Original Article

Factors Affecting the Anxiety Level and Quality of Life of Parents of Children with Hydrocephalus

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Abstract

Aim: The aim of this descriptive study was to determine the factors affecting the level of anxiety and quality of life for parents of children aged 0 to 18 years with hydrocephalus.
Methods: The study sample consisted of parents of children with hydrocephalus. Data were collected using a 27-item demographic data form, the State-Trait Anxiety Inventory (STAI), and the Short Form 36-Item (SF-36).
Result: Mothers constituted most of the parents who participated in the study. Of these mothers, 31.4% were between 26 and 33 years of age, 47.1% had an elementary school or high school degree, and 45.7% were employed. Children's gender, age, birth type, birth order, number of operations, duration of hospital stay, type of diagnosis, and type of operation had no significant effect on parents' mean state and trait anxiety scores. The results showed that mother's employment status had no statistically significant effect on parents' mean state anxiety scores but had a statistically significant effect on their mean trait anxiety scores. This study shows that parents' quality of life scores were significantly lower than those of the overall Turkish population.
Conclusion: Parent anxiety was affected by low income, lack of health insurance, and providing home care for more than one person. Parent quality of life was affected by number of siblings, birth order, time of diagnosis, number of operations, duration of hospital stay, father's age, parents' educational level, mother's employment status, family type, family income, place of residence, and health insurance.

Keywords: Hydrocephalus, Quality of Life, Anxiety, Nurses, Parents

Introduction

Hydrocephalus is a chronic disease known since ancient times in which congenital or acquired causes result in an imbalance between absorption and production of cerebrospinal fluid (CSF). (Önal, 2015). This imbalance causes an increase in spinal fluid volume and intracranial pressure, as well as dilatation of the ventricular system (Mutluer, 2015). The incidence of congenital hydrocephalus varies from 0.09 to 0.12% in developed countries and occurs in three to four of every 1000 live births worldwide. The incidence of congenital hydrocephalus increases to 48 of every 1000 live births in developing Sub-Saharan African countries such as Uganda because of preventable infections (Persson, Hagberg, & Uvebrant, 2005; Garne et al., 2010; Warf, 2010; Potts & Mandleco, 2012).

Children with spina bifida and meningocele-induced hydrocephalus suffer from reduced quality of life, psychological adjustment problems, and low self-esteem due to sensory and neurological losses (i.e., epilepsy), kidney problems (i.e., neurogenic bladder), and musculoskeletal problems (i.e., loss of movement in the lower extremities; Sprangers et al., 2000; Pit-ten Cate, Kennedy, & Stevenson, 2002). Long hospital stays affect many aspects of the lives of children with chronic diseases. Pit-ten Cate et al. (2002) conducted a study on 544 children aged 6–13 years with spina bifida, hydrocephalus, or both. They reported that the children had a low

quality of life and that those with both spina bifida and hydrocephalus had a lower quality of life than the others. Moreover, children with spina bifida had lower quality of life scores in terms of self-care, continence, and movement/activity while those with hydrocephalus had lower scores in school activities, anxiety, vision, and communication (Pit-ten Cate, Kennedy, & Stevenson, 2002). Spina bifida and hydrocephalus result in dependence on parents, less peer interaction, and low social acceptance. Children with hydrocephalus have limited social interaction, and therefore, have difficulty communicating their thoughts and feelings (Schoenmakers et al. 2005). Kulkarni et al. (2008) conducted a study on the quality of life for 340 children aged 5–18 years with hydrocephalus and their parents in three pediatric hospitals in Canada. They reported that low quality of life was associated with low family income, low parent educational level, poor family function, seizures, myelomeningocele, and long-term shunt blockage treatment (Kulkarni et al. 2008a). Erbaş and Bulut (2017) conducted a study on 75 families with 3- to 6-year-old children with hydrocephalus at the children's clinic in a university hospital. They investigated the problems that parents experience and found that they suffer from anxiety (Erbaş & Bulut, 2017). Gürol, Erdem, and Tasbasi (2015) conducted a qualitative study on mothers of children with hydrocephalus to identify the problems that they experience and reported a decrease in their quality of life (Gürol, Erdem & Tasbası, 2015).

