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Adverse Childhood Experiences (ACEs) Education Implementation for Graduate  
Nursing Students

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### **Abstract**

Chronic conditions are a leading cause of death and disability in the United States (U.S.). Adverse Childhood Experiences (ACEs) are risk factors for chronic conditions and death; however, screening and assessment of ACEs do not occur in primary care settings. A barrier to screening is a lack of knowledge and education during providers' didactic courses. To address this barrier, a standardized education tool was implemented into a midwestern public graduate nursing Doctor of Nursing Practice (DNP) curriculum. The design was a Quality Improvement (QI) project with a descriptive cohort design and purposive sample. The inclusion criteria were students in the Spring 2022 Intensive, January 18, 2022, through April 1, 2022. An online 17-item Likert Type Scale Qualtrics survey was administered pre-and post-survey to assess knowledge, comfortability of screening, and likelihood to screen for ACEs as a future Nurse Practitioner (n=38). Results suggest students had an improvement in knowledge and comfortability in ACEs and screening for ACEs; however, results suggest a minimal change in the likelihood to screen for ACEs as a future provider. Implementing a standardized training tool into the curriculum suggests future NP providers can become more knowledgeable and comfortable screening for ACEs.

### **ACEs Training Implementation for Graduate Nursing Students**

According to the Centers for Disease Control and Prevention (CDC) (2021), the leading cause of death and disability for adults in the United States

(U.S.) is chronic diseases. Chronic diseases affect six in 10 adults in the U.S., can cost upwards of 3.8 trillion dollars in healthcare annually and includes heart disease, diabetes, and cancer (CDC, 2021). The CDC estimates 6.7% of adults in the United States have heart disease and the annual cost of heart disease alone can reach 219 billion dollars (CDC, 2021). Additionally, an estimated 13.0% of adults in the United States have a diabetes diagnosis which can cost up to 327 billion dollars (Center for Disease Control and Prevention, 2020). According to the National Cancer Institute (2020), cancer is a major leading cause of death with approximately 9.5 million deaths annually. By 2040, the number of new cancer diagnoses are anticipated to rise to 29.5 million with deaths reaching up to 16.4 million Americans (National Cancer Institute, 2020).

A study by Felitti and colleagues (1998) determined adverse childhood events (ACEs) have a strong relationship to poor long-term health and early death. ACEs were originally defined by Felitti et al. (1998) as abuse, neglect, and household dysfunction. Abuse includes emotional, physical, or sexual abuse and household dysfunction includes mental illness of a parent, an incarcerated relative, violence towards the mother of the family, substance abuse within the household, and divorce of the parents (Felitti et al., 1998). Risk factors for chronic disease from the presence of ACEs in a person's life included lack of physical activity, smoking, alcoholism, substance abuse, tobacco use, missed work, and poor nutrition (Felitti et al., 1998; CDC, 2021). For each ACE accumulated, the

risk increases for an individual to develop chronic conditions. Despite this information, many primary care visits lack screening for ACEs (Felitti et al., 1998; Tink et al., 2017).

ACEs are a public health concern affecting millions of Americans in the United States (CDC, 2021). When adverse events occur in childhood, a period of vital growth and development, the consequences of these events can last into adulthood if not addressed early in life. Research shows preventative measures are associated with less suffering and reduced healthcare costs (Levine et al., 2019). Thus, conducting an ACE screening during a routine exam helps both providers and patients toward a stronger clinical care plan. Recent evidence suggests only 8% of adults in the United States received clinical preventative measures (Levine et al., 2019). In 2020, Branstetter et al. found approximately 30% of nurse practitioners (NP) screen regularly for ACEs with psychiatric mental health NPs more likely to screen than family NPs. The most common barriers cited for not screening include lack of awareness and knowledge of ACEs, lack of training/education on screening for ACEs, lack of comfort, lack of confidence, and lack of time.

The purpose of this project is to implement a standardized ACEs education program into a graduate nursing school Doctor of Nursing Practice (DNP) curriculum. The evidence-based practice framework that will be used to implement the training is the IOWA framework. This project aims to increase

graduate DNP students' knowledge, awareness, and confidence to screen for ACEs in future NP practice. The primary outcomes are knowledge and awareness levels of ACEs and stated increased confidence to screen for ACEs as a result of the training. Secondary outcomes measures will be age, gender, race, years of nursing experience, predicted use in future practice, and NP program track. The question for the study is: In a midwestern graduate nursing school, what is the effect of implementing a standardized ACE education training for graduate DNP students enrolled in the spring intensive to impact students' knowledge, comfortability, and confidence level to screen for ACEs?

