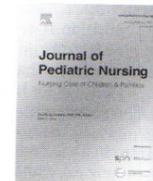




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## Family resiliency and family functioning in Non-Hispanic Black and Non-Hispanic White families of preterm infants

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### ABSTRACT

**Purpose:** The purpose of this study was to examine the relationship between resiliency factors and family functioning in families of preterm infants (< 37 weeks gestation) from two different racial groups hospitalized in a neonatal intensive care unit (NICU).

**Design and methods:** A cross-sectional design was used at five Level III/IV NICUs in a Midwestern city/suburbs. Seventy-nine family units (24 Non-Hispanic Black and 55 Non-Hispanic White) completed four instruments that assessed families' use of specific resiliency factors and a measure of family functioning. Demographic data were also collected.

**Results:** Using linear mixed modeling, the significant predictors of family functioning for both Non-Hispanic Black and Non-Hispanic White, even after adjusting for education, income and race, were the protective factors "hardiness" (coefficient =  $-0.021$ ) and "resources" (coefficient =  $-0.0052$ ). The fixed effects in the model accounted for 48% (Marginal  $R^2 = 0.48$ ) of the variance on family functioning and the fixed and random effects accounted for 59% (Conditional  $R^2 = 0.59$ ) of the variance on family functioning. Sixteen percent of the total sample rated their family as dysfunctional.

**Conclusions:** Findings from this study suggest that assessment of protective factors related to hardiness and resources individualize nursing interventions to support the resiliency of both Non-Hispanic Black and Non-Hispanic White families, regardless of differences in income and education. Further research studying resiliency in families of preterm infants is needed to understand the impact on long-term family functioning.

**Practice implications:** Understanding individual family strengths, through the identification of resiliency (protective and recovery) factors could predict at-risk families before discharge. In collaboration with other health care professionals, nurses can assess individual family needs and strengths, within the context of their socio-economic environment, and the racial and cultural influences that are important to the family.

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### Introduction

In 2019, one of every 10 births in the United States was classified as preterm (less than 37 weeks gestational age), and the number of Non-Hispanic Black (NHB) preterm births was higher (14.4%) than for Non-Hispanic White (NHW) preterm births (9.3%) (Center for Disease Control and Prevention, 2021). Investigators have reported complex, confounding etiological factors for the difference, such as neighborhood deprivation, toxic environmental exposures, genetics, education disparities and income inequality, often referred to as social determinants of

health (Burris & Hacker, 2017; Hogue & Silver, 2011; Manuck, 2017; Mohlman & Levy, 2016). Although some of these factors may involve both NHB and NHW mothers, detrimental experiences of racism and inequality have significantly affected NHBs, resulting in chronic psychosocial stress and ultimately, placing the NHB mother at increased risk for preterm birth (Alhusen et al., 2016; Braveman et al., 2015; Burris & Hacker, 2017; Johnson et al., 2020; Mutambudzi et al., 2017). Lu and Halfon's (2003) *Life Course Perspective* conceptualized birth outcomes as a combination of intergenerational factors, differential exposures during pregnancy, as well as social and environmental experiences for the entire life course of the mother. This viewpoint addressed the cumulative effects of the environment on the health of the mother, and the significance of critical periods for intervention (Halfon et al., 2014; Lu et al., 2010). The comprehensive and long-term impact of race and

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inequality are not completely understood (Alhusen et al., 2016; Beck et al., 2019; Johnson et al., 2020; Thoma et al., 2019). Further research is needed.

### Family functioning

For any family, the birth of a preterm infant may precipitate a crisis that continues throughout the hospitalization and afterwards, affecting how a family functions. Family functioning is defined as interactions between or among members regarding problem solving, communication, roles, affective responsiveness, affective involvement and behavior control (Epstein et al., 1983; Miller et al., 2000). These domains describe some of the aspects of family functioning according to the McMaster Model of Family Functioning, which is based on a systems theory. When families experience the birth of a preterm infant, roles within the family may change to support the other family member(s). The usual behaviors with respect to family activities, problem-solving and emotional responses toward each other may be altered due to this crisis within the family.

The family is challenged, sometimes requiring resources beyond their capabilities. They must learn to communicate, problem-solve, and manage in an unfamiliar Neonatal Intensive Care Unit (NICU) environment and seek support from family, friends, and health care professionals. The chronic health problems (e.g., bronchopulmonary dysplasia, neurodevelopmental and motor impairments) that may result from preterm birth, and their potential impact on the social and intellectual development of the child, place an additional strain on family functioning (Allotey et al., 2018; Anderson, 2014; Brydges et al., 2018; Everts et al., 2019; Lakshmanan et al., 2017).

Values that govern family interactions are also rooted in cultural norms that influence the individual family's definition of effective family functioning (McGoldrick et al., 2011). The need to optimize family functioning in families with premature infants is of paramount importance, especially in families disproportionately at risk for socioeconomic and health disparities (Lakshmanan et al., 2017; Treyvaud et al., 2014). Family resiliency factors such as social support, commitment, communication and problem solving skills have been identified in the literature as factors influencing family functioning (Black & Lobo, 2008; Epstein et al., 1983; McCubbin et al., 1997; Walsh, 2012).

