



EDITORIAL

Correlation of Mothers' Educational Level and Depression of Mothers with PKU Children

Iakovou K^{1,2*} and Schulpis K¹

¹National Newborn Screening Program, Aghia Sophia Children's Hospital, Greece

²Inborn Errors of Metabolism Department, Institute of Child Health, Greece

*Corresponding author: Dr. Iakovou K, National Newborn Screening Program, Aghia Sophia Children's Hospital; Inborn Errors of Metabolism Department, Institute of Child Health, Greece



Phenylketonuria (PKU) is an inborn error of phenylalanine (phe) metabolism due to the deficiency of the hepatic enzyme phe hydroxylase activity. Mothers of phenylketonuric children are obligatory heterozygous of the disease. PKU is characterized by high phe blood levels resulting in executive function impairment, convulsions and microcephaly caused by toxic effect of phe accumulation in the brain [1]. Early detection of PKU infants and proper treatment with phe-restricted diets has really minimized the more severe brain damage and psychiatric problems associated with PKU. The only therapeutic treatment includes restriction of natural protein intake supplemented with amino acid phe free medical food [2]. The most notable behavioral symptoms related to not adherence to the diet were hyperactivity, lethargy, and a variety of mental disorders including phobias, panic attacks, and depression [2]. The treatment guidelines of the American College of Medical Genetics and Genomics state that the clinical treatment goal for individuals with PKU are to maintain blood Phe concentrations within the range of (120-360 $\mu\text{mol/L}$) for individuals of all ages and that treatment should be lifelong [3]. Patients on loose or off diet result in high phe levels were as tyrosine (tyr) and especially tryptophan (try) the precursor of serotonin (ser) are measured in very low concentrations in blood and brain. It is well known that ser is responsible for depression symptoms [2]. Phe, tyr and try share the some pathway for entering the brain via the blood brain barrier [3]. This therapeutic diet can be characterized as vegan - vegetarian diet and most patients and their parents accept this kind of diet because literature adapted it as the most successive treatment [4].

Depression is one of the most common mental disorders in most civilized countries and is related to increased morbidity and mortality. With regards to the quality of life this medical condition may affect many groups of population. The socio-demographic factors of age, gender, marital status, education, immigrant status and income have consistently been identified as important factors in explain the variability in depression prevalence rates [2]. Previous studies on mothers with PKU children and patients with PKU disease were found that there was a strong correlation of quality of their life and social discrimination with phe blood concentrations of the amino acid. Furthermore, mothers who had completed Primary School and/or lived in a City > 300.000 inhabitants experienced the greatest damage of Quality of Life. With regards to Social Discrimination, these mothers who were graduated with a University degree felt the lowest Social Discrimination whereas the highest degrees of these symptoms were reported for mothers who live in a Small Town. Psychological support could be necessary for these groups of mothers [5]. Additionally, symptoms such as depression were demonstrated in PKU patients off diet who were benefited with psychological support. Depression symptoms were also characterized diabetes mellitus patients, another chronic metabolic disorder of the carbohydrate glucose who was also on special diet [2].

The aim of this study was to evaluate the depression degrees of mothers with PKU children in relation to their educational status.

The study was in accordance to Helsinki declaration



Citation: Iakovou K, Schulpis K (2023) Correlation of Mothers' Educational Level and Depression of Mothers with PKU Children. Int J Psychol Psychoanal 9:071. doi.org/10.23937/2572-4037.1510071

Accepted: December 22, 2023; **Published:** December 24, 2023

Copyright: © 2023 Iakovou K, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

(1980) and (1983) as revised in 2013, as well as by the local ethics committee. The study included 42 mothers with PKU children, mean age (28.7) years-old. The participants were psychologically evaluated monthly and when personal problems appeared. These subjects were divided in to three groups according to their educational status: High school (n = 18), University degree (n = 16) and graduated with a Master degree (n = 10). Depression was evaluated using a Patient Health Questionnaire (PHQ-9) standardized for Greek population [6]. This is easily used by patient questionnaire, is a self-administered version of the PRIME-MD diagnostic instrument for common mental disorders [6]. The PHQ-9 is the depression module, which scores each of the nine DSM-IV criteria as "0" (not at all) to "3" (nearly every day). It has been validated for use in primary care [7]. It is not a screening tool for depression, but it is used to monitor the severity of depression and response to treatment. When screening for depression the PHQ-2 can be used first (it has a 97% sensitivity and a 67% specificity in adults) [8]. Validity has been assessed against an independent structured mental health professional interview. Depression

Severity was evaluated as follows: 0-4 none, 5-9 mild, 10-14 moderate, 15-19 moderately to severe, 20-27 severe.

