



Knowledge, attitudes, and experience of child and adolescent psychiatrists in Turkey concerning pediatric electroconvulsive therapy

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ABSTRACT

Objective: Electroconvulsive therapy (ECT) is a treatment modality in children that can be life-saving but is rarely preferred. In this study, we aimed to evaluate the knowledge, experience, and attitudes of child and adolescent psychiatrists (CAPs) in Turkey about pediatric ECT and to draw attention to possible gaps and needs regarding this treatment in the child and adolescent psychiatric policies of Turkey.

Method: An electronic survey was prepared and shared with child and adolescent psychiatric residents and specialists. The participants were asked about their residency training, clinical experience, and opinion about ECT. The obtained data were entered in SPSS Statistics 23.0. Descriptive analyses and chi-squared tests were applied.

Results: One hundred and ninety-one CAPs filled in the questionnaire, 28.8% of whom assessed their knowledge level as “I have no knowledge.” Only 34% of them stated that their patients, most of whom had mood disorders, schizophrenia, and catatonia, had received ECT before. Four of these patients were under 12 years old. Sixty-six percent of the participants suggested that ECT was safe in adolescents, whereas only 5.8% held this view for prepubertal children. The most common reason for physicians not to apply ECT was “lack of means to apply ECT,” and 92.7% stated that opportunities should be provided for pediatric ECT treatment by the hospital administration.

Conclusion: This is the first data to present the knowledge and attitudes of CAPs in Turkey about ECT. The results suggest that physicians need to have more knowledge about ECT.

1. Introduction

Electroconvulsive therapy (ECT) is a fast, safe, and life-saving treatment modality. However, it is rarely preferred in children and adolescents based on the lack of knowledge and experience of physicians and concerns about the long-term adverse effects of ECT (Puffer et al., 2016; Ghaziuddin et al., 2001; Walter et al., 1997). On the other hand, studies on adolescents demonstrate that the adverse effects of ECT on memory and cognitive functions are temporary (Cohen et al., 2000; Ghaziuddin et al., 2000), while prolonged psychiatric treatment that can cause chronic stress may lead to cognitive disorders (Sandi, 2004).

In Turkey, it has been shown that 0.8% of the patients who have received ECT are children and adolescents (Saatcioglu and Tomruk, 2008). With the exception of this study in Turkey, data about ECT treatment in children are limited to case reports (Tanidir et al., 2016; Incecik et al., 2015). In addition, no treatment manual, national registry, or definite legal regulations exist in Turkey regarding ECT treatment.

For all these reasons, we aimed to evaluate the opinions, experience, and attitudes of child and adolescent psychiatrists in Turkey about ECT treatment, which has repeatedly been demonstrated to be safe and effective in children and adolescents (Ghaziuddin et al., 1996, 2000, 2004). In this way, we aimed to draw attention to possible gaps and needs regarding this treatment in the child and adolescent psychiatric policies of Turkey.

2. Methodology

2.1. Participants and procedure

An electronic survey was prepared for this study based on similar studies in the literature (Ghaziuddin et al., 2001; Loiseau et al., 2017; De Meulenaere et al., 2018). Then, it was shared in the e-mail group of the Turkish Association for Child and Adolescent Psychiatry and in a WhatsApp group, the members of which are exclusively child psychiatrists, with information highlighting that the study was conducted on a voluntary basis. No questions were asked regarding the identity of

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the participants. The responders to the questionnaire in a one-month period after the survey was posted were included in the study.

The questionnaire contained 28 items in three subsections. In the first part of the questionnaire, the participants answered how many years he/she has been working in child psychiatry, in which institution he/she works now, whether he/she had received ECT training, and whether he/she requests further ECT training. Working times of the physicians were divided into five-year periods based on the residency training time. For comparison analyses, two groups were formed based on clinical experience. Thus, the participants who are still continuing their residency training and the participants in the first five years of their expertise constitute the group of “working for less than 10 years,” and the remaining participants formed the group of “working for more than 10 years.”

In the second part, the participants were asked whether they had applied ECT to a patient or whether they had followed a patient who had received ECT. Then, the physicians were asked about their clinical experience regarding ECT treatment, such as the ages and psychiatric diagnoses of the patients they had followed or side effects that occurred after ECT treatment.