### Family resiliency

Family resiliency builds on family stress and coping theory and focuses on the behavior of family relationships, recognizing parental strengths, family dynamics, interrelationships, and the social environment of the family (Patterson, 2002). This strengths-based perspective views family stresses and challenges as opportunities for healing and growth during life transitions, crises, or adversities. In the pediatric literature, resiliency factors have been studied in families of children with a chronic illness and the impact on coping, adjustment and adaptation (Nabors et al., 2013; Svavarsdottir et al., 2005; Van Riper, 2007). Nevertheless, there is a gap in family resiliency research in families of preterm infants. Using the McCubbins' Resiliency Model of Family Stress, Adjustment and Adaptation (RMFAA), Pinelli (2000) studied the adjustment phase for parents of preterm infants ( $n = 124$  pairs) and reported that adequate family resources were more strongly related to positive family adjustment and decreased anxiety. Doucette and Pinelli (2004) followed these same families over a two-year period, and reported that ongoing child health problems were associated with significantly lower family adjustment scores in both mothers and fathers.

### Conceptual framework

The theoretical framework for this study was the Resiliency Model of Family Stress, Adjustment and Adaptation (RMFAA) (McCubbin & McCubbin, 1993). McCubbin et al. (1988) defined family resiliency as

the "...characteristics, dimensions, and properties of families which help families to be resistant to disruption in the face of change and adaptive in the face of crisis situations" (p.247). The RMFAA framework describes two distinct, but related family processes that occur during a crisis or period of instability. The first is adjustment, which involves the use of established patterns of family functioning and the effect of protective factors to communicate and problem-solve in an effort to maintain family integrity. The second family process is adaptation, whereby the demands on the family interact with an assessment of their strengths and capabilities, recovery factors, to facilitate their adaptation to the crisis.

Protective and recovery factors work synergistically and interchangeably to support the family's ability to endure in the presence of a crisis. Protective factors are family traditions, hardiness, resources and social support and incorporate the family patterns of communication and problem-solving that are learned as a member of a family. They act as a buffer from periods of stress or crisis and influence family processes and reactions (McCubbin et al., 1997). Recovery factors are family member accord, social/spiritual support, and family resources that help a family to restore effective family functioning after a crisis period.

The model for the current study (Fig. 1) specifically addresses the impact of both protective and recovery factors that develop and evolve in response to the family life event, as well as the association with demographic factors. Individually and in combination, these factors may influence family functioning. Notably, this model includes race as a demographic factor for consideration given the preterm birth rate is much higher for NHB.

### Purpose

The purpose of this study was to explore the relationship between family resiliency and family functioning in NHB and NHW families of preterm infants during their hospitalization in the NICU. The aims of the study were: 1) to describe any differences between individual demographic factors (education and income) and protective and recovery factors for NHB and NHW family members, and 2) to determine whether any protective and/or recovery factors are predictors of family functioning for NHB and NHW families.

### Methods

#### Design

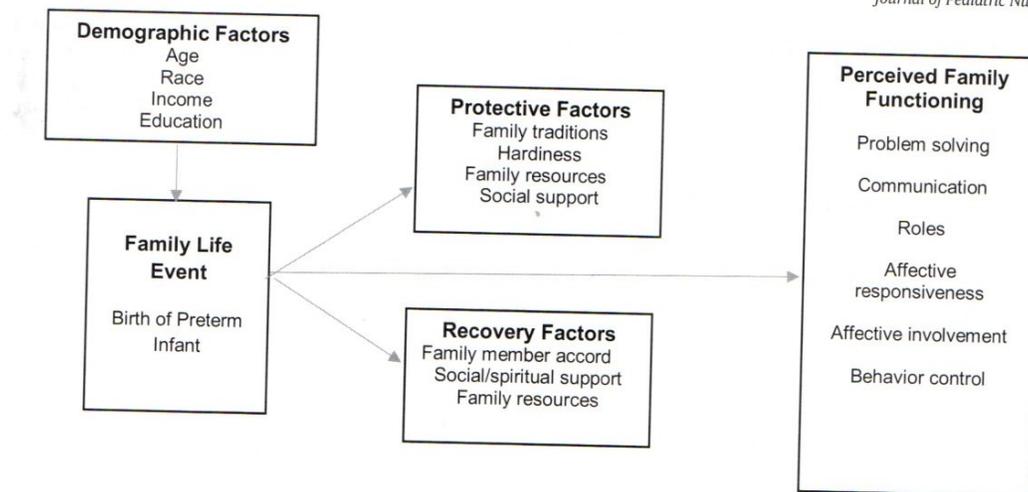
A cross-sectional design was used to investigate demographic factors of families, protective and recovery factors, and family functioning for two family racial groups. This study was approved by the University Institutional Review Board (IRB) that agreed to serve as the oversight IRB for a coordinated IRB agreement among the hospitals.

