

Open Access Article Case Study

## Case study of a patient family with multiple endocrine neoplasia syndrome. Evaluation of Stress levels.

Olga Gioldasi<sup>1</sup>, Chrisi Vlachou<sup>1</sup>, Alexandros Argyriadis<sup>1</sup>,  
Agathi Argyriadi<sup>2</sup>

<sup>1</sup> School of Health Sciences, Frederick University, Cyprus

<sup>2</sup> Department of Psychology, School of Education and Social Sciences,  
Frederick University, Cyprus

**Key words:** stress, family, evaluation, MEN syndrome.

**Citation:** O. Gioldasi, C. Vlachou, A. Argyriadis, A. Argyriadi.  
Case study of a patient family with multiple endocrine  
neoplasia syndrome. Evaluation of Stress levels. Rev. Clin.  
Pharmacol. Pharmacokinet., Int. Ed. 2022, 36,1, 11-16.

<https://doi.org/10.5281/zenodo.10050359>

Received: 12 April 2022

Accepted: 03 May 2022

Republished: 28 October 2023

**Publisher's Note:** PHARMAKON-Press stays neutral with  
regard to jurisdictional claims in published maps and  
institutional affiliations.



**Copyright:** © 2023 by the authors.

Licensee PHARMAKON- Press, Athens, Greece. This article  
is an open access article distributed under the terms and  
conditions of the Creative Commons Attribution (CC BY)  
license. (<http://creativecommons.org/licenses/by/4.0/>).

**Corresponding author:** Dr Chrisi Vlachou, School of Health  
Sciences, Frederick University, Cyprus,  
Email: [chrissivlachou@yahoo.com](mailto:chrissivlachou@yahoo.com), Tel: + 30694-6264078

<https://orcid.org/0000-0002-9679-409X>

**SUMMARY. Introduction:** Multiple endocrine neoplasia (MEN) syndrome is a rare genetic disorder with a strong hereditary factor. Patients who have this specific disorder present particularly intense psychopathological symptoms. Since their relatives also develop this disorder, their psychological needs should also be studied.

**Aim:** The aim of this research was to evaluate the stress of a patient with MEN syndrome and that of his brother.

**Method:** The present qualitative research, which refers to a case study, examined the family of a patient with this specific genetic disorder. The interviews were carried out by the patient (a 28-year-old man) and his three years younger brother. For the collection of data relevant to stress a semi-structured guide of 10 questions was used. The research participants were informed about the anonymity and confidentiality of their participation and signed a consent document. The data analysis was carried out through thematic analysis.

**Results:** The diagnosis of the disease causes a stress increase to both siblings, to the patient as well as to his brother, because of the possibility of the brother developing the disease, since it is hereditary. The chemotherapy procedure was a stressful experience for both siblings. Likewise, the fear about life and its quality in the future causes stress. Cognitive reevaluation and mutual support of family members were reported as ways to manage stress. The creation of a patients' association from people suffering from MEN was also suggested.

**Conclusions:** Patients with this specific syndrome and their relatives experience increased stress levels which are associated with the diagnosis of the disease, with the experience of the chemotherapy, and also with the fear about the future. Mutual support, cognitive reevaluation, and participation in associations seem to be satisfactory ways to manage stress. The need for family support in order to develop stress self-management skills, as well as the need for primary health care support emerged from the present study.

