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ARE RISK FACTORS FOR POSTPARTUM DEPRESSION DIFFERENT BETWEEN ADULT AND ADOLESCENT MOTHERS OF INFANTS IN NEONATAL INTENSIVE CARE?

Milly Yu

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Emily Yu

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ABSTRACT

ARE RISK FACTORS FOR POSTPARTUM DEPRESSION DIFFERENT BETWEEN ADULT AND ADOLESCENT MOTHERS OF INFANTS IN NEONATAL INTENSIVE CARE?

Emily Yu, B.S. Nursing

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Faculty Mentor: Cheryl Anderson

Postpartum depression (PPD) is a prevalent and debilitating mental disorder, but limited research exists comparing risk factors between adolescent and adult mothers. To further research comparisons between adolescent and adult mothers, a cross-sectional design of two merged datasets was used to compare eleven recognized risk factors for PPD. The sample consisted of 82 mothers with NICU infants representing 35 adults ages 20-44 and 47 adolescents ages 13-19. Assessments via the Edinburgh Postnatal Depression Scale (EPDS) indicted significantly higher mean scores for adolescent mothers. Yet, significant risk factors including pregnancy complications, lower gestational age and infant birth weight, and cesarean birth more likely characterized adults. Marital status also differentiated the groups. Findings suggest both age groups are vulnerable to PPD,

recommending routine postpartum assessments for all women. Study limitations included recruitment settings, possible differences in infant characteristics between age groups, and lack of knowledge regarding chronic depression prior to pregnancy.

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CHAPTER 1

INTRODUCTION

1.1 Statement of Purpose and Research Question

One in seven women is estimated to develop postpartum depression (PPD) (American Psychiatric Association, 2020). Adolescents have been recognized to have higher levels of PPD when compared to adult mothers (Diniz et al., 2017); however, limited research offers a comparison of risk factors between the two groups. In a recent systematic review of 48 articles, risk factors frequently recognized to contribute to PPD included a history of depression before or during pregnancy, anxiety, parity, unplanned pregnancy, lack of support, abuse and relationship issues, and stress (Hutchens & Kearney, 2018; Karaçam, 2018). Further, infant complications with admission into a Neonatal Intensive Care Unit (NICU) has been shown to increase maternal stress and PPD (Berns et al., 2021; Jubinville et al., 2012). Few studies have explored risk factors for PPD in mothers with NICU infants; however, multivariate analysis by Lasheras et al. (2020) found that the severity of neonatal health problems during the first 12 hours of life was the best predictor of PPD in the NICU group. This research compared adult and adolescent mothers of infants in NICU for differences among eleven risk factors including violence, support, unplanned pregnancy, depression during pregnancy, complications in pregnancy, manner of birth, anxiety, gestational age, infant birth weight, marital status, and race via the following research question: Are eleven commonly recognized risk factors for PPD different between adult and adolescent mothers of infants admitted into a NICU?

CHAPTER 2

LITERATURE REVIEW

2.1 Postpartum Depression: Prevalence and Risk Factors

Postpartum depression usually begins within the first six weeks after childbirth. Yozwiack (2010) argue that PPD affects as many as 13% of adult women, but studies have reported that the prevalence may be even higher in adolescents. Hymes and Girard (2019) estimated that up to 40% of adolescents may have PPD. Yozwiack (2010) further noted that at six weeks following birth, 61% of adolescent mothers versus 37.7% of adult mothers experienced symptoms, and at two to three months postpartum, 25.9% of adolescents versus 9.3% of adults were considered depressed. By one year postpartum, around 90% of mothers who experienced depressive symptoms, also experienced symptoms at 48 months postpartum, demonstrating the chronic and persistent nature of depression, especially for adolescents (Yozwiack, 2010).

Having an infant admitted into the NICU has been associated with high levels of PPD. Adult mothers of infants in the NICU have been shown to experience up to a 40% increase in PPD when compared to mothers of healthy infants (Tahirkeheli et al., 2014). Tahirkeheli et al. (2014) also noted that 39% of mothers met criteria for PPD and an additional 16.9% of mothers showed symptoms of subsyndromal PPD 30 days after a NICU admission. NICU is a stressful environment, often unfamiliar, highly technological, and unpredictable. Mothers of infants in the NICU are at great risk for relationship difficulties and family stress. Nearly 30% of mothers with a premature infant in NICU met

the diagnostic criteria of Acute Stress Disorder (ASD) at seven to ten days after birth, and for many, ASD symptoms persisted after a month (Berns et al., 2021; Jubinville et al., 2012).