#### Setting

Five individual Level III or IV NICUs in a large Midwestern city/suburbs participated in the study. Bed capacity among the NICUs ranged from 23 to 70 beds and unit design varied from single rooms to open wards with several isolettes. For each hospital/NICU, contact was initiated with nursing leaders (Chief Nursing Officer, NICU Director and Manager) to explain the purpose, aims and methods of the study and to receive their approval.

#### Participants

Seventy-nine family units, which included 24 NHB and 55 NHW family dyad units, representing a total of  $n = 158$  individuals were recruited over a nine-month period (October 2016 – June 2017). The family unit was conceptually defined as two or more persons who are



**Fig. 1.** The Relationship among Demographic, Resiliency Factors and Family Functioning.  
Note: This figure represents the model for the study.

associated through a relationship and/or a sharing of resources and identify themselves as a family unit (Kaakinen et al., 2018). Most families consisted of the mother and biological father. Other family members chosen by the mother included grandmothers, siblings and cousins. Racial categories were NHB and NHW as standardized by the United States Office of Management and Budget (OMB).

Biological mothers were recruited if they met the inclusion criteria: a)  $\geq 18$  years of age, b) self-identified as either NHB or NHW and not biracial, c) spoke and understood English, d) single, married or cohabitating, e) had a singleton birth of a preterm infant with a gestational age  $< 37$  weeks, f) the preterm infant was hospitalized in the NICU  $> 2$  weeks to allow time for adjustment, g) the infant was in stable condition and expected to be discharged with the mother and h) identified the biological father or another family member available to participate in the study as a dyad. If the biological father was not considered by the mother as a member of the mother's family, then a significant person considered a member of the family by the mother was recruited. The other family member also needed to meet the inclusion criteria and self-identify as the same race as the mother (NHB or NHW). Families were not required to co-reside. Exclusion criteria were: a) mothers and fathers who were assuming foster care or would adopt the preterm infant, b) surrogate mothers, c) same sex couples, d) biological mothers of preterm infants with a major anomaly or whose prognosis was poor and may not be discharged home, e) biological mothers of multiples (e.g. twins, triplets, etc.), f) preterm infants who were previously discharged and readmitted to the hospital and g) mothers who could not identify another family member to participate in the study or if the family member identified did not consent to participate.

#### Measures

Instruments developed by McCubbin et al. (1996) were chosen for their representation of specific protective and recovery factors and their reported validity and reliability to measure these concepts. Family traditions (Family Tradition Scale), family hardiness (Family Hardiness Index), family resources (Family Inventory of Resources for Management) and social/spiritual support (Family Crisis Oriented Personal Evaluation Scales) were the predictor variables chosen for the study. The outcome variable family functioning was measured using the McMaster General Family Functioning Scale (Epstein et al., 1983). All of the instruments were administered at the time of consent. All instruments except for two (Family Tradition Scale and Family Hardiness Index) have been used with NHB.

**Family Tradition Scale (FTS).** The protective factor of family traditions (routines/rituals, family celebrations and time together) is a 20-item scale that measures participation in maintaining traditions regarding holidays, transitions and religious occasions. An individual score was determined by scoring each Yes response as a 1, each No response as a 0 and adding the total number of Yes responses; a higher score indicating more participation in family traditions. Validity of the Family Traditions Scale was measured in relationship to other criterion indices, i.e., family sense of coherence, family hardiness, family bonding and family satisfaction and were positively correlated. It has an overall internal reliability of  $\alpha = 0.85$ . (McCubbin et al., 1996). For the current study, the Cronbach's alpha coefficient = 0.90 (NHB:  $\alpha = 0.86$  and NHW:  $\alpha = 0.91$ ). At this time, use with NHB has not been reported in the literature. McCubbin et al. (1996) published use with multiracial families.

**Family Hardiness Index (FHI).** Family hardiness is a second protective factor. This index is a 20-item instrument that assesses the individual family member's strengths and approach toward adversity; the commitment to work together, the confidence to handle problems and to control events (McCubbin et al., 1996). The values of the responses (False = 0, Mostly False = 1, Mostly True = 2 and True = 3) are summed, and a higher total score indicates increased capabilities to manage a crisis situation. Validity of the Family Hardiness Index was established in relationship to other criterion indices of family functioning: Family Flexibility, Family Times and Routines and the indices of Quality of Family Life. The overall internal reliability was reported as Cronbach's alpha coefficient = 0.82 and for this study was  $\alpha = 0.83$  (NHB:  $\alpha = 0.82$  and NHW:  $\alpha = 0.84$ ). The instrument has been used with NHW, Asians and Hawaiians (McCubbin et al., 1996).