### **Review of Literature**

A literature search was conducted using the CINAHL and MEDLINE databases using the search terms and phrases *adverse childhood experiences*, *aces*, and *adult*, with the use of the Boolean operators AND and OR. Initially, 15,185 results were generated based on the key search terms and phrases. Inclusion criteria were studies from 2016 to 2021, published in the English language, screenings, barriers, knowledge, or training, and one age filter was applied: 18 years and older which produced 277 results. Exclusion criteria of ACEs of one or less. The peer-reviewed publications were selected from within the past five years. After inclusion and exclusion criteria were applied, duplicates were removed and articles references evaluated, 15 results were generated and ultimately nine publications were selected for the review of the literature.

The gold standard research on Adverse Childhood Experiences was done at a Kaiser-Permanente Health in a primary care setting, run by Felitti et al., (1998) Using a cross-sectional survey, Felitti et al. (1998) determined a correlation between childhood adversity and the development of chronic health conditions in adulthood, including early death. Felitti et al., (1998) screened patients regarding psychological, physical, and sexual abuse, household substance abuse, violence towards the mother figure, presence of a mental health diagnosis of a family member, and occurrence of incarceration within one's family. After an office exam and screening, Felitti et al., (1998) mailed a post-visit survey to 13,000 participants. Results of the survey demonstrated a positive correlation between an increased number of ACEs in the patient's life and the presence of health risk factors and chronic conditions in adults. This study by Felitti et al., (1998) discovered that individuals exposed to at least one ACE category were 80% more likely to report exposure to a second category and 54.5% more likely to report two additional category exposures (Felitti et al., 1998). Once this study was published several research studies found similar results. Over time, the research pointed to the need for further assessment and screening in primary care.

Assessment and screening of ACEs have been identified as a need in the United States by the American Academy of Pediatrics (AAP) (Forkey et al., 2021). Screening for ACEs provides awareness and knowledge for providers to help patients who have experienced ACEs decrease the likelihood of poor health

outcomes (Tink et al., 2017). However, despite support from physicians, screening rates of ACEs by providers are low, especially for men (Branstetter et al., 2020). A survey by Tink et al., (2017) discovered physicians disclosed male gender patients were screened at 12.2% compared to women at 25% (Tink et al., 2017). Collectively, the research identified common barriers amongst providers in screening for ACEs including lack of time, lack of awareness or training, and lack of confidence. Additionally, the survey found a unanimous agreement amongst healthcare providers on the need to increase ACEs screenings in primary care settings. Implementing education for healthcare providers along with training regarding ACEs screenings could minimize chronic conditions and decrease healthcare costs in the United States. Many providers in the survey believed that time was the number one barrier (n=78, 69.6%) for not screening individuals. Perhaps most significantly, 97.4% of family medicine providers reported time was their number one barrier. Providers stated a lack of time to fully evaluate and counsel victims, assess the trauma history, and recommended increasing educational opportunities to increase the confidence in screening materials before graduation. Barriers to screening were also identified in other studies.

Maunder et al. (2020) used an online survey sent to 89 family physicians, 46 psychiatrists, and 48 other specialists which found several barriers to screening existed. Results showed that 59% of health care providers did not perform any screening due to lack of time. Additionally, the researchers found that only family



physicians (66.3%) screened as needed while psychiatrists (91.3%) “routinely” screened for ACEs even though family physicians were knowledgeable about the consequences of ACEs. Furthermore, concerns over not wanting to cause distress to patients, not feeling confident about how to ask patients trauma-based questions (43.7%), and lack of available community resources (59%) were other limitations for screening for ACEs.

More barriers identified in the literature regarding screening of ACEs included awareness and knowledge of ACEs. In a web-based survey of family and pediatric providers (MD or DO and physician assistants), Popp et al. (2020) assessed ACEs training and the prevalence of ACEs screening in practice. Popp et al. (2020) found that 66% of surveyed providers perceived a lack of professional education as the main barrier. Additionally, less than half of respondent providers (24%) received training for ACEs screening; at the same time, less than half (47%) screened for ACEs (Popp et al., 2020). Other barriers recognized by respondents were lack of time and lack of appropriate screening tools that are consistent throughout the literature (Popp et al., 2020). The identification of barriers to screening for ACEs also highlighted the need for providers to understand the importance of screening and to build their confidence levels to be successful.