Objective

This descriptive study was designed to determine the factors affecting the anxiety level and quality of life of parents of 0- to 18-year-old children with hydrocephalus. Research question in this study;

- What are the factors affecting the anxiety level and quality of life of parents of 0- to 18-year-old children with hydrocephalus?

Methods

The study sample consisted of parents of children with hydrocephalus at the neurosurgery clinic. The study inclusion criteria were (1) being literate, (2) being a parent of a child with hydrocephalus, and (3) willingness to volunteer. Permissions were obtained from the hospital and the clinic. All participants were informed of the purpose of the study and signed informed consent forms before participation.

Instruments

Data were collected using a 27-item sociodemographic data form developed by the researcher, the State□Trait Anxiety Inventory (STAI), and the Short Form 36□Item (SF□36).

Sociodemographic Data Form

A 27-item sociodemographic data form developed by the researcher was used to collect sociodemographic information on the children and their parents.

State-Trait Anxiety Inventory (STAI)

The STAI was developed by Spielberger (1970) and adapted to the Turkish language by Öner and Le Compte (1983), who also established the validity and reliability of the scale. The STAI consists of a 20-item State Anxiety Scale (STAI-S) and a 20-item Trait Anxiety Scale (STAI-T). The STAI-S assesses the temporary anxiety evoked by a situation while the STAI-T assesses general anxiety levels. The STAI is a four-point Likert scale with a lowest possible score of 20 and a highest of 80. The higher the score, the higher the anxiety (Oner & LeCompte, 1983). The Cronbach's alpha of the scale is 0.80 and was 0.85 in this study.

Short Form 36 (SF-36)

The SF-36 was developed by Rand Corporation to assess quality of life (Framework, 1992). The reliability and validity of the scale were established by Koçyiğit et al. (1999). It is a Likert scale consisting of eight health domains and 36 items. The eight health domains are physical functioning, bodily pain, role limitations due to physical health problems, role limitations due to personal or emotional problems, emotional well-being, social functioning, energy/fatigue, and general health perceptions. Only the preceding four weeks are taken into account for assessment. The health domains assess health between 0 (poor health) and 100 (good health; Framework, 1992). The Cronbach's alpha coefficient of the scale ranges from 0.69 to 0.90 (Koçyigit, 1999), and was 0.72 in this study.

Data Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 23.0 at a significance level of 0.05. Data were analyzed using descriptive statistics (mean, standard deviations, frequencies, and percentage). An independent sample *t*-test was used to compare independent groups when data were normally

distributed. The Mann-Whitney *U* test was used when data were not normally distributed. The One-Way ANOVA test was used for more than two independent groups when data were normally distributed, and if not, the Kruskal-Wallis *H* test, which is a nonparametric test, was used. The Tukey test was used to determine the differences between the groups when data were normally distributed. Multiple linear regression analysis was used to determine whether significant variables predicted dependent variables at a significant level.

In order to carry out the research, the permission of the ethics committee numbered 96681246 dated 25.01.2017 was obtained from Erciyes University Clinical Research Ethics Committee.

The permission of the institution dated 12.12.2016 and numbered 14065294-044-E-20884 was ontained from Erciyes University Health Application and Research Center.

This study was conducted in Erciyes University Hospital. tfh@erciyes.edu.tr.