**Family Inventory of Resources for Management (FIRM).** Family resources is the third protective factor. The FIRM assesses a family member's perceived resources: personal resources (financial, educational and communication), family system internal resources (identify and manage resources and problem-solving ability) and social support (emotional support from within the family, as well as friends and the community). The respondent identifies the degree to which each statement most accurately describes the family on a 0 to 3 scale with a range from 0 (not at all) to 3 (very well). A higher summed score indicates a larger repertoire of resources to enable more effective management of crisis situations. Significant positive correlations with selected Family Environment scales offered support for validity of the FIRM. For internal reliability, the Cronbach's alpha = 0.89 and for this sample was  $\alpha = 0.93$  (NHB:  $\alpha = 0.93$  and NHW:  $\alpha = 0.93$ ) (McCubbin et al., 1996).

Lee et al. (2009) reported overall FIRM Cronbach alpha's as  $\alpha = 0.90$  for African Americans and  $\alpha = 0.96$  for Caucasians.

**Family Crisis Oriented Personal Evaluation Scales (FCOPES).** The recovery factor of family member accord (ability to reframe events and problem-solve), social/spiritual support (actively engage in acquiring support from family, friends, and religious groups) and family resources was measured with the FCOPES). The FCOPES is a 30-item instrument consisting of five subscales and a total scale used for this study (McCubbin et al., 1996). A total coping score was obtained by summing the number noted by the respondent with a range from 1 (*never*) to 5 (*always*). Higher scores indicate greater coping behaviors. Validity was obtained with factor analyses on two large samples of husbands and wives. The internal reliability was a Cronbach's alpha coefficient = 0.81 (McCubbin et al., 1996). The current sample's Cronbach's alpha coefficient was similar,  $\alpha = 0.82$  (NHB:  $\alpha = 0.84$ , and NHW = 0.81). Two studies published use of this measure with NHB families, but psychometric properties were not reported in the literature (Hanline & Daley, 1992; Myers et al., 1992).

**McMaster Family Assessment Device (FAD) – General Functioning Subscale (GFS).** The McMaster Family Assessment Device: General Functioning Subscale (GFS) is one subscale of the Family Assessment Device that was used to measure the outcome of family functioning. As a global index of family functioning, the items of the GFS represent the subscales of the FAD (problem-solving, communication, involvement in family activities, emotional responsiveness to family members, roles and behavioral control). The GFS has 12 items with six reflecting healthy family functioning, and 6 six unhealthy family functioning (Epstein et al., 1983). The items ask about planning family activities, decision-making, discussing feelings, providing support during crisis periods and feeling accepted. Each participant rates agreement or disagreement with respect to how the item describes his or her family by selecting one of the four responses (i.e., 1 = *strongly agree*, 2 = *agree*, 3 = *disagree*, and 4 = *strongly disagree*) and the negatively worded items are reversed. A total score is calculated and then divided by the number of items on the subscale (12) giving a total score range between 1 and 4, with a score greater than 2 (cutoff score) indicating greater family dysfunction (Epstein et al., 1983; Miller et al., 2000). An independent assessment of the psychometric properties of the 12-item GFS was conducted using the data set from the Ontario Child Health Study, which included 1822 families. Results supported construct validity of the GFS as a measure of family functioning (Byles et al., 1988). Discriminant validity was reported between clinical and nonclinical families (Epstein et al., 1983). The GFS was considered separately in a confirmatory factor analysis, and it correlated highly with the principal component of the other items in the subscales, indicating support for use as a global index of family functioning (Kabacoff et al., 1990; Tutty, 1995). The internal reliability of the GFS was reported as Cronbach's alpha coefficient = 0.86 (Byles et al., 1988). The current study revealed a Cronbach's alpha coefficient slightly lower  $\alpha = 0.76$  (NHB:  $\alpha = 0.72$ , and NHW:  $\alpha = 0.77$ ). This subscale has been used with NHB participants and psychometric properties were similar to other groups (Chapman & Woodruff-Borden, 2009; Harper & LaVome Robinson, 1999; Petrocelli et al., 2003).

#### Procedure

Biological mothers were approached while they were at their infant's bedside. The mother was asked screening questions (gestational age of baby, number of weeks in the NICU, race and age), and the study was explained. If she agreed to participate, the mother was asked if there was another family member who would be willing to complete the instruments. If she said yes, the mother and other family member were given a consent form to read and offered the opportunity to ask questions. If the family did not visit together, a separate meeting time was scheduled. After consent forms were signed, a demographic form was completed (gestational age of baby, number of weeks in the

NICU, racial groups, age of mother, educational level for each family member and family income), and the instruments were administered using a paper and pencil scannable form. Twenty minutes was the average time to complete the instruments. The family received a \$15 gift card for their participation.

