

The Impact of C-Reactive Proteins on Quality of Life and Burnout in Parental Caregivers of Children with Special Healthcare Needs



Lily Ballard and Dr. Mandy Bamber, PhD, RN
Florida State University, Tallahassee Florida, College of Nursing



Abstract

Parents of children with special healthcare needs are at higher risk of developing a chronic illness and decreased quality of life (QOL) due to caregiving burdens demanded of them. C-reactive proteins (CRP) are prevalent biomarkers that reveal information on physiological and psychological behavior in persons with high levels of inflammation. Hence the primary purpose of the study is to explore C-reactive protein (CRP) presentation in caregivers of children with special healthcare needs compared to parents of typically developing children. Moreover, we aim to examine the relationship between CRP, caregiver burnout, and quality of life. A longitudinal study was conducted over a three-year period with parents of typically developing children (n=60), non-complex chronic disease (n=28), and complex chronic disease (n=32). Measures of C-reactive protein samples were collected via serum samples, and participants completed the Shirom-Melamed Burnout Measure (SMBM) and Quality-of-Life Scale. We predict that parents of children with more complex healthcare needs will present higher levels of CRP than parents of children without special healthcare needs. We also hypothesize that levels of burnout will be higher, and QOL will be lower in parents of children with more medically complex conditions. Statistical analysis will be utilized to determine the results. High levels of burnout and low QOL in parents of children with special healthcare needs can negatively impact caregivers' psychological well-being and lead to an increased risk for onset of disease, and inflammatory dysregulation. Future studies should further dive into CRP and its implications for chronic diseases.

Introduction

- **Research Question:** "How do C-reactive proteins present differently in caregivers of children with special healthcare needs than parents of typically developing children? What is the relationship between CRP and caregiver burnout and quality of life?"
 - **Aim 1:** Explore the relationship between CRP and measures of burnout, and quality of life.
 - **Aim 2:** Explore the differences of child severity on CRP in parental caregivers.
 - **Aim 3:** Explore the differences in CRP of parental caregivers of CSHCN pre and post pandemic.
- **Hypothesis:** It is hypothesized that increased CRP levels will be present in parents of children with special healthcare needs and that these caregivers will also show high levels of burnout and low quality of life pre and post pandemic.

Methods

Design:

- This is a longitudinal study conducted pre and post pandemic. Only participants who completed the study (n=60) in both time periods were considered in the data.

Measures:

- **C-Reactive Proteins** were measured after collected via samples. Quality of life (QOL) was measured using the **Quality-of-Life Scale** and burnout (BO) was measured using **Shirom-Melamed Burnout Measure (SMBM)**.

Statistical Methods:

- **Chi-square (χ^2), ANOVA, and independent-samples Kruskal-Wallis U test** were used to compare the difference between groups of demographic data.
- **Pearson's (r) biserial point correlation coefficient** was used to explore the relationships between the variables.
- **Repeated Measures ANOVA** was used to analyze differences between variables and change over time.

Results

Aim 1: Correlation between CRP, measures of burnout, and quality of life

		Correlations					
		QOLTOTAL	BOPHYSICAL	BOCOGTOTAL	BOEMOTOTAL	BOTOTAL	CRP12
QOLTOTAL	Pearson Correlation	1.000					
	N	60					
BOPHYSICAL	Pearson Correlation	-.626**	1.000				
	Sig. (2-tailed)	0.000					
BOCOGTOTAL	Pearson Correlation	-.454**	.520*	1.000			
	Sig. (2-tailed)	0.000	0.000				
BOEMOTOTAL	Pearson Correlation	-.476**	.505*	.554*	1.000		
	Sig. (2-tailed)	0.000	0.000	0.000			
BOTOTAL	Pearson Correlation	-.638**	.868**	.846**	.739**	1.000	
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		
CRP12	Pearson Correlation	-.253	0.002	0.095	0.143	0.076	1.000
	Sig. (2-tailed)	0.051	0.986	0.472	0.277	0.563	
		N	60	60	60	60	60