Results

Demographic Characteristics of Children with Hydrocephalus and Their Parents

Of the children, 54.3% (*n* = 38) were female, 31.4% (*n* = 22) were younger than 1 year old, 51.4% (*n* = 36) were born vaginally, 38.6% (*n* = 27) were the first child, and 32.8% (*n* = 23) had at least one sibling. Half of the children (*n* = 35) were diagnosed with hydrocephalus within the last year, 50% (*n* = 35) had their first surgery within the last year, and 77.1% (*n* = 54) had between one and four operations. The mean number of operations was 3.72 ± 4.18, 75.7% (*n* = 53) underwent VP shunt surgery, and 82.8% (*n* = 58) had congenital hydrocephalus. All children were hospitalized for between 1 and 150 days and the mean duration of hospital stays was 17.02 ± 26.18 days. Of the mothers, 31.4% (*n* = 22) were between 26 and 33 years of age, 47.1% (*n* = 33) had an elementary school or high school degree, and 45.7% (*n* = 32) were employed. Of the fathers, 28.6% (*n* = 20) were between 34 and 41 years of age, 57.1% (*n* = 40) had an elementary school or high school degree, and 92.9% (*n* = 65) were employed. Of the parents, 67.1% (*n* = 47) had neutral expenses, 87.1% (*n* = 61) were nuclear families, 82.9% (*n* = 62) lived in the city, and 88.6% (*n* = 62) had health insurance.

State-Trait Anxiety Mean Scores of Children and Parents by Sociodemographic Variables

Parents' mean state and trait anxiety scores were statistically analyzed based on the children's sociodemographic characteristics. Children's gender, age, birth type, birth order, number of operations, duration of hospital stay, type of diagnosis, and type of operation had no significant effect on parents' mean state and trait anxiety scores ($p > .05$; Table 1). A single-factor ANOVA was used for independent groups to determine whether parents' mean state and trait anxiety scores significantly differed by children's gender, age, birth type, time of diagnosis, and number of siblings (Table 1). There were statistically significant differences between the state anxiety, $F(3.66) = 4.378$, $p = .007$, $\eta^2 = .165$, and trait anxiety groups, $F(3.66) = 6.067$, $p = .001$, $\eta^2 = .216$. A post hoc test was used to determine the source of differences observed between the groups. The mean state anxiety score of parents with one child was highest (65.33 ± 11.72) while the mean trait anxiety score of parents with three or more children was highest (52.56 ± 7.40). The effect size estimated by the calculation of eta-square was large. A single-factor ANOVA was used to determine whether parents' mean state anxiety scores significantly differed by children's diagnosis time. The results showed that parents' mean state anxiety scores significantly differed by children's diagnosis time, $F(2, 67) = 4,854$, $p = .011$, $\eta^2 = .126$. Tukey's test was used to determine statistical significance for multiple comparisons. The results showed that parents of children diagnosed in the last 12 months had higher mean state anxiety scores (62.37 ± 9.30) than those of children diagnosed within 1 to 5 years (54.77 ± 9.88) and 6 years ago or earlier (56.87 ± 10.78). The effect size estimated by the calculation of eta-square was large. However, the time of diagnosis had no significant effect on parents' trait anxiety scores ($p > .05$; Table 1). Multiple regression analysis was performed to determine whether significant variables were significant predictors of state and trait anxiety. As a result of the analysis, it was determined that the time of diagnosis and the number of siblings were not a significant predictor of state and trait anxiety. The Kruskal-Wallis *H* test was used to determine whether parents' mean state and trait anxiety scores differed by father's age and mother's education level (Table 2).