## INTRODUCTION

Multiple endocrine neoplasia, which is known as MEN syndrome, is a group of hereditary syndromes. It is a rare condition, inherited in an autosomal dominant way.<sup>1</sup> It is caused by disorders of the tumor suppressor genes and results in benign and malignant tumours in various endocrine glands. The MEN syndrome is classified according to the glands which are affected in MEN1 and MEN2. MEN1 is characterised by parathyroid, pancreatic, and pituitary tumours.<sup>1</sup> MEN 2 is caused by a genetic defect in the *RET proto-oncogene*.<sup>1</sup> On the other hand, in the MEN2 syndrome myeloid thyroid carcinomas, pheochromocytomas and parathyroid hyperplasias develop.<sup>2,3,4</sup> There are two distinct clinical entities: MEN 2A and MEN 2B. MEN 2A is associated with medullary thyroid carcinoma (MTC), pheochromocytoma, primary hyperparathyroidism, cutaneous lichen amyloidosis and Hirschprung's disease. MEN 2B is associated with MTC, pheochromocytoma, ganglioneuromatosis of the aerodigestive tract, musculoskeletal and ophthalmologic abnormalities.<sup>4</sup> The real incidence and prevalence of MEN1 are unknown. The incidence of the disorder is estimated to be less than 2 cases per 1 million individuals, thus making this disease particularly rare,<sup>5</sup> but most studies report an estimated prevalence of 1–3 per 100,000.<sup>6</sup> MEN2A is most common, with an incidence of about 1 patient in 2 million, compared to MEN2B with an incidence of about 1 patient in 39 million.<sup>7</sup> Persons who have been diagnosed with a genetically inherited disease are affected not only physically, but also psychologically and socially. And this effect does not only concern the patients themselves, but also their families. Individuals with a long-term health condition are two to three times more likely to develop depression than the rest of the population.<sup>8</sup>

Regarding the mental health of patients, it seems that patients with this syndrome have an increased need for support. A relevant study in a sample of 43 patients with MEN2 found that 42% of the sample had clinically significant anxiety and 26% clinically significant depression.<sup>9</sup> As it was expected, patients with MEN syndrome have higher rates of depression and anxiety, but also more severe symptoms of sleep disorders compared to the general population, as it has been found through a relevant study in the United States.<sup>10</sup>

A similar study in the same country found a lower quality of life for these patients compared to the general population of the country.<sup>11</sup> Therefore,

it seems that these patients have an increased need for support compared to the general population.

This specific disease is, as mentioned above, genetic. Consequently, there is an increased likelihood of patients' relatives developing the disease, which leads to the need for relevant systematic monitoring.<sup>2,3</sup> Thakker considered that this aspect of the disease may lead to increased psychopathology for relatives of patients with MEN syndrome and to related support needs at the family level.<sup>12</sup>

## METHOD

Based on the above literature review, two important bibliographic gaps have been identified. The first gap concerns the examination of mental health at the level of the family system. Indeed, based on the data so far, mental health is examined individually in patients and relatives but not in the dynamic context of the family. The second gap concerns the study of stress. More specifically, research to date has focused on anxiety, depression, and quality of life, but not on stress, although this may be necessary due to its involvement in the etiological mechanism of chronic morbidity.<sup>13,14</sup> In this context, the purpose of this study was to combine the study of the stress of a patient with MEN syndrome with the study of his brother's stress.

The design of the present study involved a case study. The family of a patient with MEN syndrome is the case which is examined in this research. Methodologically, a case does not necessarily refer to an individual; it can also refer to a unit of analysis, such as a family, a hospital, a community, etc.<sup>15</sup> Therefore, the case of the present research concerns a specific family.

The research carried out was qualitative. Qualitative research does not seek to identify an objective "truth". On the contrary, through social constructivism, it attempts to construct reality based on the way in which the participants themselves perceive it.<sup>16</sup> The study participants were a patient with MEN2 syndrome and his brother. The patient was a 28-year-old man and his brother was 25 years old.

The measurements of the present study were based on two parts. The first part was common to both participants and involved a brief, unstructured interview about the general family history. Unstructured interviews allow the participants to direct the research process where they want, which therefore provides great autonomy to the interviewee.<sup>16</sup> The unstructured guide was chosen because it was impossible for the researcher to know important parameters of the family history

beforehand in order to formulate relevant questions for the participants. Therefore, the researcher used an unstructured guide, through which he sought to collect family history information that the participants themselves considered worth mentioning. A semi-structured 10-question guide was used to collect stress-related data.

The research participants were a sample of convenience from the familiar personal and wider interpersonal environment. They were informed about the research by telephone and agreed to participate. Prior to their inclusion in the study, they were informed about the anonymity and confidentiality of their participation and signed the relevant consent forms prior to their inclusion in the research.