#### Statistical analyses

Mean and standard deviation (SD) or  $n$  (%) were used to describe the demographic data (age, race, education, and income) of the individual participant sample ( $n = 158$ ).  $t$ -test was used to compare continuous variables while Fisher's exact test was used to compare categorical variables. Prorated scores were calculated for survey totals and subscales if  $\leq 10\%$  were missing. Mean of answered items were determined and multiplied by the total number of items. If respondents had  $>10\%$  of items missing, the validity of the scale might be questionable and was set to missing. Linear mixed effects model was used to examine the effects of various factors on family resiliency and family functioning. Compound symmetry structure was used to account for the correlation between mothers and the other family member. To determine if any of the protective and recovery factors were predictors of family functioning when adjusting for race, education, and income, a backward elimination was performed to select the final model. Patient's demographic factors (race, income, and education) and protective and recovery factors (family traditions, family resources, family hardiness, and family support & resources) were included in the initial model. If the protective or recovery factor was nonsignificant, it was eliminated at each step. All the significant protective and recovery factors along with patient's demographic factors were left in the final model. SAS V9.4 (SAS Institute Inc., Cary, NC), SPSS version 26.0 (IBM Corp., Armonk, NY), and R were used for statistical analysis. Tukey's test was used to adjust for the multiple comparisons. Statistical significance was set at  $p < .05$ .

#### Results

Biological mothers and fathers from both groups (NHB and NHW) were similar in age with a range from late twenties to mid-thirties. There was no significant difference in age between NHB and NHW mothers (Table 1). The gestational age of the preterm infants for each group was NHB:  $M_{\text{gestation}} = 28.74$  weeks,  $SD = 3.62$  and for NHW:  $M_{\text{gestation}} = 29.76$  weeks,  $SD = 3.45$ .

Income and education were chosen as two key demographic variables for analysis because they provide an indication of socioeconomic position, more so than age, geographic location or employment. Mean age was similar for both groups (late twenties to mid-thirties) and geographic location included city and suburban NICUs with essentially eclectic populations. Employment for both groups varied widely in number of hours worked and therefore, income was more relevant to the analysis.

There was a significant association between mother's education and race ( $p < .001$ ) for NHB and NHW mothers. Income was measured as family income, and 140/158 participants were living together and reported combined incomes. There was a significant association between family income and race ( $p < .0001$ ). Seventy percent NHB had an income less than \$30,000 annually, whereas 82% NHW reported an annual income greater than \$30,000 (Table 1).

The first aim was to examine if there was any association between individual demographic factors (education and income) and protective and recovery factors. Since the less than high school (<HS) category comprised only seven participants (1 biological father in NHW; 1 mother, 4 biological father, and 1 other in NHB), this category was combined with high school and General Education Development (GED) to make the statistical model more robust (Table 2). Mean scores from the Family Traditions scale were low for both NHB and NHW for the protective factor of traditions and not statistically significant, regardless of educational level. Formal observance of traditional ceremonies and

**Table 1**  
Demographic variables of sample.

Variable	NHB Family Dyad Unit (n = 24)			NHW Family Dyad Unit (n = 55)		
	Mother (n = 24)	Bio Father (n = 16)	Other (n = 8)	Mother (n = 55)	Bio Father (n = 50)	Other (n = 5)
Age (yrs.) Mean (SD)	28.5 (6.4)	34.5 (8.3)	39.3 (11.5)	30.2 (4.7)	32.1 (4.7)	51.4 (11.5)
Education						
<HS/HS/GED	11 (45.8)	11 (68.8)	4 (50.0)	6 (10.9)	11 (22.0)	2 (40.0)
Some college	7 (29.2)	3 (18.7)	2 (25.0)	13 (23.6)	13 (26.0)	
College degree	6 (25.0)	2 (12.5)	2 (25.0)	36 (65.5)	26 (52.0)	3 (60.0)
Income (\$)*						
0–9999	8 (33.3)			1 (1.8)		
10,000–19,999	6 (25.0)			5 (9.1)		
20,000–29,999	3 (12.5)			4 (7.3)		
30,000–49,999	4 (16.7)			6 (10.9)		
50,000–75,000	2 (8.3)			11 (20.0)		
>75,000	1 (4.2)			28 (50.9)		

Note: Data were presented as mean (SD) or n (%). \*Denotes family income.

NHB=Non-Hispanic Black, NHW = Non-Hispanic White. HS=High School, GED-General Education Development.

holidays were less of a priority. Mean scores (as measured by the FHI and the FIRM) for NHB were moderately low for the protective factors of resources and hardiness, as well as the recovery factor of support and resources (as measured by FCOPEs). In comparison, NHW had moderately high mean scores for these factors.

Similarly, the income group \$0–\$9999 and \$10,000–\$19,999 were combined (\$0–\$19,999) to make the statistical model more robust (Table 3). As with education, the protective factors of traditions and resources were not significantly different with income for either NHB or NHW. Significant differences were found for the protective factor of hardiness, as well as the recovery factor of support and resources for both NHB and NHW at all income levels (Table 3). These variables reflected the challenges and commitment perceived by individual family members, as well as their available resources.

As depicted in Fig. 2, the GFS (family functioning) scores ranged from positive to dysfunctional family functioning for both groups. Of note, 29% of NHB (8 mothers and 6 biological fathers) and 10% of NHW (2 mothers, 8 biological fathers and 1 other) scored greater than two on this instrument, indicating a perception of ineffective family functioning. These 25 individuals represent 16% of the total sample.