Successful screenings are done by providers who are confident in their skills. Questions in the ACE screening may make patients uncomfortable. Being

confident and skillful in providing a possibly uncomfortable screening takes knowledge and the ability to provide comfort for the patient. According to a study by Branstetter et al., (2020), lack of knowledge was found to be a major barrier for family nurse practitioners, of whom only 15% routinely screened for ACEs. In fact, 70% of the family nurse practitioners in the study did not believe they should be required to screen for ACEs (Branstetter et al., 2020). The survey used participants from a mid-southern state and included masters prepared nurse practitioners, doctorally prepared nurse practitioners, and Ph.D. providers, with 83% family nurse practitioners and 13% psychiatric-mental health nurse practitioners (Branstetter et al., 2020). Psychiatric-mental health nurse practitioners were more likely to screen for ACEs because they had more knowledge of questions and confidence in their ability to do a successful trauma screening (Branstetter et al., 2020). Psychiatric-mental health nurse practitioners were more aware of ACEs because of formal training completed on trauma and ineffective coping (Branstetter et al., 2020). Additionally, the lack of time to screen was vastly supported throughout every article discussed in the literature review; however, improving the education of ACEs may show providers that ACE screenings can take less than five minutes to complete and do not require additional resources (Maunder et al., 2020). When providers are knowledgeable and confident in specific screenings for ACEs, not just mental illness, and addiction, they are more likely to complete ACEs screenings quickly.

Additionally, Jones et al. (2021) cited confidence as a barrier and identified patient rapport as a barrier to not screening patients for ACEs from a sample of 319 physicians and 292 nurse practitioners via a computer-assisted self-interview. Jones et al. (2021) found providers' confidence, years of practice in screening, and resources available in the community affected screening rates of ACEs in a primary care setting. Screening rates were not affected by the gender of the provider, professional role, certification, percentage of pediatric patients seen, time spent in the office, or location of the office (Jones et al., 2021). Because of comfortability level, patients are more likely to be screened for depression or anxiety symptoms informally thus eliminating an ACE screening (Jones et al., 2021). ACEs screening requires inquiring about abuse or trauma that occurred in childhood and many adult providers are not comfortable asking for fear of upsetting rapport or retraumatizing patients. Psychosocial issues caused by trauma are uncomfortable and considered a barrier to implementing screenings and increasing training can help improve compliance.

In another study, Collins et al. (2021) surveyed 540 family medicine residents in 22 different residency programs throughout the northwestern United States (Washington, Wyoming, Alaska, Montana, and Idaho) to assess knowledge, attitudes, and comfort level in screening ACEs in primary care settings (Collins, et al., 2021). Results concluded that 65% of residents were not knowledgeable of the ACEs study completed in 1998 while 42% of residents were

only made aware of it during their final year of residency, and no other time (Collins et al., 2021).

Williams et al., (2021) and Collins et al. (2021) had similar findings and discussed implementing ACEs education with students as a valuable way to establish appropriate behaviors prior to graduating and increasing the likelihood of ACE screenings. However, professionals require the appropriate understanding of ACEs before implementing an ACEs education because of the potential for re-traumatizing if not implemented appropriately (Williams et al., 2021; Marcoux, 2021). Furthermore, a gap in the literature exists specifically for graduate-level nurse practitioners regarding ACEs education. Implementing an ACE education course within a Doctor of Nursing (DNP) curriculum may help graduate future nurse practitioners with the knowledge, awareness, and confidence level to perform ACE screenings in primary care settings.

Because there is limited research on ACE training in a graduate nursing school curriculum, the best evidence-based practice model to guide implementation will be the IOWA model. The IOWA model is effective in guiding through the process of a pilot quality improvement project. It provides step-by-step, from start to finish, guidance for advanced practice nurses in the implementation of a process change (Hickey & Brosnan, 2017).