In the last part, the knowledge level of the physicians regarding ECT and their opinions about ECT treatment in Turkey were questioned. First, in a three-choice question, the physicians were asked: “Under which conditions should ECT be used for children and adolescents?” and then they were asked to assess their knowledge level subjectively as “I have sufficient knowledge,” “I have partial knowledge,” or “I do not have any knowledge.” The physicians answered the other questions in this section as “yes,” “no,” or “I do not have sufficient knowledge.” For example, “Is ECT an appropriate treatment option for severe self-injurious behavior in adolescents?”, “Does ECT treatment lead to brain damage in children and adolescents?”, “Is ECT treatment being used frequently enough in Turkey?”, or “Should hospital administrations provide opportunities for ECT treatment in children and adolescents?”

Local ethical review board approval was obtained from Karadeniz Technical University Faculty of Medicine Ethics Committee with the protocol number 2018/188 for this study.

2.2. Statistical analyses

In this study, 191 child and adolescent psychiatrists voluntarily filled in electronic questionnaire forms. Since some physicians were members of both the e-mail and WhatsApp groups, the response rate of the questionnaire could not be obtained. The data from the survey were loaded in SPSS Statistics 23 for Windows. In statistical evaluations, numerical variables were shown with mean \pm standard deviation, and categorical variables were shown with a percentage (%). A chi-squared test was used for the comparison of categorical variables. A value of $p < 0.05$ was accepted as statistically significant.

3. Results

3.1. Findings of the clinical experience of the participants regarding child psychiatry and ECT

This study included 191 physicians who are working as specialists or residents. Table 1 includes general characteristics of the participants. Only 11% ($n = 21$) of the physicians stated that they had never received ECT training. Of these physicians, 76.2% ($n = 16$) had been working for less than 10 years while the remaining (23.8%; $n = 5$) had been working for more than 10 years. There was no significant difference between groups formed according to year of clinical experience in terms of whether they had received any ECT training previously ($p = 0.353$, $\chi^2 = 0.864$). Table 2 shows previous ECT trainings of physicians according to duration of their clinical experiences. In addition, 28.8% ($n = 55$) of the physicians assessed their knowledge level as “I have no knowledge,” 63.9% ($n = 122$) as “I have partial knowledge,” and 7.3%

Table 1
General characteristics of the participants.

	n	%
Sex		
Female	138	72.3
Male	53	27.7
Duration of clinical experience		
≤ 5 years	72	37.7
6–10 years	91	47.6
11–15 years	11	5.8
> 15 years	17	8.9
In which institution he/she works		
University Hospital	72	37.7
Training and Research Hospital	50	26.2
Public Hospital	48	25.1
Mental Health and Neurological Diseases Hospital	10	5.2
Private Hospital	6	3.1
Private Clinic	5	2.6
ECT Training		
Never trained	21	11.0
I participated in ECT treatment (patients of any age)	117	61.3
I participated in a training about ECT	48	25.1
I read scientific publications on ECT	5	2.6
Further ECT training request according to working time		
≤ 5 years	65	90.3
6–10 years	81	89.0
11–15 years	9	81.8
> 15 years	11	64.7

ECT: Electroconvulsive therapy.

Table 2
ECT trainings of physicians according to duration of their clinical experiences.

ECT Training	≤ 10 years		> 10 years	
	n	%	n	%
Never trained	16	9.8	5	17.9
I participated in ECT treatment (patients of any age)	102	62.6	15	53.6
I participated in a training about ECT	41	25.2	7	25
I have read scientific publications on ECT	4	2.5	1	3.6
Total	163	100	28	100

($n = 14$) as “I have sufficient knowledge.” Of the participants, 86.9% stated that they would like to receive further training on ECT. According to the working time of participants, 89.6% ($n = 146$) of the physicians who worked for less than 10 years and 71.4% ($n = 20$) who worked for more than 10 years requests further ECT training, and the difference was statistically significant ($p = 0.015$).

3.2. Findings of ECT applied patients

Thirty-four percent of the physicians ($n = 65$) stated that their patients had received ECT by them or by a colleague. Of these physicians ($n = 13$), 20% had been working for more than 10 years and 80% ($n = 52$) had been working for less than 10 years. Based on the physicians' statements, the characteristics of the patients who received ECT are presented in Table 3.