Psychological support of the groups was performed in every depressed participant once per weeks for three successive months under the same conditions. The support focused on the personal problems of every participant which coast depression in relation to PKU child and tried to solve them. Especially, we tried to give much attention to problems raised from the special therapeutic diet for the amelioration of the main symptoms of their children's disease.

Data was analyzed using SPSS 20.0 statistical package. Descriptive statistics were utilized for the analysis of the results.

As a presented in [Table 1](#) mothers with PKU child who had ended high school suffer from mild depression symptoms 6/18 and after support no symptoms and sings were determined. Additionally, 4/18 had moderate symptoms that turned to normal 3/4 whereas only one suffers from mild symptoms after support. Furthermore 2/18 cases presented moderate to severe symptoms,

Table 1: Depression degrees detected in mothers with phenilketonuric children who achieved high school before and after psychological support (n = 18).

Before psychological support			
Mild	Moderate	Moderate to severe	Severe
6/18 (33.3%)	4/18 (22\0.2%)	2/18 (11.1%)	2/18 (11.1%)
After psychological support			
Mild	Moderate	Moderate to severe	Severe
Normal 6/6(100%)	Normal 3/4(75%)	Normal 1/2 (50%)	Normal 1/2(50%)
Mild: 0/6 (0%)	Mild: 1/4 (25%)	Mild: 1/2 (50%)	Mild: 0/2 (0%)
Moderate 0/6(0%)	Moderate:0/4 (0%)	Moderate 0/2(0%)	Moderate: 1/2 (50%)

Note: 4/18 (22.2%) mothers had not any depression symptoms.

Table 2: University degree graduated mothers with PKU children in relation to psychological support (before and after) (n = 16).

Before psychological support			
Mild	Moderate	Moderate to severe	Severe
6/16 (37.5%)	4/16 (25%)	2/16 (12.5%)	1/16 (\6.3%)
After psychological support			
Mild	Moderate	Moderate to severe	Severe
Normal 6/6 (100%)	Normal 4/4(100%)	Normal 1/2 (50%)	Normal 0/1 (0%)
Mild: 0/6 (0%)	Mild: 0/4 (0%)	Mild 1/2 (50%)	Mild: 1/2 (50%)
Moderate : 0/6 (0%)	Moderate 0/4(0%)	Moderate 0/2(0%)	Moderate: 1/2(50%)

Note: 3/16 (18.8%) mothers had not any depression symptoms.

after psychological support one turned to normal and the rest suffered from mild symptoms. Severe symptoms of depression were detected in 2/18, after treatment one of them became normal and the other one presented moderate symptoms. 4/18 was healthy during the evaluation.

As shown in Table 2, 6/16 mothers who were graduated with a University degree were found with mild depression symptoms, after support all subject become normal. On addition, 4/16 suffered from moderate depression, after treatment all turned to normal. Mothers with moderate to severe symptoms n = 2 became one normal and the other 1 mild. Finally, one participant had severe symptoms and after support became mild. At the beginning of the study, 3/18 was healthy.

As illustrated in Table 3, 4/10 mothers were mild depressed who became normal after support. Both mothers with moderate symptoms became also normal. The only one who was found to have moderate to severe symptoms turn to mild after support. No mothers of this group presented severe symptoms, 3/10 participants were healthy at the beginning of the study.

Depression is a public health disease which is diagnosed worldwide and has been ranked as one of the illnesses having the greatest burden for individuals, families and society [9]. Furthermore, depression is related to increased morbidity and mortality [9] and decreased quality of life [6] among many other negative consequences. In a Previous study [5] it was reported that mothers who were obliged to prepare the special diet of their affected PKU children suffered from social discrimination and disturbance of their quality of life depending to their educational status. Additionally, it was recommended all the affected mothers to be under psychological support for amelioration of their clinical symptoms.

All these above mentioned arguments were utilized in mothers who take care of their PKU children in order to provide psychological support. It is underline that psychosocial symptom and sings in the PKU are of great importance to support mothers. Maternal educational status should be seriously taken in to account in order to create arguments for their psychological support groups. Familial and professional surroundings could also be included for a successful psychological treatment [10].