The analysis of the data of the present research was performed on the basis of thematic analysis. Specifically, the analysis was performed according to the method of Braun & Clarke.<sup>17</sup> According to this method, the analysis is performed in six steps, which are the following: (1) Familiarization with the data (2) Coding (3) The development of topics (4) The modification of topics (5) The naming of topics (6) The writing of the results.

Based on the thematic analysis that was carried out, five topics emerged with the following titles: "Increased stress due to the diagnosis of MEN syndrome", "Stress about the future", "Cognitive re-evaluation as a way to manage stress", "Mutual support as a method of managing stress within the family", and "The need to create patient clubs to facilitate stress management".

## RESULTS

The two brothers live with their parents in a house in the Prefecture of Evritania in Greece. The family's socio-economic background is moderate. Both participants work in the family bakery. MEN syndrome appeared in the older brother aged 28, 4 years ago. Since then, he has undergone a lot of surgeries and chemotherapy. The younger brother, despite being at relative genetic risk, does not have active disease. Both brothers are in a relationship. The patient has been in a relationship for 4 years with an employee in the next store, while the younger brother entered into a new relationship 2 months ago. Both brothers are graduates of Secondary Education.

The increase in stress due to the diagnosis of MEN syndrome is confirmed by both participants. The patient's brother mentions characteristically:

*"All of a sudden I am reminded of this possibility and I think about it a lot. Because I do not have any symptoms, I want to ring up a doctor even if I get a muscle strain. Any sign I see on me rings a bell."*

while the patient reports:

*"This syndrome does not leave you alone, that is, it is like carrying a constant tension."*

Both participants agree that chemotherapy is characterized as the most stressful experience and is the most stressful period. The brother gives this characteristic reply when asked about the most stressful part of the journey:

*"When my brother underwent chemotherapy."*

As for the patients' stress about the future, the patient's brother reports this for instance:

*"What worries me is that one day I will be sick too."*

while referring to his brother, he mentions as the main fear:

*"I'm afraid of a relapse and his having to undergo chemotherapy again."*

Cognitive reevaluation, as a way of managing stress, is mentioned as a technique by both participants. The patient is very analytical about this issue:

*"Here I wanted to tell you, that after a while I realized that I could do what I did before. And, fortunately, I was not separated from my girlfriend. She has supported me, and we have our job and everything is going well. So it helps me to think that my old fears did not come true. I live. And who knows, I may live like this always, without suffering anything."*

As for mutual support as a method of managing stress within the family, both brothers mention in their interviews the way they support each other, the support from their mother, but also the lack of mutual support from the father, which seems to promote stress:

*"... our father felt like a leper, that he infected, let's say, his children. "Believe me, the biggest problem was managing him." "...I show him that I am strong too and that helps him, that is, to see that I continue my life..."*

*"...It gives me courage. And my mother tells us this. I remember crying one day and she told me you will see, the years will pass and we will be fine... »*

*"...I was running the store, I was encouraging my mother, as for my father..."*

*"...I remember one day after consoling him ... My mother, a calmer person, thought that everything would be fine..."*

Finally, as far as the need to develop patient associations for stress management is concerned, the research patient is particularly enlightening. His younger brother mentions it, too, having been convinced of the need for an association.

*"Because the disease is rare, I wanted to see someone who had MEN... there maybe 10 to 20 cases all over Greece. I wanted to meet someone, to wonder whether I will be like him. Perhaps a club might help."*

*"Some time ago my brother said a club is needed... Maybe my brother is right, a club, an organization to help such patients."*

## DISCUSSION

Being diagnosed with a genetic disorder such as MEN2 affects not only the physical health of the patient but also has psychological and social impacts on both the patient and his family. A patient suffering from MEN2 faces a lifetime full of treatments, but without the possibility of a cure. Treatments may be difficult, with uncertain outcomes and there is also the challenge of living with the risk of a shortened life expectancy.