Two (3.1%) physicians reported that their patients were pregnant when they received ECT. Physicians who had previously recommended but had not applied ECT (18.8%; $n = 36$) reported that the most common reason was “lack of means to apply ECT” (50%; $n = 18$). The other reasons were “refusal of the ECT treatment by patient and family (27.8%; $n = 10$),” “improvement in patient's clinical condition (8.3%; $n = 3$),” “physician's assessment of his/her ECT knowledge level as low (8.3%; $n = 3$),” “physician's anxiety about the safety of ECT,” and “inability to obtain consent for ECT treatment from the clinic in which

Table 3
Characteristics of the patients who received ECT.

	n	% ^a
Distribution of age groups of the patients		
< 12 years old	4	6.1
13–15 years old	22	33.8
> 16 years old	49	73.8
Diagnoses of the patients		
Mood disorders	40	61.5
Schizophrenia	31	47.6
Catatonia	24	36.9
Severe self-injurious behavior	6	9.2
Eating disorder	2	3.1
Conversion disorder	1	1.5
Neuroleptic malignant syndrome	2	3.1
Post-traumatic stress disorder	1	1.5
Side effects observed in the patients		
No side effects	52	80
Headache, confusion and amnesia	10	15.3
Delirium	2	3.1
Bronchospasm	1	1.5

ECT: Electroconvulsive therapy.

^a Percentage distribution was given according to the responses of 65 physicians who stated that ECT was applied to his patient before. Some physicians had more than one patient who received ECT.

the physician works" (5.6%; n = 2).

3.3. Findings of the knowledge level of participants about ECT

Of the participants, 1.6% (n = 3) stated that ECT should never be used for children and adolescents, 49.7% (n = 95) stated that ECT should be used only if all other interventions fail, and 48.7% (n = 93) stated that ECT treatment may be used without waiting for a response to all treatment options. Moreover, 94.2% (n = 180) of the participants stated that a CAP should decide before ECT treatment in children and adolescents and 5.8% (n = 11) stated that consultation is not necessary.

Answers of child psychiatrists regarding their general opinion about ECT treatment are given in Table 4. A significant difference was found only in the questions of whether ECT is an applicable method in major depressive disorder (MDD) treatment and whether ECT causes brain damage, when the ECT knowledge of the physicians was assessed with respect to the working years. Accordingly, it was found that physicians who had been working for more than 10 years consider ECT to be an appropriate treatment option in the treatment of MDD at a statistically lower rate (54.5% [n = 12] and 76.9% [n = 90], respectively; [p = 0.029; $\chi^2 = 4.747$]) and think that ECT leads to brain damage at a statistically higher rate (26.3% [n = 5] and 7.1% [n = 8], respectively; [p = 0.030; $\chi^2 = 4.708$]) than those who had been working for a shorter period.

Table 4
Answers of child psychiatrists regarding their general opinion about ECT treatment.

Questions	Yes		No		Not sufficient knowledge	
	n	%	n	%	n	%
Is ECT an appropriate treatment option for major depression in adolescents?	102	53.4	37	19.4	52	27.2
Is ECT an appropriate treatment option for severe self-injurious behavior in adolescents?	70	36.6	35	18.3	86	45.0
Is ECT an appropriate treatment option for catatonia in adolescents?	166	86.9	6	3.1	19	9.9
Is a cardiovascular problem a contraindication for ECT?	64	33.5	50	26.2	77	40.3
Is epilepsy a contraindication for ECT?	71	37.2	61	31.9	59	30.9
Do you think ECT is a safe treatment for children (< 12 years)?	11	5.8	80	41.9	100	52.4
Do you think ECT is a safe treatment for adolescents (13–18 years)?	126	66.0	11	5.8	54	28.3
Do you think ECT treatment for children and adolescents has negative effects on long-term memory?	52	27.2	65	34.0	74	38.7
Do you think ECT treatment leads to brain damage in children and adolescents?	13	6.8	118	61.8	60	31.4

ECT: Electroconvulsive therapy.

