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Original Article

An Overview of a Pediatric Rehabilitation Clinic After the Kahramanmaraş Earthquakes

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ABSTRACT

Aim: This study aimed to reveal the characteristics of patients who were rehabilitated in a pediatric rehabilitation clinic after an earthquake disaster.

Materials and Methods: The records of earthquake victims who were affected by the earthquakes in Kahramanmaraş on February 6th, 2023 and hospitalized in our Pediatric Rehabilitation Clinic between February 6th and June 6th, 2023 were retrospectively reviewed. The patients' demographic data such as age, gender, the city they lived in, duration of stay under the rubble, presence of crush syndrome and dialysis needs, fasciotomy and hyperbaric oxygen therapy (HBOT) history, amputation status and levels, accompanying fracture, peripheral nerve damage, brain injury and the presence of spinal cord injury were noted.

Results: Of the 60 inpatients rehabilitated in our clinic, 31 (51.7%) were female and 29 (48.3%) were male. The mean age of the patients was 10 (±0.76) years. Twenty-two (36.7%) of the patients experienced the earthquakes in Hatay, 21 (35%) in Adıyaman, 13 (21.6%) in Kahramanmaraş and 4 (6.7%) in Gaziantep. The length of stay under the rubble of 50 patients was recorded, with a median of 12 (1-96) hours. Crush syndrome developed in 25 (41.6%) of the patients, and 14 (23.3%) of them needed dialysis. HBOT was applied to 10 (16.6%) children. Peripheral nerve damage was detected in 42 (70%) children by electro-neurophysiological or physical examination methods. The most commonly damaged nerve was the sciatic (16%). Thirty four (56.6%) patients underwent fasciotomy. There were fractures in a total of 13 (21.6%) children. Seven (11.6%) patients had amputations in various parts of the extremities. Five (8.3%) of the patients had varying degrees of traumatic brain injury. Spinal cord damage was not detected in any of our patients.

Conclusion: In the pediatric population, musculoskeletal injuries caused by earthquakes and their complications are very important in the development and realization of disaster rehabilitation strategies.

Keywords: Children, disaster, earthquake, pediatric rehabilitation, rehabilitation

Introduction

Geologically, Turkey lies on a fault line and is an earthquake prone zone. On February 6th, 2023, two major earthquakes occurred in Kahramanmaraş. These two earthquakes caused widespread damage and thousands of deaths or injuries in ten provinces in Turkiye.

Injuries are the most important cause of earthquake-related morbidity (1). Crush injuries are classic features of earthquakes and can develop into potentially fatal crush syndrome. Infections and conditions which can lead to amputation are also common. Fractures, head injuries, and peripheral nerve damage are common and all these conditions require rehabilitation. After the first and

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emergency interventions after this major disaster, many children and adults were treated with physical therapy and rehabilitation programs at various centers according to their needs.

Although there are several studies in the literature on earthquake survivors from various aspects, to the best of our knowledge, there was no study directly examining pediatric patients treated in a Pediatric Rehabilitation Clinic (2-5).

Since the number of clinics dedicated to pediatric rehabilitation is very few, in this study, we aimed to examine the characteristics of pediatric patients who were hospitalized for post-earthquake rehabilitation. With this work, physical medicine and rehabilitation specialists will be able to have information regarding which strategies they should follow in cases of similar disasters.

Materials and Methods

For this study, the records of all patients under the age of 18 who were hospitalized and rehabilitated in our Pediatric Rehabilitation Clinic were retrospectively reviewed. The information of the earthquake victims who were affected by the earthquakes in Kahramanmaraş on February 6th, 2023 and hospitalized in our clinic between February 6th and June 6th, 2023 were reviewed.