Because patients are not being screened for ACEs, the CDC supports screening for ACEs to help combat health disparities in adulthood. Throughout

the reviewed literature, low rates of screening are attributed to barriers. Barriers include time, knowledge and awareness, lack of confidence in screening for trauma, and lack of nurse practitioner program education.

## **Methods**

### **Design**

In this methods section, an overview of the study design, setting, sample, data collection, approval process, and procedures are described. This quality improvement project utilized a descriptive cohort design. Participants answered a pre-education 17-item Likert Type Scale Qualtrics survey to establish baseline awareness of their knowledge regarding adverse childhood experiences (ACEs) and to assess their confidence level to screen in primary care. Educational modules on the topic of adverse childhood experiences and provider-specific ACEs training from the CDC Preventing Adverse Childhood Experiences website were used. After completion, the same 17-item Likert Type Scale Qualtrics survey was administered. The primary outcome of interest was the level of ACE awareness and confidence to screen for ACEs in the primary care programs among graduate student nurses as determined by pre-and post-training surveys.

### **Setting**

The setting for this project was a nursing graduate school in a public university in the Midwest. This project occurred in a College of Nursing program preparing Doctor of Nursing Practice (DNP) students with approximately 259

total students in the program. Student participants in the ACEs education module were in either the women's health, adult-gerontology, family practice, or psychiatric mental health programs.

### **Sample**

The sample was collected via a purposive sample of graduate nursing students in the DNP program enrolled in a required Spring Intensive course. The inclusion criteria were all DNP students enrolled in the Spring Intensive course, hence those not taking the Spring Intensive course were excluded.

### **Approval Processes**

The University of Missouri- St. Louis Internal Review Board approval was obtained before starting the DNP Project. Potential risks were minimal, as the Spring Intensive education was a requirement of the DNP programs, and all surveys were de-identified.

### **Procedure**

Implementation of ACEs training versus current mental health curriculum without ACEs training curriculum was a Quality Improvement (QI) project selected by the university and led by a Doctor of Nursing Practice candidate. The CDC ACEs training tool was utilized by the University for the education implementation (<https://vetoviolence.cdc.gov/apps/aces-training/###top>). This CDC ACEs training tool is composed of two parts, general ACE training, and specific training for primary care providers. This education was an online module

accessed by the DNP students via a Canvas course site. The survey links were inserted into each of the education modules. At the predetermined timeframe conclusion, data was collected by the primary investigator through Qualtrics, transferred into an Excel spreadsheet, and analyzed with SPSS using descriptive statistics. A Wilcoxon signed-rank test was done to explore the statistical significance of the pre-and post-education scores of the participants.

### **Data Collection/Analysis**

All graduate DNP students enrolled in the Spring intensive course from January 18, 2022, through April 1, 2022, who gave consent were included in the analysis. A pre and post Qualtrics survey was administered to the students during the training. Data collected from participants via the same pre and post Qualtrics survey was used to assess baseline awareness of their knowledge regarding adverse childhood experiences (ACEs) and assessment of their confidence level to screen in primary care. Additional demographic variables collected were demographic attributes of nursing students including age, years of experience as a Registered Nurse (RN), and racial or ethnic identity (Figures 1 & 2). The surveys were prefaced with participant information on the project, the purpose, and the overall intent from the data collected. Once the participants begin their survey all respondent information was de-identified by using their driver's license letter and first three numbers.

## **Results**

## **Sample**

The sample size (N) was 38 DNP graduate nursing students that range from ages 24-to 51 years old. Demographic data was collected with pre-and post-surveys. Participants were identified as Caucasian, African American, Asian, or Pacific Islander. Hispanic or multiracial were not represented. Participants identified as either male or female, the majority being female participants. The participants' nursing experience (Figure 1.) ranged from 2 years to 20 years and participants' work experiences (Figure 2.) ranged from cardiac units, critical care units (ICU, NICU, ED), psychiatric units, medical-surgical units, pediatric units, and labor and delivery.

This project had three dependent variables. First, students' knowledge (Table 1.) was measured by a Likert scale of agreements in which they rated their knowledge and understanding of ACEs. The second is the comfortability (Table 2.) of discussing and screening for ACEs with patients and family members. The third is the likelihood to screen for ACEs as a future provider. The independent variable was the CDC ACEs training tool. Because the data collected was Likert type style data, the Wilcoxon signed-rank test was completed to evaluate the median difference between paired or matched observations regarding post-education in knowledge, comfortability, and likelihood to screen for ACEs in patients.