From the case study, it appears that the families of patients with MEN syndrome experience, particularly intense stress. Stress seems to be related to the diagnosis of the disease, to the experience of chemotherapy, but also to the fear about the future. In fact, the period of chemotherapy was the most stressful period for both the patient and his brother. Cognitive evaluation, mutual support, and seeking help from clubs have been recorded as adaptive strategies on the part of patients.

Undoubtedly, the stress experienced by patients with MEN and bad psychology also leads to poor life quality. The need to manage stress in patients with MEN syndrome is a given. For example, a case study in the United States reports the development of severe stress and trichotillomania in adolescents due to diagnostic tests for the disorder.<sup>18</sup> In a recent survey in the UK, concerning 219 patients suffering from

MEN1 and MEN2, over half of them felt that it had a negative impact on their long-term mental/emotional well-being, their employment/career, and family life.<sup>19</sup> A recent survey of over 200 patients suffering from MEN1 in the USA also found that patients reported worse health-related quality of life scores compared with the general population. Persistent hypercalcemia after parathyroid surgery was associated with higher levels of anxiety, depression, fatigue, and decreased social functioning; travelling more than 50 miles for doctor appointments and having more than 20 doctor appointments per year was associated with lower health-related quality of life.<sup>11</sup> In a study of 43 adults (age  $\geq 18$  years) with clinical and genetic diagnosis of MEN2, anxiety (42% of patients) and depression (26% of patients) symptoms were frequent. Psychological distress is likely chronic in MEN2 patients.<sup>9</sup>

Diagnosis can affect relationships and family dynamics. The feelings which emerge in the rest of the family members vary. Some family members can be very supportive, such as the mother of the two brothers in our case study. Family members without this condition can experience guilt as they are not affected.<sup>1</sup> Parents may also feel guilt when finding out that their offspring have inherited the disorder, as observed in the case of the father in our study.<sup>1</sup> Unfortunately, the father was not able to support the other members of the family. The guilt he felt due to the hereditary nature of the disease, caused stress to him. Thus he felt responsible for the illness of his eldest son and also for the potential illness of his youngest son. Parents may also focus more time and attention on siblings who are affected.<sup>20</sup> In a study of 43 adults (age  $\geq 18$  years) with clinical and genetic diagnosis of MEN2, patients who transmitted *RET* mutations to a child had higher scores for weakness-discouragement or anxious preoccupation and lower scores for cognitive, emotional, and physical functioning. Feelings of guilt were present in 35% of patients with mutation-positive children.<sup>9</sup>

In any case, the stress of relatives has not only a negative but also a positive side. According to a study of relatives of patients with multiple endocrine tumours in the United States, the need to relieve stress was the main reason why relatives decided to proceed with genetic testing.<sup>21</sup> More broadly, mild stress levels can be beneficial under certain conditions, as they actually mobilize the individual.<sup>13</sup> The role of the occupational health professional should therefore be to alleviate the stress levels of the relatives of the patients after

attending the health services, as from that point on the stress is no longer functional but completely harmful.

Particular mention should be made of the fact that the patient and his brother have developed adaptive mechanisms, such as mutual support and cognitive reevaluation. Based on the previous literature, these mechanisms contribute to the management of the mental burden of cancer patients<sup>22</sup> and should be evaluated very positively.

Stress management in patients with MEN syndrome is considered necessary. In order to reduce and manage stress, support groups for patients with MEN syndrome or rare syndromes, as well as health professionals are called to play an important role. Living with a rare disease can feel isolating for the patient, and therefore meeting others with the same condition can be a positive experience. Of particular interest is the proposal of the brothers of our study for the development of support groups for patients with MEN syndrome, which is particularly effective in cancer patients.<sup>23</sup> As the number of MEN patients in Greece may be too low to support this, online initiatives to develop such patient clubs online at the international level might be useful. Nurses can provide in-depth information and support for patients and their families facing MEN, enabling them to access specialist support such as genetic counsellors, psychologists, social workers, and support groups. Several countries also have charities that offer information and support for individuals and families with MEN, such as the Association for Multiple Endocrine Neoplasia Disorders (AMEND) in the UK.<sup>1</sup> AMEND was established by patients, for patients, in 2002, supporting patients and families with multiple endocrine neoplasia disorders, offering free membership, free counselling service by a specialist Consultant Psychotherapist, and free information resources by an expert Medical Advisory Team, empowering patients to seek the best medical care and treatments.<sup>1,24,25,26</sup> Providing patients with the correct information can result in the relief of patients' anxieties and in the improvement of their care. In order to connect patients for mutual support and reduce isolation, the Association runs several private social media groups.<sup>1</sup>