The patients' demographic data such as age, gender, the city they lived in, duration of stay under the rubble, crush syndrome and dialysis needs, fasciotomy and hyperbaric oxygen therapy (HBOT) history, amputation status and levels, accompanying fracture, peripheral nerve damage (with the results of electro-neuromyographic (ENMG) examinations), brain injury and the presence of spinal cord injury were noted. The characteristics of a few cases which we thought were special and which we had difficulties in managing were reviewed in more detail (such as a case with neuropathic pain (NP) and a high LANSS (Leeds Assessment of Neuropathic Symptoms and Sign) scale, a case with delayed fracture healing, cases requiring evaluation by hand surgery, and several cases with high kinesiophobia). The drugs used in pain control and the last ambulatory status of the patients were noted. This study was approved by the Ethics Committee of Ankara Etlik City Hospital (date: 20.06.2023, approval number: AEŞH-EK1-2023-265) before the study, and it was conducted in accordance with the rules of the Declaration of Helsinki.

Statistical Analysis

SPSS version 20.0 was used for statistical analysis. The conformity of the data to the normal distribution was examined using the Shapiro-Wilk test. Categorical values are presented as n (%), non-normally distributed numeric data are presented as median (minimum-maximum).

Results

Tables I and II show the characteristics of pediatric earthquake victims hospitalized in our clinic for rehabilitation.

Table I. Characteristics of pediatric earthquake victims-1

No	Gender	City	Hour*	Fasciotomy	Amputation	Fracture	Brain injury	Peripherial nerve injury	Drugs for pain control	Final ambulatuar status
1	G	H	36	-	Left transtibial	-	-	-	-	Indepent with prosthesis
2	B	H	16	Left thigh and cruris	-	-	-	Left sciatic and femoral	-	KAFO and one-person support
3	B	H	8	-	-	Right femur	-	Right median	-	One-person support
4	G	H	?	Left forearm and thigh	Left transmetatarsal	-	-	-	-	Sitting independently
5	G	A	7	Left thigh and bilaterally cruris	-	Left tibia	-	Left sciatic	-	AFO and walker
6	B	A	1	-	Right hip desarticulation	-	-	-	-	Sitting independently
7	B	A	80	-	-	Left 1st metacarp	-	Left radial	-	Independent
8	B	A	72	-	Right transhumeral	-	-	-	-	Independent

Table I. Continued

No	Gender	City	Hour*	Fasciotomy	Amputation	Fracture	Brain	Peripherial nerve injury	Drugs for pain control	Final ambulatuar status
9	B	H	9	Right tight and cruris	-	-	-	Right femoral	-	Independent
10	B	A	5	-	-	-	SDH	Left peroneal	-	Independent
11	G	A	72	Left cruris	-	-	-	Left peroneal	-	Afo
12	G	K	20	Left cruris	-	-	-	-	-	Independent
13	B	H	9	Right forearm	-	-	-	Right median, ulnar, radial	-	Independent
14	B	H	32	-	-	-	-	Right brachial plexus	-	Independent
15	B	H	48	-	-	-	-	Bilaterally peroneal	NSAID, TDL	AFO and walker
16	B	A	9	Right cruris	-	-	-	-	PS	Independent
17	G	A	55	Bilaterally cruris	-	-	-	Bilaterally peroneal	PS, NSAID	Walker
18	G	A	4	Right tight and cruris	-	Right ileum	-	Right sciatic	-	Afo
19	G	A	?	Right forearm and cruris	-	-	-	Right sciatic	GBP	AFO and walker
20	B	K	4	Left arm and forearm	-	-	-	Left brachial plexus	PS	Independent
21	G	H	34	-	-	-	-	Right sciatic	-	Afo
22	B	K	72	Right tight and cruris	-	-	-	Right sciatic	PS	Afo
23	B	H	?	Bilaterally tight	-	-	-	Right sciatic	NSAID, TDL	AFO, immobilizer and walker
24	B	K	22	Right arm and forearm	-	-	-	Right median, ulnar, radial, musculocutaneus	PS	Independent
25	G	K	17	-	-	-	-	Right fascial	-	Independent
26	B	A	9	-	-	-	-	Left sciatic and femoral	NSAID, TDL	AFO, immobilizer and walker
27	G	A	3	-	-	-	-	Bilaterally peroneal	GBP	Bilaterally foot dorsiflexion bandage
28	G	G	1	Left cruris	-	Right tibia	-		PS, NSAID, TDL	Walker
29	G	G	3	-	-	Bilaterally femur	-	-	PS, TDL	Walker
30	G	H	96	Left cruris	Left Chopart and right 5th MTF	-	-	-	PS, TDL	Prosthesis and walker