Questions were grouped according to assessing knowledge, comfortability, or likelihood to screen as a future provider. Question seven assessed understanding of ACEs pre and post and revealed a better understanding of ACEs post-completion of education ( $Md= 1.2632$ ,  $n=38$ ) compared to before ( $Md=2.55$ ,  $n=38$ ),  $Z=-4.993$ ,  $p<0.05$ . Question nine assessed knowledge of chronic long-term health consequences and data revealed a better understanding post-education, ( $Md=1.1579$ ,  $n=38$ ) compared to before ( $Md=1.74$ ,  $n=38$ ),  $Z=-3.214$ ,  $p<0.05$ . Question 11 addressed knowledge of screening done by NPs and data revealed increased student knowledge regarding screening for ACEs after education ( $Md=1.1579$ ,  $n=38$ ) compared to before ( $Md= 1.39$ ,  $n=38$ ),  $Z=-2.500$ ,  $p<0.05$ . Question 12 assessed knowledge of risk factors for ACEs and question 13 assessed protective factors for ACEs. Data revealed a better understanding of risk factors and protective factors post-education ( $Md=1.1579$ ,  $n=38$ ) and ( $Md=1.2895$ ,  $n=38$ ) compared to before ( $Md=2.26$ ,  $n=38$ ) and ( $Md=2.58$ ,  $n=38$ ),  $Z=-4.545$  and  $Z =-4.549$ ,  $p<0.05$ . Questions 15 and 16 assessed knowledge of when to refer to additional resources and knowledge of available resources; data revealed an increase in knowledge after completion of the education, ( $Md=1.3684$ ,  $n=38$ ) and ( $Md=2.04789$ ,  $n=38$ ) compared to before ( $Md=1.63$ ,  $n=38$ ) and ( $Md=3.24$ ,  $n=38$ ),  $Z=-1.901$  and  $Z=-3.971$ . The P-value for question 15 was  $p=0.06$  and had a small effect size, whereas question 16's p-value was less than 0.05.

Questions eight and 14 evaluated the comfortability (1= extremely uncomfortable and 5= extremely comfortable) of screening for ACEs in patients and the comfortability of discussing ACEs with patients and family members. Data revealed an improvement in comfortability post-education, ( $Md=3.8684$ ,  $n=38$ ) and ( $Md=3.8421$ ,  $n=38$ ) compared to before ( $Md=2.66$ ,  $n=38$ ) and ( $Md=2.74$ ,  $n=38$ ),  $Z=-4.452$  and  $Z=-4.260$ . Since healthcare requires a multi-disciplinary approach, question 10 evaluated students' pre-and post-education comfortability of managing ACEs in a multi-disciplinary approach. Data revealed an improved comfortability post-education, ( $Md=1.6316$ ,  $n=38$ ),  $Z=-4.460$ ,  $p<0.05$ .

Lastly, question 17 assessed the likelihood to screen as a future provider. Results revealed an increase in the likelihood to screen for ACEs as a future provider after education, ( $Md=4.2632$ ,  $n=38$ ) compared to before ( $Md=4.18$ ,  $n=38$ ),  $Z=-0.529$ ,  $p=0.6$ , with a small effect size.

All questions indicated an improvement; however, two questions (Questions 15 and 17) were not statistically significant but had a small effect size. Questions 15 and 17 evaluated willingness to refer to additional resources for ACEs and the likelihood to screen for ACEs as a future provider.

## **Discussion**

The results suggest that education made a difference. The confidence level in knowledge, comfortability in screening and discussing ACEs, and screening as

a future provider improved. However, most of the students demonstrated no change in their knowledge of ACEs, as demonstrated in questions nine, 11, and 15. Whereas most of the students felt they could more comfortably discuss ACEs with patients and families while screening for ACEs, as demonstrated in questions eight and 14.

Limitations of this QI project include time, sample size, possible sample bias, and measurement tool. Due to this QI being part of a graduate student requirement, a population with limited time, having more time to complete the surveys and modules could have resulted in an increased number of returned student surveys. Since the sample was collected from one university and not representative of true population this can increase type II error. With an increase in sample size, the risk of type II error decreases.