Often infants requiring admission into a NICU are distressed in utero (fetal distress) or premature, often necessitating a cesarean birth. Both the manner of birth and the infant's condition may elicit additional depressive and/or anxiety symptoms. In a systematic review conducted by Vigod et al. (2010), four of six studies with comparison groups reported significantly increased depression prevalence or higher mean depression scores in mothers of preterm infants (versus term births) during the first year after birth. Specifically, Vigod noted the risk of depression at eight weeks postpartum in mothers of preterm infants to be 1.6 times the risk for mothers of term infants. The prevalence of PPD also increased in mothers of preterm infants at 12 weeks after birth (Vigod et al., 2010). Notably, significantly higher scores for PPD were found in mothers of very preterm infants up to 60 weeks after birth (Vigod et al., 2010).

Some commonly reported risk factors for PPD include relationship problems and violence in the family, lack of social support, unplanned pregnancy, depression before and during pregnancy, anxiety, and number of children (Hutchens & Kearney, 2018; Jubinville et al., 2012; Karaçam, 2018). Adult mothers with low relational and trauma-related stress, but high financial stress had a much lower prevalence of PPD compared to those with low financial stress but high relational and high trauma-related stress, indicating personal relationships play a significant role in the risk of PPD (Qobadi et al., 2016). Waraphorn and colleagues (2021) also noted the significant contribution of relationship factors in explaining depression, showing high relationship satisfaction reduced PPD; yet,

unexpectedly, low social support did not significantly explain PPD. When the current father was involved, any previous effects of intimate partner violence (IPV) on PPD became nonsignificant (Waraphorn et al., 2021). Yet, IPV remains a recognized risk factor in published studies. Among 248 Arabian women, ages 18 to 48, those developing PPD (10.3 %) also reported partner violence (Shwartz, 2020).

Schwartz (2020) also noted the impact of an unplanned pregnancy on PPD. Additional researchers exploring unplanned pregnancies and PPD among women in Israel and China reported the importance of this variable (Polachek et al., 2014; Chan, 2019). Chan reported that an unintended pregnancy was a major factor that doubled the risk for PPD among adult Chinese mothers and suggested that these mothers received less support from their partners, making it more difficult to cope with the pregnancy and the baby (Chan, 2019).

Another important contributor to PPD is maternal mental health including a previous history of depression and/or anxiety and stress (Karaçam, 2018; Swift et al., 2020). Anxiety has also been recognized as a risk factor for depression, often which goes undiagnosed, and is frequently co-morbid with depression (Swift et al., 2020). Among American women, “high worriers” had a four-time greater likelihood of developing PPD than women with low to average worry during pregnancy (Osborne, 2021). Moreover, Osborne noted that high worry in pregnancy was found to be a better predictor of the development of PPD than a current psychiatric diagnosis. Ahmed et al. (2021) also reported no statistically significant relationship between PPD and psychiatric risk factors including a history of depression, revealing about 85% of mothers reporting a history of depression, experiencing no PPD. However, Ahmed et al. (2021) indicated a statistically significant

association between a history of stressful conditions and PPD, revealing 59.3% of women with stress reporting PPD versus 40.7% of women without a reported history of stressful conditions.

The 21-study systematic review conducted by Hutchens and Kearney (2018) offered additional support for these recognized risk factors for PPD including life stress, low social support, abuse (current, past, and child sexual abuse), prenatal depression, and lack of partner satisfaction. However, these researchers questioned whether the associated attributes were risk factors or characteristics of those suffering from depression, and if the inconsistent use of operational definitions for risk factors among studies and existing cultural influences limited the findings.

2.2 PPD Among Adolescent Mothers: Risk Factors

Few studies have examined the adolescent population for risk factors related to PPD regardless of infant status or NICU admissions. One available study found a higher prevalence of PPD among Jordanian adolescent mothers than adolescents in high-income countries such as the United States, suggesting the impact of culture upon PPD (Mohammad et al., 2021). These researchers suggested that Jordanian men are considered the head of the household and have the power and authority over the wife, which leads to limited decision-making by wives over their own life and the care of their children. This power imbalance is more detrimental for an adolescent mother who could be more immature, less educated, and more socialized into submissiveness. (Mohammad et al., 2021).