3.4. Findings about the opinions regarding the safety of ECT and its use in Turkey

Most of the participants, independently from their working time being less or more than 10 years, stated that ECT is unsafe in children (87.5% [n = 63] and 89.5% [n = 17], respectively; [p = 1.000]). On the other hand, significantly more physicians who had less than 10 years of experience found ECT to be safe in adolescents than the others (94.7% [n = 108] and 78.3% [n = 18]; [p = 0.020]). When the physicians were compared according to their gender whether they consider ECT to be a safe practice, 90.9% (n = 60) of women and 80.0% (n = 20) of men stated that they regard ECT as being an insecure method in prepubertal children (p = 0.287; $\chi^2 = 1.134$), while 9.2% (n = 9) of women and 5.1% (n = 2) of men reported that they consider ECT to be unsafe in adolescents. Physicians who responded "I do not have any knowledge" were excluded in comparisons.

Ninety-nine percent of the participants (n = 189) reported that a Turkish ECT guideline is needed, 35.1% (n = 67) reported that a national registry for pediatric ECT treatment is absolutely required, 62.3% (n = 119) reported that it would be useful, and 2.6% (n = 5) reported that it is not needed.

In addition, 82.2% (n = 157) of the physicians stated that ECT treatment for children in Turkey is inadequate, and only one (0.5%) physician stated that it is adequate in Turkey. Lastly, 92.7% (n = 177) of the physicians stated that opportunities should be provided for childhood ECT treatment by the hospital administration.

4. Discussion

These are the first data to present the knowledge and attitudes of child and adolescent psychiatrists in Turkey about ECT. In addition, although the study does not include clinical records, it is the first comprehensive one that includes general data about pediatric ECT treatment. In Turkey, the duration of child and adolescent psychiatry residency training is four years. Nine months of this training consists of a mandatory adult psychiatry rotation (National Board of Medical Specialties (BMS) et al., 2017). Most of the physicians in this study (85.3%) were residents or specialists who were in the early years of their profession. In addition, most of the physicians were working at university hospitals or education hospitals. However, not all of the clinics that can perform ECT in Turkey are education clinics, and it is known that ECT can be applied to adolescents in adult psychiatry clinics under compulsory conditions, and there is no national registry for ECT. Due to all of these reasons, ECT experience of the physicians who involved in this study reflected their own clinical experience.

In this study, 61.3% of the participants reported that they had previously been involved in ECT treatment for patients of any age. While there was no significant difference in whether physicians had received any ECT training when compared to their working years, it was observed that those who had less than 10 years of experience had a

higher rate of attendance to an ECT practice. This suggests that the new generation has the chance of experiencing ECT more as a psychiatric treatment method during their specialist trainings or in their practices. However, considering the time passed in adult psychiatry clinics during child and adolescent psychiatry residency training, their ECT experience may be said to be mostly limited to adult patients. Thus, although most of the participants (89%, $n = 170$) stated that they had received some ECT training previously, just 7.3% of them considered their knowledge level about ECT to be “I have sufficient knowledge.” The rates of physicians’ own assessment about their knowledge level were consistent with studies conducted in Australia, the US, and Belgium (Walter et al., 1997; Ghaziuddin et al., 2001; De Meulenaere et al., 2018). On the other hand, it is indicated that as the knowledge of the physician increases, the perception about ECT safety also increases and concerns about ECT decrease (Ghaziuddin et al., 2001; Walter and Rey, 2003). In this study, 66% of the physicians found ECT to be safe in adolescents and 5.8% found it safe in prepubertal children. Additionally, it is shown that physicians consider ECT application during the prepubertal period to be unsafe at higher rates compared to adolescence regardless of the working year. Ghaziuddin et al. (2001) showed that 73% of the participants in their study found ECT to be safe in adolescents and 47% found it safe in prepubertal children. These rates were 31% and 10%, respectively, in another study (De Meulenaere et al., 2018). Thus, it can be said that concern about the safety of ECT treatment for prepubertal children in Turkey is higher. However, these results may be attributed to the difference in treatment routines of the surveyed physicians rather than a difference in knowledge level. Indeed, in our study, the majority of physicians who reported that they had previously been on ECT practice and followed up patients who had received ECT had been working for less than 10 years. In addition, it is found that physicians who worked for more than 10 years identify ECT to be less reliable even in adolescents than those who worked for less than 10 years, and their requests for advanced ECT training is also significantly lower. It can be said that these findings support the idea that physicians’ own treatment routines can be effective in their concerns about ECT. Another interesting finding regarding the safety of ECT is that female physicians find ECT to be less trustworthy for children and adolescents. In comparison analyzes, however, there was no significant difference in respect to gender. In studies where the effect of the gender of the physician is investigated on their own treatment modalities, it is reported that female physicians are more patient-focused, exhibit more emotional behaviors like concern, empathy, and sympathy; moreover, they are better in standardized examination and internalize evidence-based medicine practices more than men (Tsugawa et al., 2017; Jefferson et al., 2013; Roter et al., 2002). These results suggest that besides the clinical experience of physicians, their gender also can make a difference on their ECT preferences.