In conclusion, people suffering from MEN syndrome, as well as the other family members, experience intense stress. Health care professionals can provide great help in reducing and managing stress. The present study highlighted the need for family support in order to develop stress self-management skills, as well as the need for primary health care support.

**Conflicts of Interest:** The author declares no conflicts of interest regarding the publication of this paper.

#### REFERENCES

1. Tadman M, Martin L. Multiple Endocrine Neoplasia. In: Llahana S, Follin C, Yedinak C, Grossman A. (eds), *Advanced Practice in Endocrinology Nursing*. Springer, Cham; 2019. p.1259-1278. Available from: [https://doi.org/10.1007/978-3-319-99817-6\\_66](https://doi.org/10.1007/978-3-319-99817-6_66)
2. Moline J, Eng C. Multiple endocrine neoplasia type 2: an overview. *Genetics in Medicine*. 2011; 13(9): 755-764. DOI: 10.1097/GIM.0b013e318216cc6d.
3. Thakker R V. Multiple endocrine neoplasia type 1 (MEN1). *Best practice & research Clinical endocrinology & metabolism*. 2010; 24(3): 355-370. DOI: 10.1016/j.beem.2010.07.003.
4. Mathiesen J S, Effraimidis G, Rossing M, Rasmussen Å K, Hoejberg L, Bastholt L, Godballe C, Oturai P, Feldt-Rasmussen U. *Seminars in Cancer Biology*. 2022; 79:163-179. DOI: <https://doi.org/10.1016/j.semcancer.2021.03.035>.
5. Mathiesen J S, Kroustrup J P, Vestergaard P, Madsen M, Stochholm K, Poulsen P L, Hahn C H. Incidence and prevalence of multiple endocrine neoplasia 2B in Denmark: a nationwide study. *Endocrine-Related Cancer* 2017; 24(7): L39-L42. DOI: 10.1530/ERC-17-0122
6. Al-Salameh A, Cadiot G, Calender A, Goudet P, Chanson P. Clinical aspects of multiple endocrine neoplasia type 1. *Nat Rev Endocrinol*. 2021; 17: 207–224. DOI: <https://doi.org/10.1038/s41574-021-00468-3>
7. Hughes M S, Feliberti E, Perry R R, Vinik A. *Multiple Endocrine Neoplasia Type 2A (including Familial Medullary Carcinoma) and Type 2B*. In: *Endotext*. MDText.com, Inc., South Dartmouth (MA); 2000. PMID: 29465928.
8. Grey J, Winter K. Patient quality of life and prognosis in multiple endocrine neoplasia type 2. *Endocrine-Related Cancer*. 2018; 25(2): 69-77. DOI: <https://doi.org/10.1530/ERC-17-0335>
9. Rodrigues K C, Toledo R A, Coutinho F L, Nunes A B, Maciel R M, Hoff A O, Lourenço Jr D M. Assessment of depression, anxiety, quality of life, and coping in long-standing multiple endocrine neoplasia type 2 patients. *Thyroid*. 2017; 27(5): 693-706. DOI: 10.1089/thy.2016.0148.
10. Mongelli M N, Peipert B J, Goswami S, Helenowski I, Yount S E, Sturgeon C. Quality of life in multiple endocrine neoplasia type 2A compared with normative and disease populations. *Surgery*. 2018; 164(3): 546-552. DOI: 10.1016/j.surg.2018.04.036
11. Goswami S, Peipert B J, Helenowski I, Yount S E, Sturgeon C. Disease and treatment factors associated with lower quality of life scores in adults with multiple endocrine neoplasia type 1. *Surgery*. 2017; 162(6): 1270-1277. DOI: 10.1016/j.surg.2017.07.023.