Another risk factor found to contribute to adolescent PPD is social support. Fagbemi (2019) found an inverse relationship between social support and PPD

among adolescent mothers, wherein receiving social support after birth was important in reducing the risk of PPD. A perception of social support from the family has been found to be negatively associated with PPD symptoms, perhaps because family members are often more attuned to the adolescent's triggers or mood fluctuations prior to or during pregnancy and may be the first to recognize symptoms of depression and enable the adolescent to seek help (Hymas & Girard, 2019). On the contrary, for some adolescents, support can be "too much." Mohammad et al. (2021) found adolescent Jordanian mothers reporting high social support to be at highest risk for PPD. This unexpected result was explained by stating that traditional forms of support by Jordanian families in the first postpartum month were described as "too much and interfered with their parent confidence" creating a source of family conflict and diminishing the value of support to the adolescent (Mohammad et al., 2021).

The mental health of the adolescent is another risk factor for PPD. In a systematic review of 14 articles focused specifically on adolescents, a significant association between prenatal depression and PPD was identified (Hymas & Girard, 2019). These researchers suggested that the closer the experience of depression to the childbirth, the greater its predictive power for PPD. If an adolescent was susceptible to depression before pregnancy, it was likely that depression would occur during pregnancy, birth, and into motherhood (Hymas & Girard, 2019).

Hymas and Girard (2019) also explored several other variables in their systematic review including the impact of race/ethnicity and planned pregnancy on PPD. Yet, across six studies reviewed, none revealed a statistically significant association between race/ethnicity or unplanned pregnancy and PPD symptoms. Hymas and Girard, however,

did note that the measurement tools and definitions of PPD differed across studies, thus limiting the findings.

2.3 Comparison of PPD-Risk Factors Among Adolescents and Adults

Few studies exist comparing PPD risk factors for both adolescents and adults; however, Swift et al. (2020) compared 355,864 postpartum women with 1,420,350 non-childbearing women and found the rate of depression and anxiety highest for adolescents. Further, a history of depression prenatally or before pregnancy was considered a main predictor of PPD for all ages of women. In a rare comparative study by Nunes and Phipps (2013), risk factors for PPD were found to be different between adolescents and adults. Adolescent PPD more often associated with reports of prior depression and lack of support; whereas, for adults, a likelihood of depression associated more with prior depression, pregnancy intent, race, socioeconomic standing, and mental health during pregnancy. Furthermore, adults experiencing PPD "argued more than usual," had "physical fights," and often reported that their "partner did not want pregnancy." When applied to the adolescent population, predictive models developed for all pregnant women were not as accurate as the adolescent-specific predictive model. This finding led Nunes and Phipps to suggest that current screening tools may not be adequate for risk assessment of PPD in pregnant adolescents.

For adolescents, support from a partner may be frequently absent or of poor quality; however, married adolescent mothers have been found to show a greater likelihood of reporting PPD than adult married mothers due to unstable marriages and higher divorce rates (Qobadi et al., 2016). Demographically, age may contribute more than marital status to PPD. It has been noted that unmarried older mothers have less likelihood of experiencing

PPD than unmarried younger mothers (Qobadi et al., 2016). The age when one gives birth has been found to be age-dependent for depression and anxiety (Swift et al., 2020). Swift and her colleagues noted a seven times greater risk of PPD after birth for 15- to 19-year-old women versus a 2.7 times greater risk for women ages 30 to 34. (Swift et al., 2020).

The notion that PPD may differ between adolescents and adults has been suggested by both Nunes and Phipps (2013) and Hymes and Girard (2019). When compared with adults, Hymes and Girard reported adolescents' depressive symptoms have been shown to persist for longer durations after delivery, more often lead to an increased likelihood of rapid subsequent pregnancy and were more often associated with a higher risk of IPV. These researchers suggest that differences could be because adolescent mothers often had unmet and idealistic expectations of motherhood, more negative evaluations of their body changes during pregnancy, increased feelings of inadequacy about the maternal role, and experienced more conflict between wanting more independence yet needing more support as a new mother. Furthermore, higher prevalence of social isolation and higher levels of parenting stress in adolescent mothers have also been suggested as contributing to increased PPD in adolescent mothers (Hymes & Girard, 2019).