- There was found to be a significant negative correlation (r, p) between quality of life (QOL) and, physical burnout (r=-0.626, p=0), cognitive burnout (r=-0.454, p=0), emotional burnout (r=-0.476, p=0), and total burnout (r=-0.638, p=0). While there was not a significant enough correlation between QOL and C-reactive proteins, the statistic was only 0.001 away from being statically significant (p=0.051).
 - There was a positive correlation between physical burnout and cognitive burnout (r=0.520, p=0), emotional burnout (r=0.505, p=0), and total burnout (r=0.868, p=0).
 - There was a positive correlation between cognitive burnout and emotional (r=0.554, p=0) and total burnout (r=0.846, p=0).
 - There was a positive correlation between emotional burnout and total burnout (r=0.739, p=0)
- ### Aim 2 & 3: Differences in child severity on CRP pre and post pandemic
- There was a significant correlation between subjects' severity (p=0.017) according to Pillai's Trace multivariate test.
 - After testing the between-subject effects it was found that severity is statistically significant between physical burnout (p=0), total burnout (p=0.018) and quality of life (p=0.017). Cognitive burnout, emotional burnout, and CRP did not show a correlation with severity.
 - There was a significant correlation within subject's time (p=0.002) according to Pillai's Trace multivariate test.
 - After testing the within-subjects contrasts, it was found that time had a correlation with CRP (p=0.001). The other variables did not show to be statistically significant.

		Multivariate Tests ^a						
		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	
Between Subjects	Intercept	Pillai's Trace	0.994	1910.315 ^a	5.000	53.000	0.000	0.994
		Wilks' Lambda	0.006	1910.315 ^a	5.000	53.000	0.000	0.994
		Hotelling's Trace	180.218	1910.315 ^a	5.000	53.000	0.000	0.994
		Roy's Largest Root	180.218	1910.315 ^a	5.000	53.000	0.000	0.994
		Severity	Pillai's Trace	0.352	2.307	10.000	108.000	0.017
Within Subjects	Time	Wilks' Lambda	0.661	2.442 ^b	10.000	106.000	0.012	0.187
		Hotelling's Trace	0.495	2.574	10.000	104.000	0.008	0.198
		Roy's Largest Root	0.453	4.893 ^b	5.000	54.000	0.001	0.312
		Pillai's Trace	0.289	4.299 ^b	5.000	53.000	0.002	0.289
		Time * Severity	Wilks' Lambda	0.711	4.299 ^b	5.000	53.000	0.002
		Hotelling's Trace	0.406	4.299 ^b	5.000	53.000	0.002	0.289
		Roy's Largest Root	0.406	4.299 ^b	5.000	53.000	0.002	0.289
		Pillai's Trace	0.152	0.888	10.000	108.000	0.547	0.076
		Wilks' Lambda	0.852	.884 ^c	10.000	106.000	0.551	0.077
		Hotelling's Trace	0.169	0.880	10.000	104.000	0.555	0.078
		Roy's Largest Root	0.135	1.462 ^c	5.000	54.000	0.218	0.119

Discussion

Aim 1:

- Our findings for aim 1 suggest that as burnout increases in any of the categories listed, quality of life decreases. The strength of the correlations suggest that physical burnout and total burnout have the strongest impact on reducing quality of life in parents of CSHCN.
- The correlation between QOL and C-reactive proteins was not considered statistically significant; however, it was close to being considered significant (p < 0.05). There may be a relationship between these two variables but more data or a slight change in condition will be needed to confirm a significance.
- The data suggests that the types of burnouts are highly interrelated; experiencing one type of burnout will likely cause a parent to experience other types as well. Physical burnout and total burnout showed the strongest correlation. This suggests that physical exhaustion is a major contributor to overall burnout.

Aim 2 & 3:

- Our findings for aim 2 and 3 suggest that individuals with greater severity are more likely to have higher physical and total burnout and well as lower quality of life. However, severity does not impact cognitive and emotional burnout or inflammation (CRP).
- CRP, a marker of inflammation, changes over time, possibly indicating a physiological response to stress or burnout. Burnout and quality of life remained stable over time in this study, suggesting they are not highly time-dependent or may require a longer period to show change.

Conclusion and Future Implications:

- These findings highlight the substantial toll that prolonged caregiving demands have on the physical well-being of these parents, potentially due to increased stress, reduced access to support systems, or additional caregiving responsibilities brought on by the pandemic.
- While this research provides insight into how parents are being impacted by long-term complicated caregiving, it does not describe how parents should deal with the mental and physical consequences of this long-term caregiving.
- Future studies should explore the potential benefits of structured support systems, such as respite care programs, counseling services, peer support networks, and wellness initiatives tailored specifically to caregivers. Investigating the effectiveness of these programs in reducing burnout and improving quality of life will be crucial in shaping policies and resources that better support parents of children with special health care needs.



Acknowledgements

I would like to thank my amazing UROP leaders, Loudan and Liv, for their tremendous amounts of help through this process. They have always been inclusive and welcoming. I wish them luck in their future endeavors.

I would like to give an extra special thank you to my amazing UROP Mentor, Dr. Bamber. None of this would have been possible without her amazing help and dedication to our projects. I am honored to be able to showcase her work and I cannot wait to continue our research in the future.

References