The results indicated statistically significant differences in state anxiety scores, KWH(3) = 8.728, p = .033, and trait anxiety scores, KWH(3) = 8.618, p = .035, between the groups. A post hoc test was used to determine the source of the difference observed between the groups. Fathers aged 18–25 years had higher mean state (67.88 ± 8.06) and trait (49.75 ± 5.55) anxiety scores than the other age groups. A single-factor ANOVA was used to determine whether parents' mean state and trait anxiety scores significantly differed by mother's education level. The results showed that parents' mean state anxiety scores, $F(3, 66) = 5.280$, p = .003, η^2 = .189, and trait anxiety scores, $F(3, 66) = 35.585$, $p < .001$, η^2 = .617, significantly differed by mother's education level. Tukey's test was used to determine statistical significance for multiple comparisons. The results showed that illiterate mothers had higher mean state anxiety scores (71.33 ± 8.18) than the other education groups. The effect size estimated by the calculation of eta-square was large. A single-factor ANOVA was used to determine whether parents' mean state and trait anxiety scores significantly differed by father's education level. The results showed statistically significant differences; for state anxiety scores, $F(3, 66) = 5.538$, p = .002, η^2 = .201; for trait anxiety scores, $F(3) = 34.745$, $p < .001$, η^2 = .235. Tukey's test was used to determine statistical significance for multiple comparisons. The results showed that illiterate fathers had higher mean state anxiety scores (71.33 ± 8.18) and higher mean trait anxiety scores (62.17 ± 8.21) than the other education groups (Table 2).

A t-test was used to determine whether parents' mean state and trait anxiety scores differed by mother's employment status. The results showed that mother's employment status had no statistically significant effect on parents' mean state anxiety scores but had a statistically significant effect on their mean trait anxiety scores (t = 3.782, p = .001, η^2 = .17). Unemployed mothers had significantly higher mean trait anxiety scores (50.31 ± 7.29) than employed mothers (44.03 ± 6.45). Parents living in extended families had significantly higher mean state (66.88 ± 12.02, t = 2.646, p = .003, η^2 = .09) and trait (58.44 ± 8.83, t = 5.614, $p < .001$, η^2 = .32) anxiety scores than those living in nuclear families. Low-income families had significantly higher mean state anxiety scores, 67.88 ± 7.32, KWH(2) = 13.860, p = .001, and trait anxiety scores, 55.88 ± 6.90, KWH(2) = 27.176, p = .001, than high-income and middle-income families. Rural dwellers had higher mean state (65.16 ± 10.48) and trait (54.58 ± 8.81) anxiety scores than urban dwellers. Parents with an insurance policy have less than mean state (70.75 ± 8.81) and trait (58.88 ± 9.25) anxiety scores than those without an insurance policy. Parents providing home care for more than one person had higher mean trait (52.33 ± 8.19) scores than those providing home care for only one person (44.89 ± 5.83, MWU = 218.0, p = .042; Table 3). In the regression analysis, it was concluded that the independent variables did not explain the state and trait anxiety in a significant way.

Quality of Life Mean Scores of Parents by Sociodemographic Variables

This study shows that parents' quality of life scores were significantly lower than those of the overall Turkish population (Demiral et al. 2006). Mothers with a bachelor's degree or higher had significantly higher physical functioning (82.77 ± 13.01), role limitations due to physical health problems (66.66 ± 39.52), social functioning (48.61 ± 25.34), bodily pain (81.38 ± 21.10), and general health perception (50.00 ± 3.53) scores than illiterate mothers and those with a primary school or elementary school degree. There was a statistically significant difference in physical functioning scores and role limitations due to physical health problems scores between mothers with a bachelor's degree or higher and illiterate mothers. There was a statistically significant difference in social functioning and bodily pain scores between illiterate mothers and others. There was a statistically significant difference in general health perceptions scores between mothers with a bachelor's degree or higher and those with a primary school or elementary school degree. Fathers with a bachelor's degree or higher had significantly higher physical functioning, role limitations due to personal or emotional problems, social functioning, bodily pain, and general health perceptions scores than illiterate mothers and mothers with a primary school or elementary school degree. There was a statistically significant difference in physical functioning scores between fathers with a bachelor's degree or higher and illiterate fathers. There was a statistically significant difference in role limitations due to personal or emotional problems and general health perceptions scores between fathers with a bachelor's degree or