The second aim was to determine if any of the protective and recovery factors were predictors of family functioning. A backward elimination was performed to select the final model. The protective factors “hardiness” and “resources” were the only significant predictors of

family functioning. They remained significant even after adjusting for education, income and race (Table 4). The fixed effects in the model accounted for 48% (Marginal  $R^2 = 0.48$ ) of the variance on family functioning and the fixed and random effects accounted for 59% (Conditional  $R^2 = 0.59$ ) of the variance on family functioning.

## Discussion

The purpose of this study was to explore the relationship between family resiliency and family functioning in NHB and NHW families of preterm infants during their hospitalization in the NICU. NHW median income (\$56,083) is greater than NHB (\$26,053) in this urban/suburban area, and in the current study 67.4% of NHB reported annual household income <\$30,000 as compared to the 14.7% of the NHW group which was significantly different. Although these differences may be related to social determinants of health, including systemic bias and racism, this study did not address these factors. Nevertheless, it highlights the need to investigate these factors further to understand the NHB family perspective and potentially influence practice and policy-making.

Even though there were differences in income and education between the two racial groups, the predictors of family functioning were similar to the results reported in other studies. Our findings indicated that the protective factors of resources (measured by the Family

**Table 2**  
Comparison of Resiliency Instruments and Related Protective and Recovery Factors for NHB and NHW Families by Education.

Scale / Variable	NHB (n = 48) Mean (95% CI)	NHW (n = 110) Mean (95%CI)	p
Family Traditions / traditions			
<HS/HS/GED	13.0 (11.2,14.9)	13.1 (11.1,15.0)	0.99
Some College	13.0 (10.7,15.2)	13.0 (11.2,14.8)	0.99
College Degree	13.3 (11.1,15.4)	13.3 (12.0,14.6)	0.99
Family Inventory of Resource Management/resources			
<HS/HS/GED	168 (160,176)	179 (171,186)	0.022
Some College	173 (164,182)	184 (177,191)	0.022
College Degree	171 (162,180)	182 (176,187)	0.022
Family Hardiness / hardiness			
<HS/HS/GED	43.6 (41.2,45.9)	48.1 (45.7,50.5)	0.001
Some College	44.4 (41.7,47.1)	48.9 (46.7,51.1)	0.001
College Degree	43.7 (41.1,46.4)	48.3 (46.7,49.8)	0.001
Family Crisis Oriented Personal Evaluation /support & resources			
<HS/HS/GED	69.2 (65.2,73.2)	73.8 (69.5,78.2)	0.047
Some College	71.1 (66.2,75.9)	75.7 (71.7,79.7)	0.047
College Degree	71.7 (66.9,76.4)	76.3 (73.5,79.1)	0.047

Note: NHB=Non-Hispanic Black, NHW = Non-Hispanic White, HS=High School, GED-General Education Development.

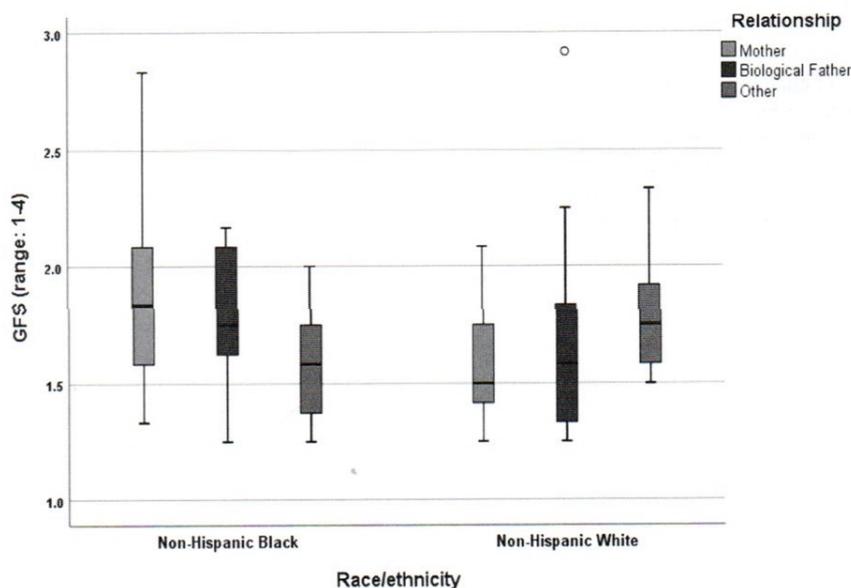
**Table 3**  
Comparison of Resiliency Instruments and Related Protective and Recovery Factors for NHB and NHW Families by Income.