In summary, numerous risk factors have been identified as contributing to PPD; however, most published works have failed to include adolescents, offer comparisons by age groups, or focus on risk factors within the vulnerable population of mothers with NICU infants. This study compared risk factors for PPD between adolescent and adult mothers with infants in NICU.

CHAPTER 3

METHODOLOGY

3.1 Study Design

This comparative descriptive study used a cross sectional design to compare risk factors for PPD for adolescent versus adult mothers of infants admitted into a NICU. Adolescent data was collected approximately ten years ago. Adult data was recently collected at the same hospital; however, with the pandemic, data collection was prematurely halted in 2020 due to hospital restrictions. Available data from the two datasets were merged by common variables to create a second dataset offering an opportunity to explore comparisons between adults and adolescent mothers. The University of Texas at Arlington provided Institutional Review Board (IRB) approval for both studies that had one common aim of exploring the mental health and birth experience of new mothers.

3.2 Study Sample

Merging of the two primary study datasets by common variables lowered the original sample size for the adolescent study. Further, creating a subset of mothers with NICU infants further lowered the sample size of the new dataset thereby producing a sample of 82 mothers consisting of 35 adults and 47 adolescents for comparison. Study adults were 20-44 years of age; adolescents were 13 -19 years of age. For the primary adolescent study, there was no direct question regarding NICU infant status asked; therefore, infants of adolescent mothers were assumed to be NICU admissions if birth

weight was below 2500 grams, gestational age was under 37 weeks, or adolescents identified the infant to be in NICU in the qualitative portion of the primary study. For both primary studies, mothers spoke, read, and wrote English and had a viable infant.

3.3 Study Setting

Adolescent data for the primary study was collected on two large postpartum units of a large, public hospital in North Texas serving a high Spanish-speaking demographic and reporting an annual birth rate of 5000 births, equivalent to 20% of the county's deliveries. Adult data for the primary study was collected from one level three NICU at the same setting.

3.4 Study Measurements

Data for PPD were assessed with the Edinburgh Postnatal Depression Scale (EPDS) which is a 10-item survey that rates each item from 0 to 3 points for a total of 30 points. The higher the score, the more severe the depressive symptoms. According to the original developer of the EPDS, "women scoring above a threshold of 12/13 were most likely to be suffering from a depressive illness of some severity" (Cox et al., 1987, p785). Lesser scores of 9/10 suggested some level of depression above the absence of depression (Cox et al., 1987). The EPDS has shown adequate reliability and validity for pregnant and postpartum women among both adult and adolescent populations (Birkeland et al., 2005; Cox et al., 1987). More recently, researchers have defined items 3,4,5 in combination as an assessment of anxiety (EPDS-A; Swaim et al., 2010). The EPDS-A has been used to assess anxiety at birth indicating anxiety with a score of 4 or greater (Swaim et al.). The EPDS-A has been described as a reliable screen for anxiety (Loyal et al., 2020; Riaz & Riaz, 2020). For the current study, the EPDS-A was used to measure the risk factor of anxiety.

A researcher-developed demographic and background sheet was used to collect data for report of the remaining ten risk factors: violence, support, unplanned pregnancy, prenatal depression (assessed retrospectively at postpartum), complications in pregnancy, manner of birth, gestational age, infant birth weight, marital status, and race. Age-influenced demographic factors potentially contributing to PPD, such as parity and socioeconomic level were not included in the analysis. On average, measures were administered to mothers between 3 to 13 days following birth of the infant.

3.5 Study Procedures

For both primary studies, participants' data were collected directly in person in the designated settings, postpartum or NICU. Unit secretaries provided names of potential participants to the researchers that met the inclusion criteria of the corresponding study. Either the primary researcher or student research assistants collected the data. Interest in the study was obtained first and then in a private area, details of the study were discussed, and consent was obtained. For the adolescent study, both assent and parental/guardian consent was obtained for teens under the age of 18. For both primary studies, all other study participants over 18 consented for themselves. Collection of data was done in private as could be arranged. In a small number of cases parents preferred to be with the adolescent when completing the surveys. Data completion took about 40 minutes and all mothers in both primary studies were provided with handouts and community resources for depression.