higher and those with a primary school degree. There was a statistically significant difference in social functioning scores between illiterate fathers and others. There was a statistically significant difference in bodily pain scores between fathers with a bachelor's degree or higher and others. Parents living in nuclear families had significantly higher social functioning and bodily pain scores than those living in extended families. Parents with positive income had significantly higher physical functioning, social functioning, bodily pain, and general health perceptions scores than those with neutral income or negative income. Urban dwellers had significantly higher role limitations due to personal or emotional problems, social functioning, bodily pain, and general health perceptions scores than rural dwellers. Parents with an insurance policy had significantly higher physical functioning, role limitations due to physical health problems, social functioning, and bodily pain scores than those without an insurance policy. Multiple linear regression analysis was performed to determine whether the above-mentioned parameters were significant predictors of quality of life. As a result of the analysis, father's educational status, $r = .69$, $F(1.68) = 62.792$, $p < .001$, and the place of residence, $r = .71$, $F(2.67) = 35.078$, $p < .001$, were significant predictor of quality of life. It was determined that the father explained the variance of the quality of life of the education level at 48% and the quality of life variance at the level of 51%.

Discussion

This study the number of children and the time of diagnosis had a significant effect on parents' state and trait anxiety scores (Table 1 and 2). Kulkarni (2006) conducted a study on parents of 80 children with hydrocephalus and found a relationship between child age and parental anxiety; the younger the child, the higher the parental anxiety (Kulkarni, 2006). In our study, parents of children younger than 1 year of age had high state anxiety (62.81 ± 10.49), but it was not significantly higher than those of other age groups ($p > .05$). The number of children and the duration of diagnosis had a significant effect on parental anxiety ($p < .05$). Parents of children diagnosed in the last 12 months had higher state anxiety than those of children diagnosed within 1 to 5 years and 6 years ago or earlier (Table 1). This may be due to parents' concerns about possible treatments for their children diagnosed with hydrocephalus. Hydrocephalus is a chronic health condition. Parents' lives change dramatically and enter a period of uncertainty at the time of diagnosis, increasing their anxiety. However, the more they understand about their child's condition, the less anxiety they experience. Vermaes et al. (2012) conducted a meta-analysis on the families of children with chronic diseases and reported that socioeconomic difficulties, disease, duration of hospital stay, and number of surgeries increased parental anxiety (Vermaes, van Susante & van Bakel, 2012). In our study, health insurance, employment status, family type, and income level were used as indicators of socioeconomic status. While parents' employment status had no effect on their state anxiety, mother employment status affected their trait anxiety.

Extended family structure, living in a rural area, and negative family income increased parental anxiety (Table 3), which was also reported by Vermaes et al. (2012). They also reported that the duration of hospital stay and number of operations increased parental anxiety. However, the number of operations, duration of hospital stay, type of diagnosis, and type of operation did not affect parental state anxiety in our study. Malm-Buatsi et al. (2015) conducted a study on the families of children with spina bifida and reported that parental anxiety and depression were correlated with age (Malm-Buatsi et al. 2015). In our study, although age of the mother was not correlated with parental anxiety, fathers aged 18–25 years had higher state (67.88 ± 8.06) and trait (49.75 ± 5.55) anxiety than the other father age groups (Table 2). Kulkarni et al. (2008b) examined the effect of medical, social, and economic factors on health-related quality of life in children with hydrocephalus and concluded that parents' education level is a socially and economically important parameter (Kulkarni et al. 2008b). Similarly, parents' educational level was found to be associated with health-related quality of life and five (physical functioning, social functioning, role limitations due to physical health problems, role limitations due to personal or emotional problems, and bodily pain) of the eight health domains of the SF-36 in children with hydrocephalus in this study. Parents' educational level was also associated with high parental state anxiety. Illiterate parents had significantly lower state and trait anxiety than those with a higher education level (Table 2). Kronenberger and Thompson Jr

