical Practice Guidelines:** Systematically developed recommendations from nationally recognized experts based on research evidence or expert consensus panel. **LEVEL IV**

☐ **Consensus or Position Statement:** Systematically developed recommendations based on research and nationally recognized expert opinion that guides members of a professional organization in decision-making for an issue of concern. **LEVEL IV**

	Yes	No
• Are the types of evidence included identified?	☐Yes	☐No
• Were appropriate stakeholders involved in the development of recommendations?	☐Yes	☐No
• Are groups to which recommendations apply and do not apply clearly stated?	☐Yes	☐No
• Have potential biases been eliminated?	☐Yes	☐No
• Were recommendations valid (reproducible search, expert consensus, independent review, current, and level of supporting evidence identified for each recommendation)?	☐Yes	☐No
• Were the recommendations supported by evidence?	☐Yes	☐No
• Are recommendations clear?	☐Yes	☐No

☐ **Literature Review:** Summary of published literature without systematic appraisal of evidence quality or strength. **LEVEL V**

	Yes	No
• Is subject matter to be reviewed clearly stated?	☐Yes	☐No
• Is relevant, up-to-date literature included in the review (most sources within last 5 years or classic)?	☐Yes	☐No
• Is there a meaningful analysis of the conclusions in the literature?	☐Yes	☐No
• Are gaps in the literature identified?	☐Yes	☐No
• Are recommendations made for future practice or study?	☐Yes	☐No

☐ **Expert Opinion:** Opinion of one or more individuals based on clinical expertise. **LEVEL V**

	Yes	No
• Has the individual published or presented on the topic?	☐Yes	☐No
• Is author's opinion based on scientific evidence?	☐Yes	☐No
• Is the author's opinion clearly stated?	☐Yes	☐No
• Are potential biases acknowledged?	☐Yes	☐No

Organizational Experience:

☐ **Quality Improvement:** Cyclical method to examine organization-specific processes at the local level. **LEVEL V**

☐ **Financial Evaluation:** Economic evaluation that applies analytic techniques to identify, measure, and compare the cost and outcomes of two or more alternative programs or interventions. **LEVEL V**

☐ **Program Evaluation:** Systematic assessment of the processes and/or outcomes of a program and can involve both quantitative and qualitative methods. **LEVEL V**

Setting:	Sample (composition/size):			
• Was the aim of the project clearly stated?		☐Yes	☐No	
• Was the method adequately described?		☐Yes	☐No	
• Were process or outcome measures identified?		☐Yes	☐No	
• Were results adequately described?		☐Yes	☐No	
• Was interpretation clear and appropriate?		☐Yes	☐No	
• Are components of cost/benefit analysis described?		☐Yes	☐No	☐N/A

☐ **Case Report:** In-depth look at a person, group, or other social unit. **LEVEL V**

• Is the purpose of the case report clearly stated?	☐Yes	☐No	
• Is the case report clearly presented?	☐Yes	☐No	
• Are the findings of the case report supported by relevant theory or research?	☐Yes	☐No	
• Are the recommendations clearly stated and linked to the findings?	☐Yes	☐No	

Community Standard, Clinician Experience, or Consumer Preference

☐ **Community Standard:** Current practice for comparable settings in the community **LEVEL V**

☐ **Clinician Experience:** Knowledge gained through practice experience **LEVEL V**

☐ **Consumer Preference:** Knowledge gained through life experience **LEVEL V**

Information Source(s):	Number of Sources:			
• Source of information has credible experience.		☐Yes	☐No	
• Opinions are clearly stated.		☐Yes	☐No	☐N/A
• Identified practices are consistent.		☐Yes	☐No	☐N/A

Findings that help you answer the EBP question:

Appendix I. Non-Research Evidence Appraisal Tool

QUALITY RATING FOR CLINICAL PRACTICE GUIDELINES, CONSENSUS OR POSITION STATEMENTS (LEVEL IV)
A High quality: Material officially sponsored by a professional, public, private organization, or government agency; documentation of a systematic literature search strategy; consistent results with sufficient numbers of well-designed studies; criteria-based evaluation of overall scientific strength and quality of included studies and definitive conclusions; national expertise is clearly evident; developed or revised within the last 5 years.
B Good quality: Material officially sponsored by a professional, public, private organization, or government agency; reasonably thorough and appropriate systematic literature search strategy; reasonably consistent results, sufficient numbers of well-designed studies; evaluation of strengths and limitations of included studies with fairly definitive conclusions; national expertise is clearly evident; developed or revised within the last 5 years.
C Low quality or major flaws: Material not sponsored by an official organization or agency; undefined, poorly defined, or limited literature search strategy; no evaluation of strengths and limitations of included studies, insufficient evidence with inconsistent results, conclusions cannot be drawn; not revised within the last 5 years.

QUALITY RATING FOR ORGANIZATIONAL EXPERIENCE (LEVEL V)
A High quality: Clear aims and objectives; consistent results across multiple settings; formal quality improvement or financial evaluation methods used; definitive conclusions; consistent recommendations with thorough reference to scientific evidence
B Good quality: Clear aims and objectives; formal quality improvement or financial evaluation methods used; consistent results in a single setting; reasonably consistent recommendations with some reference to scientific evidence
C Low quality or major flaws: Unclear or missing aims and objectives; inconsistent results; poorly defined quality improvement/financial analysis method; recommendations cannot be made

QUALITY RATING FOR LITERATURE REVIEW, EXPERT OPINION, COMMUNITY STANDARD, CLINICIAN EXPERIENCE, CONSUMER PREFERENCE (LEVEL V)
A High quality: Expertise is clearly evident; draws definitive conclusions; provides scientific rationale; thought leader in the field
B Good quality: Expertise appears to be credible; draws fairly definitive conclusions; provides logical argument for opinions
C Low quality or major flaws: Expertise is not discernable or is dubious; conclusions cannot be drawn