12. Thakker R V. Multiple endocrine neoplasia—syndromes of the twentieth century. *The Journal of Clinical Endocrinology & Metabolism*. 1998; 83(8): 2617-2620. DOI:10.1210/jcem.83.8.5045
13. Chrousos G P. Stress and disorders of the stress system. *Nature reviews endocrinology*. 2009; 5(7): 374. DOI: 10.1038/nrendo.2009.106
14. McEwen B S. Central effects of stress hormones in health and disease: Understanding the protective and damaging effects of stress and stress mediators. *European journal of pharmacology*. 2008; 583(2-3): 174-185. DOI: 10.1016/j.ejphar.2007.11.071
15. Christensen L B. *Experimental methodology*. Boston: Pearson/Allyn & Bacon; 2004.
16. Babbie E R. *The basics of social research*. Cengage Learning; 2013.
17. Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative research in psychology*. 2006; 3(2): 77-101. DOI: 10.1191/1478088706qp063oa
18. Giarelli E. Spiraling out of control: one case of pathologic anxiety as a response to a genetic risk of cancer. *Cancer nursing*. 1999; 22(5): 327-339.
19. Winter K, Grey J. Psychosocial impact of multiple endocrine neoplasia disorders. *Endocrine Abstracts*. 2016; 44: 121. DOI: 10.1530/endoabs.44.P121
20. New York – Mid - Atlantic Consortium for Genetic and Newborn Screening Services. *Understanding genetics: a New York, mid-Atlantic guide for patients and health professionals*. Washington, DC: Genetic Alliance; 2009.
21. Grosfeld F J, Lips C J, Ten Kroode H F, Beemer F A, Van Spijker H G, Brouwers-Smalbraak G J. Psychosocial consequences of DNA analysis for MEN type 2. *Oncology (Williston Park)*. 1996; 10(2): 141-6.
22. Golden W L, Gersh W D, Robbins D M. *Psychological treatment of cancer patients: A cognitive-behavioral approach*. Macmillan Publishing Company; 1992.
23. Ussher J, Kirsten L, Butow P, Sandoval M. What do cancer support groups provide which other supportive relationships do not? The experience of peer support groups for people with cancer. *Social science & medicine*. 2006; 62(10): 2565-2576. DOI: 10.1016/j.socscimed.2005.10.034.
24. Argyriadis A, Argyriadi A. Socio-Cultural Discrimination and the Role of Media in the Case of the Coronavirus: Anthropological and Psychological Notes through a Case Study. *International Journal of Caring Sciences*. 2020; 13(2): 1449-1454. Available from <https://www.proquest.com/scholarly-journals/socio-cultural-discrimination-role-media-case/docview/2462488615/se-2>
25. Patelarou A, Saliadj A, Galanis P, Pulomenaj V, Prifti V, Sopjani I, Mechili E A, Laredo-Aguilera J A, Kicaj E, Kalokairinou A, Cobo-Cuenca A I, Celaj J, Carmona-Torres J M, Bucaj J, Asimakopoulou E, Argyriadi A, Argyriadis A, Patelarou E. Predictors of nurses' intention to accept COVID - 19 vaccination: A cross - sectional study in five European countries. *Journal of Clinical Nursing*. 2021. DOI: 10.1111/jocn.15980
26. Patelarou E, Galanis P, Mechili E A, Argyriadi A, Argyriadis A, Asimakopoulou E, Brocaj S, Bucaj J, Carmona-Torres J M, Cobo-Cuenca A I, Dolezel J, Finotto S, Jarosova D, Kalokairikou A, Mecugni D, Pulomenaj V, Saliadj A, Sopjani I, Zahaj M, Patelarou A. Factors influencing nursing students' intention to accept COVID-19 vaccination: A pooled analysis of seven European countries. *Nurse Education Today*. 2021; 104:105010. DOI: 10.1016/j.nedt.2021.105010.