(1992) investigated anxiety and depression in 66 mothers of children with spina bifida and reported that strong family bonds, a supportive attitude, and good communication resulted in less anxiety and depression. Although our study did not address family attitudes, parents participating in the study had lower scores in all health-related areas than the overall Turkish population, suggesting that they do not receive sufficient support in terms of physical, spiritual, and social functions. Kulkarni et al. (2008a) reported that low quality of life was associated with low family income, low parent education level, poor family function, seizures in children, myelomeningocele, and long-term shunt therapy (Kulkarni et al. 2008a). In our study, parents' education level affected some sub-areas of health-related quality of life as well. Parents with a high level of education were found to have higher quality of life than those with a low level of education. Similarly, family income was also associated with some sub-areas of health-related quality of life such as physical functioning, social functioning, bodily pain, and general health perceptions. Parents of children who underwent 1–4 surgeries had higher physical functioning, role limitations due to physical health problems, and general health perceptions scores than those of children who underwent 5 or more surgeries. These results are in agreement with those reported by Kulkarni et al. (2008a).

Conclusion

Parental state and trait anxiety levels were not associated with children's gender, age, birth type, birth order, number of operations, duration of hospital stay, type of diagnosis, or type of operation. However, they were associated with the number of children and the time of diagnosis of hydrocephalus in their children. Mother's employment status was not associated with state anxiety, but it was associated with trait anxiety.

Extended family structure, rural dwelling, negative family income, and lack of health insurance affect parental state and trait anxiety, while having to provide home care for more than one person affect parental trait anxiety.

Parents' quality of life was found to be associated with the number of children, birth order, time of diagnosis, number of operations, and duration of hospital stay, and parents' educational level, family type, income level, place of residence, and health insurance ownership.

References

Demiral Y., Ergor G., Unal B., Semin S., Akvardar Y., Kıvırcık B & Alptekin K. (2006). Normative data and discriminative properties of the short form 36 in Turkish urban population. BMC Public Health, 6:247-255.

Erbaş A. & Bulut H. (2017). The experienced problems of families having children with cerebrospinal fluid shunt. Gazi Journal of Health Sciences, 2(2), 9-19.

Framework I. C. (1992). The MOS 36-item short-form health survey (SF-36). Med Care, 30(6), 473-83.

Freeborn D. & Mandleco B. L. Neurological Alterations, Potts N.L. & Mandleco B.L. (eds) (2012) Pediatric Nursing: Caring for Children and Their Families, 3th edition. Cangage Learning Pres, NY, p. 1206-13.

Garne E., Loane M., Addor M.C., Boyd P.A., Barisic I. & Dolk H. (2010). Congenital hydrocephalus–prevalence, prenatal diagnosis and outcome of pregnancy in four european regions. European Journal of Paediatric Neurology, 14(2), 150-155.

Gürol A., Erdem Y. & Tasbasi F.Y. (2015). The experienced problems of mothers having children with hydrocephalus: a qualitative study. International Journal of Caring Sciences, 8(2), 435-442.

Kocyigit H. (1999). The reliability and validity of the Turkish version of the Short Form-36 (SF-36). Journal of Medicine and Treatment, 12, 102- 106.

Kronenberger W.G. & Thompson Jr R.J. (1992). Psychological adaptation of mothers of children with spina bifida: association with dimensions of social relationships. Journal of Pediatric Psychology, 17(1), 1-14. doi: 10.1093/jpepsy/17.1.1.

Kulkarni A.V. (2006). Questionnaire for assessing parents' concerns about their child with hydrocephalus. Developmental Medicine and Child Neurology, 48(2), 108-113.

Kulkarni A.V. & Shams I. (2007). Quality of life in children with hydrocephalus: results from the hospital for sick children, Toronto. Journal of Neurosurgery: Pediatrics, 107(5), 358-364.

Kulkarni A.V., Cochrane D.D., McNeely P.D. & Shams I. (2008a). Comparing children's and parents' perspectives of health outcome in paediatric hydrocephalus. Developmental Medicine and Child Neurology, 50(8), 587-592.