Scale/Variable	NHB (n = 48) Mean (95% CI)	NHW (n = 110) Mean (95% CI)	p
Family Traditions /traditions			
\$0–19,999	13.3 (11.2,15.3)	13.2 (10.68,15.7)	0.94
20,000–29,000	13.2 (10.2,16.2)	13.1 (10.0,16.2)	0.94
30,000–49,999	12.9 (10.2,15.6)	12.8 (10.2,15.4)	0.94
>50,000	13.3 (10.8,15.8)	13.2 (12.0,14.4)	0.94
Family Inventory of Resources for Management /resources			
\$0–19,999	171 (162,179)	179 (169,189)	0.13
20,000–29,000	164 (152,175)	172 (160,184)	0.13
30,000–49,999	170 (159,181)	178 (168,188)	0.13
>50,000	175 (165,186)	183 (178,188)	0.13
Family Hardiness /hardiness			
\$0–19,999	44.0 (41.5,46.6)	48.6 (45.5,51.7)	0.0034
20,000–29,000	42.3 (38.6,45.9)	46.8 (43.0,50.7)	0.0034
30,000–49,999	43.3 (40.1,46.8)	48.0 (44.8,51.2)	0.0034
>50,000	43.9 (40.7,47.0)	48.5 (47.0,50.0)	0.0034
Family Crisis Oriented Personal Evaluation / support & resources			
\$0–19,999	70.8 (66.4,75.2)	77.5 (72.0,83.0)	0.015
20,000–29,000	68.7 (61.9,75.5)	75.4 (68.1,82.6)	0.015
30,000–49,999	69.6 (63.3,75.6)	76.3 (70.5,82.0)	0.015
>50,000	68.9 (63.3,74.5)	75.6 (72.9,78.2)	0.015

Note: NHB=Non-Hispanic Black, NHW = Non-Hispanic White.

Inventory of Resources for Management (FIRM) instrument) and hardiness (measured by the Family Hardiness instrument) were the significant predictors of family functioning for both NHB and NHW families. Although mean scores for the FIRM were moderately low for NHB families, the scores were moderately high for both groups if educated at the college level. The FIRM was the most comprehensive of all of the instruments (55 questions), measuring a broad range of strengths regarding personal income and education resources, family capabilities to communicate, manage and problem-solve crises, as well as social support resources from family, friends and the community (McCubbin et al., 1996). In this current study, NHB families reported overall lower incomes than NHW. Families who have fewer personal resources or access to resources may be challenged to plan for the future of their preterm infant (Braveman et al., 2015; DeSisto et al., 2018; Manuck, 2017; Thoma et al., 2019).

Several studies reported associations between family resources (as measured by the FIRM) with their main outcomes of well-being, adaptation, or family functioning. Doucette and Pinelli (2004) reported higher scores on the FIRM, for their study of parent couples in the NICU, and suggested that these scores were related to the higher education and income levels of their participants. In her study of parents of preterm infants, Pinelli (2000) reported that adequate family resources were a significant predictor for positive family adjustment for mothers of preterm infants. Forsythe, Maher, Kirchick, & Bieda (2007) recommended interventions that would help families develop family resiliency and promote family functioning, e.g. participation in care and decision-making, education on care of the infant, and identification and utilization of referral services. Because FIRM measures resources of esteem, communication, social support and financial well-being, these appear to be important protective factors for parents of premature



**Fig. 2.** Boxplot of General Functioning Subscale (GFS) by Race.  
Note: This figure describes the range of scores by group and type of participant.  
GFS = General Functioning Subscale.

**Table 4**  
Predictors of family functioning based on multivariable analysis.

Predictors	Initial Model			Final model		
	Coefficient	SE	<i>p</i>	Coefficient	SE	<i>p</i>
Race (reference group NHB)	−0.05	0.06	0.43	−0.059	0.058	0.31
Income: (reference group 0–19,999)			0.17			0.18
20,000–29,000	0.14	0.08		0.12	0.079	
30,000–49,999	0.13	0.07		0.13	0.071	
>50,000	0.13	0.07		0.13	0.067	
Education: (reference group)			0.90			0.89
<HS/HS/GED)	−0.022	0.058		−0.017	0.055	
Some College	−0.022	0.057		−0.026	0.055	
College Degree						
Family Tradition / traditions	0.00045	0.0040	0.91			
Family Inventory of Resources for Management / resources	−0.0050	0.0013	<0.001	−0.0052	0.0012	<0.001
Family Hardiness / hardiness	−0.020	0.0039	<0.001	−0.021	0.0037	<0.001
Family Crisis Oriented Personal Evaluation / support & resources	−0.0026	0.0020	0.19			

Note: HS=High School, GED-General Education Development, SE = Standard Error, NHB = Non-Hispanic Black.

infants. If families do not have these capabilities and resources, then they will need ongoing assessment and guidance to help them develop these strengths, and potentially impact family functioning. Additionally, Lee et al. (2009) used the FIRM with African American and Caucasian parents and found a positive relationship between family resources and family well-being for both groups.