In this study, the detected high percentage of mild depression in mothers who achieved a post graduate degree, master or PHD, could be related to the better understanding of the pathophysiology of the metabolic disease. On the contrary the others may understand the mechanism of the disease into a laser degree. It is underlined that all symptoms disappeared after two months of support during which efforts were utilized to make mothers understand all the above. Moderate degrees of depression where observed in all the studied groups of mothers to the almost similar characterization of the metabolic disorder. Additionally, same results of depression scores where determined in all the studied groups. The observed results, moderate, moderate to severe could be due to the same understanding of the therapeutic process of the disease and the expected results of this therapeutic process. This argument is further supported by the absence of severe depression degrees in mothers who succeeded a master or PHD degree. This group had the ability to understand the beneficial effect of the therapeutic special PKU diet on their children. Additionally these who finished high school could not focused on the mechanism of this kind of diet and that it is the only treatment of this metabolic disorder [2,5].

Psychological support was beneficial in all the studied groups especially in those who had a post graduated degree. 'Allergy' in food is a very good excuse

Table 3: Post-graduated (Master and or PHD) mothers with PKU children were benefited of their depressions symptoms graduated after psychological support (n = 10).

Before psychological support			
Mild	Moderate	Moderate to severe	Severe
4/10 (40%)	2/10 (20%)	1/10 (10%)	0/10 (0%)
After psychological support			
Mild	Moderate	Moderate to severe	Severe
Normal 4/4 (100%)	Normal 2/2(100%)	Normal 0/1(0%)	Normal 0/0(0%)
Mild: 0/4 (0%)	Mild: 0/2(0%)	Mild 1/1(100%)	Mild: 0/0(0%)
Moderate 0/4 (0%)	Moderate 0/2(0%)	Moderate 0/1(0%)	Moderate 1/2 (0%)

Note: 3/10 (30%) mothers had not any depression symptoms.

for avoiding reach in natural protein food. Patients who believe that they suffer from a disease, severe or very severe had a disturbance in Quality of life, Social Discrimination and Anxiety and Depression. The degree of severity of the disease may have an inverse correlation with the IQ scores. Further investigation may be needed for explanation of these findings [10].

Psychological support ameliorates depressions symptoms in all the studied groups especially in those who had a post graduate degree. Adherence to the special PKU diet is improved by psychological support. Encourage of mothers to pay much attention on the adherence to the diet may act into two ways: PKU children behavioral amelioration and on mothers who understood the grade value of this kind of treatment on their children.

References

1. Brumm VI, Bilder D, Waisbren SE (2010) Psychiatric symptoms and disorders in phenylketonuria. *Mol Genet Metab* 99: 559-563.
2. Iakovou K, Schulpis K (2019) The significant role of educational status in PKU patients: The beneficial effect of psychological support in depression. *Int J Adolesc Med Health* 33: 20180233.
3. Vockley J, Anderson HC, Antshel KM, Braverman NE, Burton BK, et al. (2014) Phenylalanine hydroxylase deficiency: Diagnosis and management guideline. *Genet Med* 16: 188-200.
4. Schulpis K, Iakovou K (2021) Stress degree demonstrated in mothers with phenylketonuria or hyperphenylalaninemia infant when requested for total or partial breastfeeding replacement. *Case Rep Perina Med* 10: 20190079.
5. Iakovou K, Madoglou A, Monopolis I, Schulpis K (2019) The effect of PKU diet on the maternal quality of life and social discrimination in relation to their educational status and place of living. *J Pediatr Endocrinol Metab* 32: 281-285.
6. Ginkel JM, Gooskens F, Schepers VP, Schuurmans MJ, Lindeman E, et al. (2012) Screening for post stroke depression using the patient health questionnaire. *Nurs Res* 61: 333-341.
7. Cameron IM, Crawford JR, Lawton K, Reid IC (2008) Psychometric comparison of PHQ-9 and HADS for measuring depression severity in primary care. *Br J Gen Pract* 58: 32-36.
8. Nuyen J, Volkers C, Verhaak F, Schellevis FG, Groenewegen PP, et al. (2005) Accuracy of diagnosing depression in primary care: the impact of chronic somatic and psychiatric co-morbidity. *Psychol Med* 35: 1185-1195.
9. D'Alisa S, Miscio G, Baudo S, Simone A, Tesio L, Mauro A (2006) Depression is the main determinant of quality of life in multiple sclerosis: A classification-regression (CART) study. *Disabil Rehabil* 28: 307-314.
10. Fatemeh F, Zahra S, Marzieh A (2019) Association of quality of life with serum phenylalanine level and socioeconomic status in patients with phenylketonuria: A review. *Int J Nutr Sci* 4: 109-112.