Kulkarni A.V., Cochrane D.D., McNeely P.D. & Shams I.J. (2008b). Medical, social, and economic factors associated with health-related quality of life in Canadian children with hydrocephalus. The Journal of Pediatrics, 153(5), 689-695.

Malm-Buatsi E., Aston C.E., Ryan J., Tao Y., Palmer B.W., Kropp B.P., Klein J., Wisniewski B.A. & Frimberger D. (2015). Mental health and parenting characteristics of caregivers of children with spina bifida. Journal of Pediatric Urology, 11(2), 65-e1.

Mutluer S. (2015). Definition of hydrocephalus and CSF circulation. Turkey Clinics Neurosurgery-Special Topics, 5(1), 4-6.

Önal S.Ç. (2015). History of hydrocephalus. Turkey Clinics Neurosurgery-Special Topics, 5(1), 1-3.

Oner N. & LeCompte A. (1983). The handbook of the state-trait anxiety inventory: Istanbul: Bogazici Publications.

Persson E.K., Hagberg G. & Uvebrant P. (2005). Hydrocephalus prevalence and outcome in a population□based cohort of children born in 1989–1998. Acta Paediatrica, 94(6), 726-732.

Pit-ten Cate I.M., Kennedy C. & Stevenson J. (2002). Disability and quality of life in spina bifida and hydrocephalus. Developmental Medicine and Child Neurology, 44(5), 317-322.

Schoenmakers M.A., Uiterwaal C.S., Gulmans V.A., Gooskens R.H. & Helders P.J. (2005). Determinants of functional independence and quality of life in children with spina bifida. Clinical Rehabilitation, 19(6), 677-685.

Sprangers M.A., de Regt E.B., Andries F., van Agt H.M., Bijl R.V., de Boer J.B., Marlen F., Hoeymans N., Jacops A.E., Kempen G.I., Miedema H.S., Tijhuis M.A. & de Haes H.C et al. (2000). Which chronic conditions are associated with better or poorer quality of life? Journal of Clinical Epidemiology, 53(9), 895-907.

Vermaes I.P., van Susante A.M. & van Bakel H. J. (2012). Psychological functioning of siblings in families of children with chronic health conditions: a meta-analysis. Journal of Pediatric Psychology, 37(2), 166-184. D oi: 10.1093/jpepsy/jsr081.

Warf B.C. (2010). Pediatric hydrocephalus in East Africa: prevalence, causes, treatments, and strategies for the future. World Neurosurgery, 73(4), 296-300.

Table 1 Parents' State and Trait Anxiety Mean Scores by Socio-demographic Characteristics of Children with Hydrocephalus

	State Anxiety Score	Test	p	Trait Anxiety Score	Test	p
Sex						
Female	59.16±10.26	MWU=568.0[c]	0.636	46.79±8.50	MWU=561.5[c]	0.582
Male	58.41±10.33			48.33±6.32		
Age (Years)						
0 (n = 22)	62.81±10.49	KWH=5.442[b]	0.142	47.09±6.74	KWH=1.932[b]	0.587
1-3 (n = 14)	54.00±11.64			48.50±9.37		
4-6 (n = 16)	56.87±6.54			45.37±5.57		
7 or older (n = 18)	59.38±10.14			48.88±8.60		
Birth Type						
Caesarean (n = 34)	60.23±11.12	MWU=526.0[c]	0.311	47.11±7.81	MWU=598.5[c]	0.874
Normal (n = 36)	57.47±9.25			47.75±7.41		
Number of Children						
Only child (n = 15)	65.33±11.72[x]	F= 4.378[a]	0.007*	47.20±6.84	F= 6.067[a]	0.001*
2 children (n = 23)	54.26±8.67			43.21±5.57		
3 children (n = 16)	57.43±8.96			48.62±7.88		
4 or more children (n = 16)	60.62±9.04			52.56±7.40		
Time of Diagnosis						
In the last year (n = 35)	62.37±9.30[x]	F= 4.854[a]	0.011*	47.02±7,29	F= 1.501[a]	0.472
Within 1-5 years (n = 27)	54.77±9.88			47.00±7.77		
6 years ago or earlier (n = 8)	56.87±10.78			50.75±8.20		

a: Single-factor ANOVA for independent groups b. Kruskal-Wallis H test c. Mann-Whitney u test x: Tukey test *: p <0.05.