Hardiness was the second protective factor that was a significant predictor of family functioning. Similar to resources, this protective factor acts a buffer and influences a family's response to a crisis. Hardiness describes a family's approach toward a crisis, their ability to work together and their confidence to manage and control events (McCubbin et al., 1996). In this current study, mean hardiness scores were moderately lower for NHB than NHW, and the association was significant for all education and income levels. Over a nine-year period, Greeff and colleagues conducted several studies investigating the association of various resiliency factors and adaptation with select populations, e.g., families with mental illness (Bishop and Greeff, 2015; Greeff et al., 2006; Jonker & Greeff, 2009), hard of hearing/deafness (Ahlert & Greeff, 2012) or poverty (Greeff and Holtzkamp, 2007). The authors reported family hardiness as a significant protective factor predicting adaptation or a sense of coherence for each study. Nevertheless, the research involving families caring for a child with a physical disability found that families with more education and higher income had greater access to resources (Ahlert & Greeff, 2012).

The birth of a preterm infant presents even more challenges to family functioning. Despite these challenges, greater than 80% of family members in this study did not view their family as dysfunctional. In the literature focusing on families of preterm infants, family functioning has been primarily studied as an outcome in longitudinal studies of families (Saigal et al., 2010; Treyvaud et al., 2011; Treyvaud et al., 2014). In comparison with families who had a term newborn, researchers reported varied outcomes; some families of preterm infants experiencing poorer family functioning over time and other families indicating effective family functioning. Ballantyne et al. (2013) conducted a cross-sectional study of Canadian born and immigrant mothers of preterm infants at discharge and found that interventions to decrease stress, increase family functioning and social support could impact depressive symptoms. More recently, parents of extremely preterm infants participating in a qualitative study in Sweden described a significant change in family dynamics (Baraldi et al., 2020). These studies support family functioning as a salient outcome in research for families of preterm infants. Further research is needed to explore the factors and issues that impact family functioning for families of preterm infants.

#### Practice implications

The transition from hospital to home in families of preterm infants is challenging. There are changes in parenting, role alterations and

communication that are all components of family functioning (Boykova, 2016). Families require individualized ongoing assessment and guidance to help them develop resiliency, and to modify family roles and functions to meet the needs of their family, as well as their preterm infants (Boykova, 2016; Mundy, 2010; Raines, 2013). Berman et al. (2019) interviewed NICU parents who described several needs during their infant's hospitalization, including: better communication with healthcare professionals, assistance with problem-solving skills, knowledge and training to care for their infant, information about financial resources and identifying support from family, friends and the community.

The results of this study indicate the importance of assessing socioeconomic disparities and identifying and accessing resources that may positively impact the functioning of individual families regardless of race. Healthcare professionals can develop interventions that address quality of care and community resources, as well as systemic bias, while building on the strengths of families (Alhusen et al., 2016; Beck et al., 2019; DeSisto et al., 2018; Janvier et al., 2016). Recent literature reported the racial/ethnic disparities in the quality of neonatal care, and the authors recommended a focus on family-centered and culturally competent care to change practice and affect outcomes (Profit et al., 2017; Sigurdson et al., 2019).

Neonatal nurses have unique opportunities to meet the needs of the family and support effective family functioning. Understanding individual family strengths, through the identification of family resiliency (protective and recovery) factors could predict at-risk families before discharge. In collaboration with other health care professionals, nurses can assess individual family needs and strengths, within the context of their socioeconomic environment, and the racial and cultural influences that are important to the family. This information could be added to the electronic health record and the nursing plan of care.

#### Limitations

Limitations for this study included potential threats to internal validity: a) participant reading level that may affect understanding the verbiage of the instruments, b) a measurement effect related to the timing of the administration for the participant, and the interaction effect of other personal factors, or the infant's condition, c) measurement fatigue due to the number of questions, and d) a subject effect because the person administering the scales was NHW and different than the NHB participants. Because only NHB and NHW participants were recruited, this excluded any participants who were biracial or born in a country other than the United States. Overall, recruitment was challenging due to a sole data collector, who may not have been available at the same time as the mother. Visitation by families varied, and particularly when the preterm infant was hospitalized for months. Families have to consider care for siblings at home, potential transportation issues, as well

as potentially returning to work before the infant is discharged. Due to the above reasons, the sample size for the two groups was unequal, which may have impacted statistical power and may not be a representative sample for the actual population. Future studies need a variety of recruitment strategies to enroll more parents.

## Conclusion

There is a gap in research exploring the relationship between family resiliency factors and family functioning in families of preterm infants. Findings from this study suggest there may be relevance for examining the protective factors of resources and hardiness in relation to family functioning for NHB and NHW families who experienced the birth of a preterm infant. Further research is needed to study longitudinally family resiliency in families of preterm infants, and to understand family needs and strengths that support effective family functioning. Continued research with families of preterm infants will provide the evidence to implement interventions that will facilitate the development of family strengths, and optimally influence long-term family functioning.

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## Declaration of Competing Interest

Family Resiliency and Family Functioning in Non-Hispanic Black and Non-Hispanic White Families of Preterm Infants

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