The measurement tool was written by the PI, the student; it was not a validated tool used by the CDC to measure outcomes of the ACEs education which can also result in possible bias. Future Plan-Do-Study-Act (PDSA) cycles should use a validated tool to assess and measure the data collected more accurately.

Due to the lack of significant effect in Questions 15 and 17, it might be concluded sample bias was present. Instead of asking for nursing expertise, it may be more informative to ask the area of program studies to be knowledgeable in

how many participants of the sample were in the psychiatric mental health program and would not refer to services, but rather manage services themselves.

There are limited research studies assessing the education of ACEs within graduate nursing curriculums. Additionally, the creation of an increased number of validated measurement tools would help to assess an increased knowledge more accurately, along with the assessment of comfortability, and the likelihood of screening for ACEs as a future provider. The students who participated in the spring intensive will be graduating in one to two years. Future PDSA cycles should utilize a validated measurement tool to gather data and possible PDSA cycles in the future would be for follow-up two to three years after students graduate to analyze if the education has made a difference in NP practice long term.

### **Conclusion**

Chronic conditions are a leading cause of death and disability. All nurse practitioners should be aware and have the knowledge of ACEs. Implementing a standardized training tool into the curriculum suggests future NP providers can become more knowledgeable and comfortable screening for ACEs. However, the likelihood to screen as a future provider and referring will need to be assessed in future PDSA cycles. This DNP project embodies the role of a doctorally prepared nurse practitioner through applying evidence-based practice to advance

knowledge. Decreasing the time between PDSA findings and use in practice can improve patient outcomes and quality of life.

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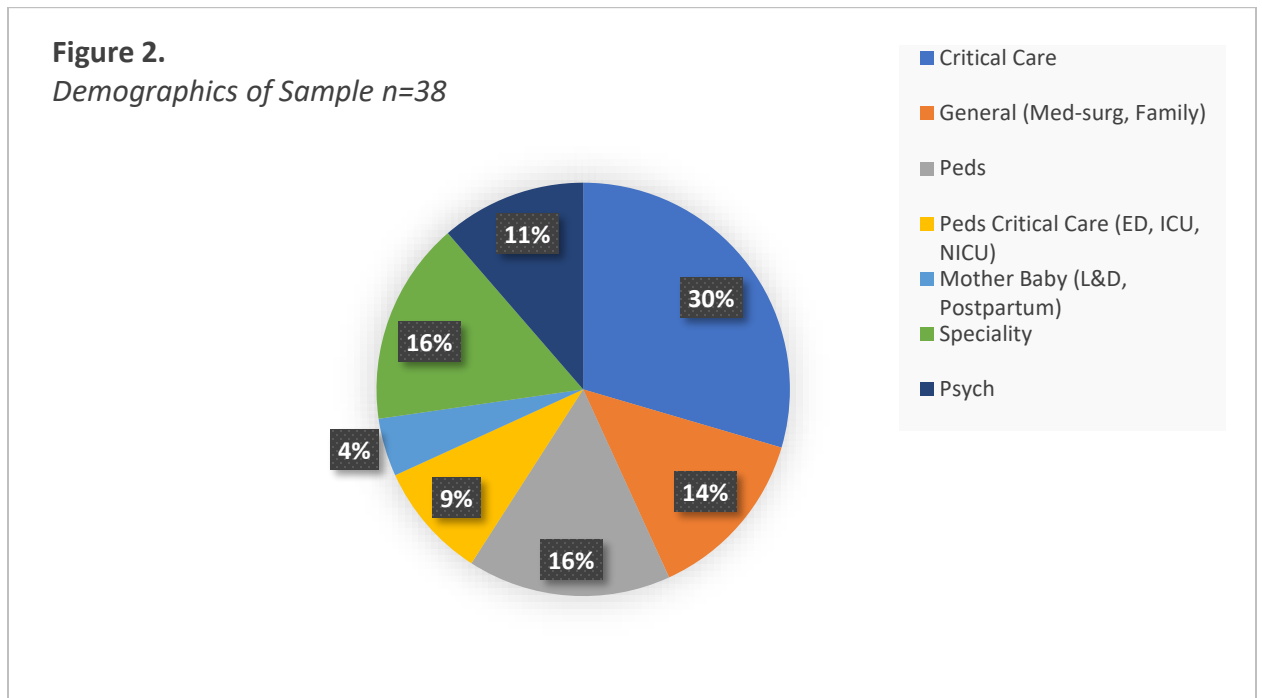
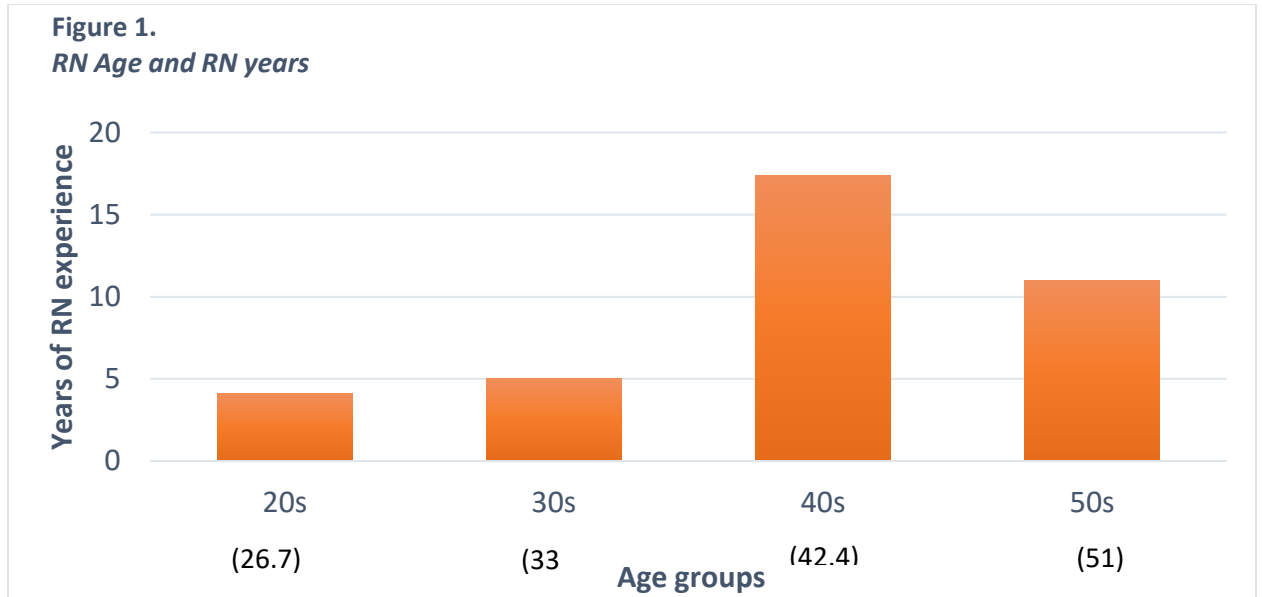
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Appendix A.