Table 2 Parents' State and Trait Anxiety Mean Scores by Socio-demographic Characteristics of Children with Hydrocephalus

	State Anxiety Score	Test	p	Trait Anxiety Score	Test	p
Father's Age						
18-25 (n = 8)	67.88±8.06[y]	KWH=	0.033*	49.75±5.55[y]	KWH= 8.618[a]	0.035*
26-33 (n = 20)	57.50±12.44	8.728[a]		47.85±9.33		
34-41 (n = 20)	56.70±8.13			43.55±5.23		
42 or older (n = 22)	58.64±9.21			49.74±5.21		
Mother's Education (Degree)						
Illiterate (n = 6)	71.33±8.18[x]	F= 5.280[b]	0.003*	62.16±8.20[x]	F= 35.585[b]	0.000*
Primary School (n = 22)	59.68±10.77			49.00±4.15		
Elementary/High School (n = 33)	57.78±8.03			46.69±4.36		
Bachelor's or Higher (n = 9)	52.11±11.07			36.55±5.00		
Father's Education (Degree)						
Illiterate (n = 6)	71.33±8.18[x]	F= 5.538[b]	0.002*	62.17±8.21[y]	F= 34.745[b]	0.000*
Primary School (n = 13)	62.30±11.95			50.08±4.52		
Elementary/High School (n = 40)	57.05±7.24			47.03±4.13		
Bachelor's or Higher (n = 11)	54.27±12.89			37.82±5.33		

a: Kruskal-Wallis H test. b: One-factor ANOVA for independent groups. x: Tukey test. *: p <0.05. y: Non-parametric Post-hoc test

Table 3 Parents' State and Trait Anxiety Mean Scores by Sociodemographic Characteristics

	State Anxiety Score	Test	p	Trait Anxiety Score	Test	p
Mother's Employment Status						
Employed (n=32)	57.06±9.66	t= 1.323[c]	0.190	44.03±6.45	t= 3.782[c]	0.001*
Unemployed (n=38)	60.28±10.56			50.31±7.29		
Family Type						
Nuclear (n=61)	57.62±9.47	t= 2.646[c]	0.003*	45.81±5.87	t= 5.614[c]	0.000*
Extended (n=9)	66.88±12.02			58.44±8.83		
Family Income						
Neutral (Expenses Equal Income) (n=47)	59.36±9.72	KWH= 13.806[a]	0.001*	48.40±6.06	KWH= 27.176[a]	0.001*
Positive (Income Surpasses Expenses) (n=15)	52.27±9.18			39.93±5.78		
Negative (Expenses Surpass Income) (n=8)	67.88±7.32[x]			55.88±6.90[z]		
Place of Residence						
Urban (n=58)	57.50±9.74	t= 2.449[c]	0.017*	45.96±6.42	t= 3.956[c]	0.000*
Rural (n=12)	65.16±10.48			54.58±8.81		
Health Insurance						
Yes (n=62)	57.27±9.39	MWU = 71.0 [b]	0.001*	45.97±5.96	MWU = 44.0 [b]	0.000*
No (n=8)	70.75±8.81			58.88±9.25		
Providing Care for More Than One Person						
Yes (n=24)	60.58±8.83	MWU= 223.0[b]	0.051	52.33±8.19	MWU=218.0[b]	0.042*
No (n=46)	57.89±10.86			44.89±5.83		

a: Kruskal-Wallis H test. b: Mann-Whitney U test. c: T-test for independent groups. x: Non-parametric Post-hoc test *:p<0.05