G: Girl, B: Boy, A: Adıyaman, H: Hatay, G: Gaziantep, K: Kahramanmaraş, MTF: Metatarsophalangeal, SDH: Subdural hematoma, NSAID: Non-steroidal anti-inflammatory drug, TDL: Tramadol, PS: Paracetamol, GBP: Gabapentin, AFO: Ankle-foot orthosis, KAFO: Knee-ankle foot orthosis, *Length of stay in the rubble, ?: Unknown

Table II. Characteristics of pediatric earthquake victims-2

No	Age	Gender	City	Hour*	Fasciotomy	Amputation	Fracture	Brain injury	Peripherial nerve injury	Drugs for pain control	Final ambulatuar status
31	10	G	H	1	-	-	Left femur, left 4th distal phalanx on hand	-	-	PS, NSAID	Independent
32	11	B	G	?	-	-	-	EDH	-	PS	A canadian
33	11	G	K	72	Right foot	Left transfemoral	-	-	-	TDL	Sitting independently
34	11	G	H	?	Left tight and foot	-	-	-	-	-	Independent
35	12	G	K	1	Left foot	-	-	-	-	PS, NSAID, TDL	Independent
36	12	G	H	15	Bilaterally cruris	-	-	-	Right sciatic	PS	AFO
37	12	B	A	10	-	-	-	-	Right peroneal	GBP, TDL	AFO
38	12	B	H	60	Right forearm	-	-	-	Right median, ulnar, radial, sciatic	TDL	AFO
39	13	G	K	48	-	Left transfemoral	-	-	Left radial, femoral, ulnar	-	Prosthesis and walker
40	13	G	K	?	Bilaterally cruris	-	-	-	Bilaterally sciatic	-	Bilaterally AFO
41	13	B	H	40	Right forearm	-	-	-	Right radial, median, ulnar	PS	Independent
42	13	B	A	?	Left tight and cruris	-	Left femur and 4th thoracal vertebra	-	Left femoral and sciatic	-	AFO
43	13	B	K	?	Bilaterally tight	-	-	-	Right femoral and sciatic	-	AFO and walker
44	14	G	A	1	-	-	Left ileum	-	Left sciatic, superior gluteal nerve	PS	AFO
45	14	B	A	8	Left forearm	-	-	-	Left median, ulnar, radial	PS, TDL	Independent
46	13	G	H	8	Left tight and foot	-	-	-	Left sciatic	PS, TDL	
47	14	G	A	13	-	-	-	EDH	-	PS	Independent
48	15	G	A	1	Right forearm	-	-	-	Right brachial plexus	NSAID	Independent
49	15	B	H	5	-	-	-	-	Right radial, ulnar	-	Independent
50	15	G	H	1	-	-	?Radius lomber thoracal?	-	Cauda equina syndrome	-	Bilaterally AFO
51	16	B	K	48	-	-	Left radius and ulna	-	Left axillar, suprascapular nerve	PS, TDL	Independent
52	14	B	K	42	Right tight	-	-	-	Right sciatic	PS, TDL	

Table II. Continued

No	Age	Gender	City	Hour*	Fasciotomy	Amputation	Fracture	Brain injury	Peripherial nerve injury	Drugs for pain control	Final ambulatuar status
53	16	G	A	?	Left cruris	-	Left tibia,1st,2nd,3th lomber vertebra	-	Left bracial plexus	PS	Independent
54	16	B	A	6	Right tight and cruris	-	-	-	-	TDL	Independent
55	16	G	G	3	Left forearm	-	-	-	Left brachial plexus, right femoral and sciatic, left sciatic	PS	Two canadian
56	17	B	K	1	-	-	Right 1st metatars	-	-	PS, TDL	2 canadian
57	17	B	A	40	-	-	-	-	Left brachial plexus, bilaterally sciatic	PS, TDL	Independent
58	17	G	H	42	-	-	-	-	Right sciatic	GBP, TDL	AFO and a canadian
59	17	G	H	30	-	-	-	SDH	Median, ulnar, sciatic, femoral	PS	Independent
60	17	B	H	?		-	-	-	-	PS, PGB, TDL	Prosthesis