According to the APA ECT guideline, the only contraindication for ECT is pheochromocytoma (Ghaziuddin et al., 2004). Epilepsy is not a contraindication; indeed, ECT may be used for the treatment of epilepsy (Incecik et al., 2015). Today, ECT indications for children and adolescents are severe and persistent major depression or mania, schizoaffective disorder, schizophrenia, catatonia, neuroleptic malignant syndrome, and serious self-injurious behavior. Also, ECT can be used without waiting for the response to all treatment options in patients who cannot tolerate pharmacotherapy and in conditions that waiting may threaten a patient’s life (Ghaziuddin et al., 2004). Current studies show that more than one-third of physicians did not know whether cardiovascular diseases or epilepsy were contraindications for ECT and did not have any knowledge about whether ECT has a negative effect on memory or leads to brain damage. While 86.9% of the physicians stated ECT to be an appropriate treatment option for catatonia, only 53.4% considered it appropriate for MDD, and 36.6% for severe self-injurious behavior. Epilepsy was mostly identified as a contraindication. Half of the physicians stated that ECT could be applied only when all other treatment options had failed, and three physicians stated that ECT

should never be used for children and adolescents. Consequently, as ECT may be a life-saving treatment option, these results show the lack of knowledge of the physicians and the need for regulations in CAP residency training in Turkey.

There was no significant difference between the groups in terms of whether ECT is an applicable method in the treatment of catatonia and severe self-harming behavior when compared according to physicians’ working years. However, it was found that physicians who had been working for less than 10 years consider ECT to be a reliable option in MDD treatment at a significantly higher rate than those who had been working for more than 10 years. In addition, it was identified that physicians who had been working for more than 10 years consider that ECT leads to brain damage at a significantly higher rate, but there was no significant difference in physicians’ views about the negative effect of ECT on memory and whether epilepsy and cardiovascular disease states are contraindicated in ECT. These findings suggest that there can be differences in notions regarding ECT between generations. In particular, it is thought that the past experiences of physicians about ECT contribute to this variation. As a matter of fact, it is known that there have been changes in ECT devices and methods of application; additionally, data sharing on child–adolescent patient follow-up has increased all over the world (Ghaziuddin et al., 2004; Lima et al., 2013). For these reasons, it can be said that the perspectives of the new generation regarding ECT are more similar to the guidelines.

In this study, clinical features of the patients who received ECT were obtained by retrospective self-reports of the physicians. Accordingly, ECT was applied mostly to patients with mood disorders, schizophrenia, and catatonia. These data are consistent with the literature (Puffer et al., 2016; Loiseau et al., 2017). But, in the current study, ECT was identified to be used also for patients with eating disorders and post-traumatic stress disorder (PTSD). In fact, two physicians reported that some of their patients who received ECT were pregnant. Since detailed clinical records of patients could not be obtained for this survey, the factors that affected the ECT choices of the physicians remained unclear. Moreover, 6.1% ($n = 4$) of the patients were under 12 years of age. But it should be noted that not all of the defined ECT procedures might have been performed by CAPs because this questionnaire collected data of the patients for whom the physicians knew that ECT was applied. In conclusion, new studies that present more detailed clinical records are needed. Reflecting this, one-third of the participants indicated that a national registry is definitely needed. Thereby, sharing of knowledge and experience by physicians in Turkey may also be increased.

The most frequently reported side effects of ECT in children and adolescents are headache, nausea/vomiting, confusion, and agitation. Reversible disturbance in memory and learning functions, post-ECT delirium, and bronchospasm due to anesthesia are the other reported side effects (Chanpattana et al., 2010; Ozdemir et al., 2016). In this study, 80% ($n = 65$) of the physicians who followed a patient who had received ECT did not observe any side effects. The most common side effects were consistent with the literature. However, detailed data regarding the start and course of these side effects could not be provided.