3.6 Study Data Analysis

Characteristics of the sample were described using descriptive statistics including means, frequencies, and percentages. Differences between adults and adolescents by PPD

scores and risk factors were determined via t test or Chi Square. Correlations were determined via Pearson's Product Moment Correlation Coefficient.

CHAPTER 4

RESULTS

4.1 Research Results

Sample characteristics for both adolescents and adults are presented in Table 4.1. Postpartum depression (PPD) scores were highest in adolescent mothers, t (78.3) =2.004, p=0.003, but mean EPDS scores were not indicative of depressive symptoms: with M=7.57(SD = 5.88) versus M=5.37(SD = 4.05) for adolescents and adults respectively. Only adults reported significant risk factors: pregnancy complications, X^2 = 20.326, p=.001, lower gestational age, t(25.26)=2.842, lower infant birth weight, t(35.36)=2.842, p=0.007, and cesarean birth, X^2 = 7.61, p=.006. As expected, adults were more likely to be married, X^2 =10.968, p=.001. No significant differences were found between adolescents and adults for reports of prenatal depression or anxiety, and all anxiety mean scores were under 4; however, anxiety did correlate strongly with PPD (r=.696, p=.001). Violence (family/partner and nonfamily), unplanned pregnancy, and race/ethnicity were not found to be significant risk factors for adolescents or adults, $p > 0.05$. The risk factor of support was not analyzed because all, except one mother (adolescent), indicated support by either family, partner, or healthcare provider.

Table 4.1: Sample Characteristics

Variables	Adolescent Mothers (n = 47)		Adult Mothers (n = 35)	
	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)
Depression* Prevalence (EPDS > 8)	21	44.6	8	22.9
Depression during pregnancy	6	13	1	0.03
Single*	39	83	17	48.6
Race/Ethnicity Caucasian Black Hispanic Other	 4 14 26 3	 8.5 29.8 55.3 6.4	 4 10 18	 11.4 28.6 51.4
Planned Pregnancy	16	34	14	40
Cesarean Section Birth	16	34	23	65.7
Violence (non-family)	5	10.6	6	17.1
Violence (family)	2	4.3	3	8.6
Complications in Pregnancy*	11	23.4	26	74.3
Support	All participants indicated support except one adolescent			
Gestational age** (weeks)	Mean = 34.7; SD = 4.07		Mean = 32.19; SD = 3.08	
Birth weight** (grams)	Mean = 2583.78; SD = 984.98		Mean = 1916.12; SD = 655.6	
Depression	Mean = 7.58; SD = 5.88		Mean = 5.37; SD = 4.05	
Anxiety	Mean = 3.23; SD = 2.37		Mean = 2.34; SD = 1.79	

*p=.05; **p=.01

CHAPTER 5

DISCUSSION

5.1 Research Discussion

This study analyzed differences in risk factors for PPD between adolescent and adult mothers of infants admitted into NICU. A consistent finding from various studies indicated that having an infant admitted into NICU is associated with higher levels of PPD than in the normal population (Tahirkeheli et al., 2014). Further, numerous studies have shown that the adolescent population in general is more vulnerable to PPD than adults. The current study adds support to these findings with a higher PPD prevalence rate revealed for adolescents than adults of NICU infants. Further, prevalence rates overall were found to be higher than commonly noted among the general population. The highest rates of adolescent pregnancy are in countries in sub-Saharan Africa, such as Nigeria. From 8,580 adult mothers, 6.9% had major depression compared with 17.7% of 772 adolescent mothers. (Oladeji et al., 2019).

While PPD rates were highest for the adolescent, no risk factors were found to significantly impact the teen's depressive symptoms. These results were unexpected and may be influenced by study limitations related to recruitment settings, thus, potentially creating a healthier population of infants for the adolescents or less time in the NICU. In contrast, significant risk factors for PPD among adults included pregnancy complications,lower gestational age and infant birth weights, and higher frequency of cesarean births. Numerous studies support infant complications as contributing to PPD.