G: Girl, B: Boy, A: Adıyaman, H: Hatay, G: Gaziantep, K: Kahramanmaraş, MTF: Metatarsophalangeal, SDH: Subdural hematoma, EDH: Epidural hematoma, NSAID: Non-steroidal anti-inflammatory drug, TDL: Tramadol, PS: Paracetamol, GBP: Gabapentin, PGB: Pregabalin, AFO: Ankle-foot orthosis, *length of stay in the rubble, ?: Unknown

Of the 60 inpatients rehabilitated in our clinic, 31 (51.7%) were girls and 29 (48.3%) were boys. The mean age of the patients was 10 (±0.76) years. Twenty-two (36.7%) of the patients experienced earthquakes in Hatay, 21 (35%) in Adıyaman, 13 (21.6%) in Kahramanmaraş and 4 (6.7%) in Gaziantep. The length of stay under the rubble of 50 patients was recorded, with a median of 12 (1-96) hours.

Crush syndrome developed in 25 (41.6%) of the patients, and 14 (23.3%) of them needed dialysis. HBOT was applied to 10 (16.6%) children. Low molecular weight heparin was used in a few of the patients, particularly those undergoing orthopedic surgery. None of the patients developed thrombotic complications due to immobilization.

Peripheral nerve damage was detected in 42 (70%) children by electro-neurophysiological or physical examination methods. Despite the difficulty of electro-neurophysiological examinations in pediatric patients, it could be applied to 34 (80.9%) of these patients. The most damaged nerve in the lower extremity was the sciatic (16%), followed by the peroneal (10.9%) and femoral nerves (3.6%). Combined damage of median, ulnar and radial nerves (12.7%) and brachial plexus damage (10.9%) were the most common nerve pathologies in the upper extremity. In addition to these; facial, axillary, suprascapular, musculocutaneous and superior gluteal nerve pathologies were also present. Twelve patients underwent control ENMG and 9 (75%) showed signs of reinnervation.

Thirty-four (56.6%) patients underwent fasciotomy. The fasciotomy sites were one lower extremity in 17 (28.3%) children, one upper extremity in 9 (15%) children, bilateral lower extremities in 6 (10.0%) children, and one upper and ipsilateral lower extremity in 2 (3.2%) children.

There were fractures in a total of 13 (21.6%) children: one lower extremity in 6 (10.0%) patients, one upper extremity in 2 (3.2%) patients, two lower extremities in 1 (1.6%) patient, one lower and one upper extremity in 1 (1.6%) patient, one lower extremity and spine in 2 (3.2%) patients, and one upper extremity and spine in 1 (1.6%) patient. One (1.6%) patient developed atlantoaxial joint subluxation, and 1 (1.6%) patient developed right 1st metatarsophalangeal (MTF) joint subluxation (patient #7 and #54 respectively).

Seven (11.6%) patients had amputations in various parts of the extremities. The amputation level was transfemoral in 2 (3.2%) patients, transhumeral in 1 (1.6%), hip disarticulation in 1 (1.6%), transtibial in 1 (1.6%), Chopart and other 5th MTF joint in 1 (1.6%) patient and 1 (1.6%) had transmetatarsal (TMT) amputation. None of the amputees developed any complications which may occur after amputation (phantom pain, phantom sensation, contracture, edema, etc.).

Five (8.3%) of the patients had varying degrees of traumatic brain injury. Spinal cord damage was not detected in any of our patients.