**Table 1.**

*Knowledge of ACEs*

	Mean	Z	2-tailed
<i>Good understanding of ACEs</i>	2.55	-4.993	<b>.000</b>
<i>Post survey</i>	1.2632		
<i>ACEs chronic long-term health</i>	1.74	-3.214	<b>.000</b>
<i>Post survey</i>	1.1579		
<i>Level of agreement screening for NPs</i>	1.39	-2.500	<b>.012</b>
<i>Post survey</i>	1.1579		
<i>Risk factors for ACEs</i>	2.26	-4.545	<b>.000</b>
<i>Post survey</i>	1.1579		
<i>Protective factors for ACEs</i>	2.58	-4.549	<b>.000</b>
<i>Post survey</i>	1.2895		
<i>Willing to refer</i>	1.63	-1.901	.057
<i>Post survey</i>	1.3684		
<i>Aware and knowledgeable of local resources</i>	3.24	-3.971	<b>.000</b>
<i>Post survey</i>	2.0789		

**Table 2.**

*Comfortability of ACEs*

	Mean	Z	2-tailed
<i>Comfortable screening for ACEs</i>	2.66	-4.452	<b>.000</b>
<i>Post Survey</i>	3.8684		
<i>Comfortable managing in a multi-disciplinary approach</i>	3.24	-4.460	<b>.000</b>
<i>Post survey</i>	4.3684		
<i>Comfortable discussing with family and patients</i>	2.74	-4.260	<b>.000</b>
<i>Post survey</i>	3.8421		
<i>Likelihood to screen</i>	4.18	-0.529	0.597
<i>Post survey</i>	4.2632		