In a systematic review of 26 studies totaling 2392 mothers of preterm or low birth weight infants, Vigod (2010) reported that increased depression prevalence rates or higher mean depression scores commonly characterized the mothers. Cesarean births, especially emergency cesareans, often performed for complications and lower gestational age infants, have also been linked to PPD (Valentina, 2019).

While marital status differentiated adolescent and adult mothers as expected, there was no knowledge of marital relationship quality, conflict, or partner support. Thus, support may have played a large protective role for adolescents, thus diminishing the stress of risk factors such as single status, high- risk pregnancy, or a cesarean birth and impacted the PPD outcome. However, analysis for social support was abandoned as all but one mother (adolescent) indicated support.

Additional risk factors explored included relationship problems and family violence, unplanned pregnancy, depression during pregnancy, and anxiety were not identified as significant risks for either adolescents or adults. Yet, previous researchers exploring a comparison of risk factors between adolescent and adult mothers, such as Hymas and Girard (2019), Swift et al. (2020), and Nunes and Phipps (2013), have reported differences in these risk factors between the two age groups revealing previous depression, violence, and lack of support as adolescent risks. Further, while not significant in our study, adolescents did indicate more prenatal depression than adults. Both Hymas and Girard (2019) and Swift et al. (2020) found significant associations between prenatal depression and PPD in adolescent mothers. According to Karaçam (2018) and Swift et al. (2020), anxiety and stress have also been recognized as risk factors for depression among all age

groups; however, the current study's small sample size may have prevented a replication of these expected findings.

Study results may suggest that risk factors for PPD of mothers with NICU infants may be more likely related to infant characteristics than other demographic or background variables. Finding that certain risk factors were significant only in the adult population may suggest a lack of knowledge by the adolescent regarding the potential outcomes and consequences of having an infant in NICU. The importance of education and ongoing communication in terms an adolescent understands regarding the present and potentially future outcome and care of her infant prior to the adolescent's discharge home is critical.

CHAPTER 6

CONCLUSION

6.1 Research Conclusion

This study provides some understanding of the complexity of risk factors for PPD between adolescent and adult mothers of infants in NICU. Adolescent mothers had higher mean depression scores, but adult mothers reported more significant risk factors such as pregnancy complications, lower gestational age and infant birth weights, and cesarean birth. Findings suggest many risk factors may be similar between adolescents and adults of NICU infants, or other unexplored risk factors outside of the 11 examined in the current study relate more to the childbearing adolescent, suggesting additional research. Revealing differences in risk factors between adolescents and adults encourages healthcare providers to design and direct tailored care both prenatally and in postpartum. Continued research of risk factors in general can direct best practice and aid in the reduction of PPD for all age mothers.

6.2 Limitations and Recommendations

Two datasets were merged with data collected from two different settings, postpartum (adolescents) and NICU (adults). For the adolescent study, a direct question inquiring if the infant required NICU admission was not asked; therefore, NICU admission was assumed if the infant was below 37 weeks, below 2500 grams or specifically noted by the adolescent. However, according to the March of Dimes (MOD), almost 50 % of infants

born at 35-37 weeks and 90% of preterm infants born at 34 weeks and under will be admitted to a NICU (MOD, 2011).

Further, knowledge of participant symptoms of depression or anxiety prior to pregnancy and relationship quality may also have produced different study results. Stress, an important contributor to PPD, was not examined because the measurement tool assessing this variable in the two primary studies was different. Support was omitted from regression analysis because all study participants (except one) provided a positive report of support from family, partner or healthcare provider. Measures of depression and anxiety were administered to mothers at different times, with assessments in adolescents in early postpartum possibly missing delayed anxiety or depressive symptoms. Additional studies using larger samples and a breakdown of adolescent ages (younger versus older), including an increase in younger age adolescents could provide additional information for similarities and differences in risk factors of the youngest childbearing mothers of NICU infants.

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BIOGRAPHICAL INFORMATION

Emily Yu is a senior nursing student at the University of Texas at Arlington pursuing an Honors Bachelor of Science in Nursing. Yu began her journey to nursing in 2019 and has pushed through the obstacles of being an Honors student, nursing student, and also along with working on her personal relationships with friends and family. Despite wanting to give up many times, she persevered these last few years and will graduate with her BSN in August of 2022.