The Role of Pet Ownership in Mental Health of Children with Diabetes and Impact on Parental Stress

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Introduction

- Substantial increase in # of children diagnosed with diabetes worldwide [5]
  - Higher risk for developing negative health outcomes
  - Complex & demanding treatment regimens

- Youth with diabetes have a 2–3-fold increased risk for mental health disorders including anxiety & depression [7, 8]
- Parents, specifically mothers, consistently report stress resulting from daily management of their child's diabetes [3]

- Pets encourage positive interactions that favor closeness, sharing, & empathy resulting in more prosocial relational models [1, 4, 6]
- Pet ownership decreases general anxiety, presents better emotional well-being, reduces feelings of loneliness, & depressive symptoms [1, 2, 6]

Research Question: Do pet owners & non-pet owners differ in mental health outcomes for children with diabetes specifically in:

(1) emotional regulation **(2)** anxiety/depression **(3)** parental stress

(4) A1c (blood glucose) **(5)** percentage of adults with diabetes in community

Methods

Participants: children with diabetes (n = 80)

Nationally-representative sample from the Adolescent Brain Cognitive Development (ABCD) Study

Non-pet owner (n = 23)

Pet owner (n = 57)

Measurements

Emotional Regulation Questionnaire (ERQ)

- Measures child's self-control & emotions:
  - Cognitive reappraisal
  - Expressive suppression
- Self-rated questionnaire
- 6 questions (scale of 1-5)

Child Behavioral Checklist - Anxiety/Depression (CBCL - A/D)

- Subscale measuring child's anxiety & depression (CBCL-A/D)
- Parent rated scale
- 13 questions (3 pt scale)

Perceived Stress Scale (PSS-10)

- Measures stress levels of parent
- Self-rated questionnaire
- 10 questions (scale of 0-4)

Exploratory Analysis Measurements

A1c (blood glucose)

- Measures child's average blood sugar levels over past 3 months
- Blood test (biospecimen)
- Often used to assess blood glucose management

Residential prevalence of diagnosed diabetes among adults

- Measures residential history of diagnosed diabetes among adults aged ≥18 years of age
- % of population with diabetes within each participant's geographical location

Data Analysis

ERQ (n = 79) & PSS-10 (n = 77)

- Continuous outcome measures with normal distribution
- Independent samples t-test (p of <.05 significance)
- Includes two outcome measures for ERQ:
  - Cognitive reappraisal & Expressive suppression

CBCL-A/D (n = 60)

- Not normally distributed with bimodal distribution
- Re-coded CBCL-A/D score into dichotomous variable
  - "low" or "high" for anxiety/depression
- Chi-square analysis (χ^2)

A1c (n = 10) & Residential history of diabetes (n = 9,802)

- Continuous outcome measures with normal distribution
- Independent sample t-test (p of <.05 indicating significance)
- A1c (pet owners: n = 6, non-pet owners: n = 4)
- Residential (pet owners: n = 7,504, non-pet owner: n = 2,298)

Results

Table 1. Diabetic Population Demographics Stratified by Pet Ownership Status

	Total Sample n = 80	No Pet n = 23	Pet Owner n = 57
Age (years) M (SD)	12.88 (0.65)	13.03 (0.59)	12.83 (0.66)
Gender	*n* (%)	*n* (%)	*n* (%)
Female	43 (53.8%)	7 (30.4%)	36 (63.2%)
Male	37 (46.3%)	16 (69.6%)	21 (36.8%)
Race/Ethnicity			
White	46 (57.5%)	6 (26.1%)	40 (70.2%)
Black	32 (40%)	16 (69.6%)	16 (28.1%)
Hispanic	16 (20%)	4 (17.4%)	12 (21.1%)
Asian	2 (2.5%)	1 (4.3%)	1 (1.8%)
Indigenous	6 (7.5%)	1 (4.3%)	5 (8.8%)
Parent Education			
High School or less	25 (31.25%)	9 (39.1%)	16 (28.0%)
Any undergraduate	40 (50%)	10 (43.5%)	30 (52.6%)
Graduate degree	14 (17.5%)	3 (13.0%)	11 (19.3%)
Combined Family Income			
≤ $49,999	32 (40%)	11 (47.8%)	21 (36.8%)
$50,000-99,999	24 (30%)	7 (30.4%)	17 (29.8%)
≥ $100,000	18 (22.5%)	4 (17.4%)	14 (24.5%)
Parent's Martial Status			
Married	42 (52.5%)	9 (39.1%)	33 (57.9%)
Divorced	10 (12.5%)	2 (8.7%)	8 (14.0%)
Separated	5 (6.3%)	2 (8.7%)	3 (5.3%)
Never Married	18 (22.5%)	7 (30.4%)	11 (19.3%)
Living with Partner	3 (3.8%)	1 (4.3%)	2 (3.5%)

Table 2. Pet ownership status predicting perceived parental stress, child emotional regulation, & child anxiety/depression

	Non-pet owner *M (SD)*	Pet owner *M (SD)*	*t*	*df*	Cohen's *d*	*p*
PSS-10	15.59 (6.38) *n* = 22	14.54 (6.71) *n* = 55	-0.63	75	0.16	0.53
ERQ: Cognitive Reappraisal Score	10.82 (1.84) *n* = 22	10.02 (2.30) *n* = 57	-1.46	77	0.37	0.15
ERQ: Expressive Suppression Score	10.14 (2.88) *n* = 22	9.65 (2.42) *n* = 57	-0.76	77	0.19	0.50

CBCL-A/D	**Non-pet owner *% (n)***	**Pet owner *% (n)***	***df***	**Chi-square analysis (χ2)**
Low Anxiety	70.59% (n = 12)	76.74% (n = 33)	1	0.62
High Anxiety	29.41% (n = 5)	23.26% (n = 10)		

Table 3. Exploratory Analysis: A1c & Residential History

A1c	○ Average A1c levels for pet owners (M = 5.27; SD = 0.43) was lower than the non-pet owners (M = 5.68; SD = 0.73) ○ $t(8)$ = -1.01, p = 0.29, Cohen's d = -0.73
Residential History Derived of Diagnosed Diabetes	○ There was a **significant difference** between pet owners & non-pet owners ○ The average population density for diabetes for pet owners was lower (M = 9.46; SD =3.30) compared to non-pet owners (M =10.67; SD = 4.25) ○ **Pet owners live in communities with lower rates of diabetes than non-pet owners** $t(3190.22)$ = -12.51, p <0.001, Cohen's d = 0.34

Conclusion

- ✓ No significant difference in anxiety/depression, emotional regulation, parental stress, or A1c between pet owners & non pet owners in children with diabetes
- ✓ Although no significant differences between groups, there was a medium effect size for cognitive reappraisal emotional regulation & A1c between pet owner vs. non pet owners in children with diabetes
  - ✓ Non-pet owners had higher scores on adaptive emotional regulation
  - ✓ Pet owners had a lower A1c value (more control)
- ✓ Significant difference in residential prevalence of diagnosed diabetes in adults
  - ✓ Findings indicated that lower diabetic based populations areas correlate with higher odds of being a pet-owner
  - ✓ May be confounded with other demographic variables

OT & other professions working with children with diabetes to improve social & emotional development need to identify how pet ownership can be employed to positively impact diabetic children's eating habits, activity level, problem solving, & healthy coping to reduce risks & decrease A1c, anxiety/depression, & parent's stress levels.

For references and more information:

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