Lastly, 82.2% of the physicians stated that pediatric ECT treatment in Turkey is inadequate, and unavailability is the most common reason for not using ECT. In Norway, it was reported that ECT could not be applied to patients under 18 years of age because of the unavailability of an ECT device (Jarosch-von Schweder et al., 2011). Similarly, Loiseau et al. (2017) reported unavailability as the second most frequent reason for the inability to apply ECT. In the current study, about one-third of the physicians stated that they could not apply ECT because of the refusal of families and patients. However, many of the patients and their families who received ECT emphasize that the disease that required treatment is more destructive than ECT treatment (Walter et al., 1999). In conclusion, the knowledge levels of patients, families, and physicians in Turkey should all be increased.

5. Conclusions

Results of this study demonstrated that the ECT experience of child and adolescent psychiatrists in Turkey is limited. Children and adolescents constitute about one-third of the general population in Turkey (Turkish Statistical Institute (TSI), 2017). Considering the morbidity and mortality rates of severe and chronic psychiatric diseases, physicians need to have more knowledge about ECT, which is a fast, effective, and safe treatment option for this age group. Therefore, more research about the short- and long-term effects of this treatment should be presented by the clinics that perform ECT treatment. On the other hand, as 99% of the physicians in this study have stated, a Turkish ECT guideline and standards for pediatric ECT in the light of scientific data are needed.

6. Limitations

This study has several limitations. First of all, it is not clear how many physicians in total could be reached by the study questionnaire. Although the number of physicians who responded to this questionnaire is high, the results are limited to participants. Secondly, the survey mostly involved residents and specialists in the early years of their profession. This might have led to obtaining inadequate data about their experience. Thirdly, in this questionnaire, the clinical experiences of the physicians were obtained based on their self-reports. In these data, which are not based on a registry, falsification of the memory may have generated a bias. Lastly, clinical data regarding previous treatment experience and disease of the patients could not be obtained. In this context, new research and a national ECT registration system are needed.

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Declaration of Competing Interest

None.

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Appendix A. Supplementary data

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References

National Board of Medical Specialties (BMS), Republic of Turkey, Ministry of Health,

2017. Child and Adolescent Psychiatry Residency Training Program. (Accessed 27th January 2019). <https://tuk.saglik.gov.tr/TR31502/cocuk-ve-ergen-ruh-sagligi-ve-hastalıkları.html>.
- Chanpattana, W., Andrade, C., Gangadhar, B.N., Kitphati, R., Kramer, B.A., Kunigiri, G., 2010. A survey of the practice of electroconvulsive therapy in Asia. *J. ECT* 26, 5–10.
- Cohen, D., Allilaire, J., Basquin, M., Benoit, N., Chevret, S., Corcos, M., Flaument, M., Fossati, P., Jeamment, P., Taieb, O., 2000. Absence of cognitive impairment at long-term follow-up in adolescents treated with ECT for severe mood disorder. *Am. J. Psychiatry* 157, 460–462.
- De Meulenaere, M., De Meulenaere, J., Ghaziuddin, N., Sienaert, P., 2018. Experience, knowledge, and attitudes of child and adolescent psychiatrists in Belgium toward pediatric electroconvulsive therapy. *J. ECT* 34, 247–252.
- Ghaziuddin, N., King, C.A., Naylor, M.W., Ghaziuddin, M., Chaudhary, N., Giordani, B., Dequardo, J.R., Tandon, R., Greden, J., 1996. Electroconvulsive treatment in adolescents with pharmacotherapy–refractory depression. *J Child Adolesc Psychopharmacol.* 6, 259–271.
- Ghaziuddin, N., Giordani, B., Laughrin, D., 2000. Cognitive side effects of electroconvulsive therapy in adolescents. *J Child Adolesc Psychopharmacol.* 10, 269–276.
- Ghaziuddin, N., Ghazi, N., Kaza, M., King, C., Rey, J., Walter, G., 2001. Electroconvulsive therapy for minors: experiences and attitudes of child psychiatrists and psychologists. *J. ECT* 17, 109–117.
- Ghaziuddin, N., Arnold, V., Beitchman, J., Benson, S., Bernet, W., Bukstein, O., Kinlan, J., Knapp, P., Kutcher, S.P., McClellan, J., Rue, D., Shaw, J.A., Stock, S., AACAP, 2004. Practice parameter for use of electroconvulsive therapy with adolescents. *J. Am. Acad. Child Adolesc. Psychiatry* 43, 1521–1539.
- Incecik, F., Altınbasak, S., Herguner, O.M., Horoz, O.O., Yildizdas, D., 2015. Electroconvulsive therapy for refractory status epilepticus in a child: a case report. *Ann Indian Acad Neuro* 118 (364–365).
- Jarosch-von Schweder, L., Bergsholm, P., Linaker, O.M., Lydersen, S., Wahlund, B., 2011. Electroconvulsive therapy in Norway rates of use, clinical characteristics, Diagnoses, and Attitude. *J. ECT* 27, 292–295.
- Jefferson, L., Bloor, K., Birks, Y., Hewitt, C., Bland, M., 2013. Effect of physicians' gender on communication and consultation length: a systematic review and meta-analysis. *J. Health Serv. Res. Policy* 18, 242–248.
- Lima, N.N., Nascimento, V.B., Peixoto, J.A., Moreira, M.M., Neto, M.L., Almeida, J.C., Vasconcelos, C.A., Teixeira, S.A., Júnior, J.G., Junior, F.T., Guimarães, D.D., Brasil, A.Q., Cartaxo, J.S., Akerman, M., Reis, A.O., 2013. Electroconvulsive therapy use in adolescents: a systematic review. *Ann. Gen. Psychiatry* 12, 17.
- Loiseau, A., Beaudry, V., Harrisson, M.C., Patry, S., 2017. Electroconvulsive therapy use in youth in the province of Quebec. *J. Can. Acad. Child Adolesc. Psychiatry* 26, 4–11.
- Ozdemir, A., Çırakoğlu, E., Erten, E., Poyraz, C.A., Tomruk, N., 2016. Electroconvulsive therapy in women: a retrospective study from a mental health hospital in turkey. *Psychiatr. Q.* 87, 769–779.
- Puffer, C., Frye, M., Huxsahl, J., Wall, C., 2016. A 20 year practice review of electroconvulsive therapy for adolescents. *J. Child Adolesc. Psychopharmacol.* 26, 632–636.
- Roter, D.L., Hall, J.A., Aoki, Y., 2002. Physician gender effects in medical communication: a meta-analytic review. *JAMA* 288, 756–764.
- Saatcioglu, O., Tomruk, N.B., 2008. Practice of electroconvulsive therapy at the research and training hospital in Turkey. *Soc. Psychiatry Psychiatry Epidemiol.* 43, 673–677.
- Sandi, C., 2004. Stress, cognitive impairment and cell adhesion molecules. *Nat. Rev. Neurosci.* 5, 917–930.
- Tamidir, C., Aksoy, S., Aras, G.F., Canberk, O., Erdogan, A., Kilicoglu, A., 2016. Treatment of neuroleptic malignant syndrome with electroconvulsive therapy in an adolescent with psychosis. *J. Child Adolesc. Psychopharmacol.* 26, 176–180.
- Turkish Statistical Institute (TSI), 2017. Statistics on Child. (Accessed 27th January 2019). <http://www.tuik.gov.tr/PreHaberBultenleri.do?id=27596>.
- Tsugawa, Y., Jena, A.B., Figueroa, J.F., Orav, E.J., Blumenthal, D.M., Jha, A.K., 2017. Comparison of hospital mortality and readmission rates for medicare patients treated by male vs female physicians. *JAMA Intern. Med.* 177, 206–213.
- Walter, G., Rey, J.M., Starling, J., 1997. Experience, knowledge and attitudes of child psychiatrists regarding electroconvulsive therapy in the young. *Aust. N. Z. J. Psychiatry* 31, 676–681.
- Walter, G., Koster, K., Rey, J.M., 1999. Views about treatment among parents of adolescents who received electroconvulsive therapy. *Psychiatr. Serv.* 50, 701–702.
- Walter, G., Rey, J., 2003. How fixed are child psychiatrists' views about ECT in the young? *J. ECT* 19, 88–92.