Discussion

On February 6th, 2023, two major earthquakes occurred on the same day in Kahramanmaraş in southeastern Turkey. In this major disaster which resulted in thousands of dead and injured, the treatment of musculoskeletal traumas included medical treatment, debridement, fasciotomy, open or closed reduction and amputation, and the importance of post-disaster rehabilitation services once again emerged.

The first of the patients we examined in our study was admitted on the 5th day after the earthquake. In our 25-bed Pediatric Rehabilitation Clinic, a total of 60 patients were hospitalized and treated within the specified period.

After detailed evaluation, pain control was provided to all patients and necessary exercises were performed to prevent the possible effects of immobilization. For pain control, paracetamol, topical or oral non-steroidal anti-inflammatory drugs, tramadol, gabapentin and pregabalin were preferred as single or in combination medication. Exercises to maintain range of motion and muscle strength, appropriate physical therapy agents for fracture healing, therapeutic electrical stimulation in cases of nerve damage, balance and ambulation training, hydrotherapy, and appropriate bandaging for stump formation in amputees were applied. During the hospitalization of three patients in our clinic, prostheses were provided and prosthesis training was given.

In a study examining 33 pediatric patients who were transferred to a Pediatric Surgery Clinic after the 1999 Marmara earthquake, it was reported that 16 of the children were female and 17 were male, with a mean age of 8.8±0.75 years (6). In that study, the mean duration of stay under the debris was 30 hours (1-110 hours). While the cases in that study were similar to our patients in terms of gender, it was observed that their mean age was lower and the duration of stay under the rubble was longer than in our cases. In that same study, only 6 patients underwent fasciotomy, and it was stated that no amputation was performed on any of the children. Peripheral nerve damage was reported in 3 children, fractures in 8 children, and central nervous system damage in 8 children (6). Except for central nervous system damage, all injuries were more common in our cases. The study we mentioned included patients in a Pediatric Surgery Clinic, not a Rehabilitation Clinic, and the number of patients was fewer. These may be the reasons for the differences between the two studies.

In a study presenting musculoskeletal injuries after the 2008 Wenchuan earthquake, 205 cases were examined and peripheral nerve damage was reported in 20 percent of the cases (7). In a study by Uzun et al. (8), in which electrophysiological examinations of 12 pediatric cases affected by the 1999 Marmara earthquake were evaluated, brachial plexus damage was reported in 2 patients and peripheral nerve damage in 10 patients. In these two studies, similar to our study, the sciatic and peroneal nerves were the most affected peripheral nerves. In the aforementioned study of Uzun et al. (8), check-up ENMG was performed on 8 patients and regeneration findings were observed in 5 of them. We were able to perform check-up ENMG on 12 of 34 patients on whom we performed baseline ENMG evaluation and found reinnervation findings in 9 of them. The fact that the Kahramanmaraş-centered earthquake affected a wider region and our hospital is located in a province far from the earthquake zones, the difficulties experienced by the discharged patients in coming to our hospital for check-up examinations may have led to the low number of patients who underwent check-up ENMG.

In the study of Uzun et al. (8), the problems seen in adult and child patients after this disaster were also compared, and it was revealed that children in this age group stayed under the rubble longer and compartment syndrome was more common. Additionally, in the same study, it was reported that since the adult group has more muscle mass, muscle breakdown and therefore crush syndrome were more common in adults than in children (8). Although there are a few studies in the literature examining affected children or adults after a disaster such as an earthquake; to our knowledge, there is no study directly examining the experience of a pediatric rehabilitation clinic (1-6). Such differences have led to the need to examine the pediatric age group in more detail. Our work is important in this respect. Some of the patients we followed have given us new experiences as clinicians. We aim to share a few of them below:

First of all, the most common musculoskeletal pathology in our patients was peripheral nerve injuries. ENMG is an important test which can guide diagnosis, treatment planning, prognosis and follow-up. This requires clinical experience, and it can only be applied to more selective cases compared to adults due to the limited tolerance of the pediatric patient group to this painful examination, and the difficulty of working in smaller areas (9-11). The patients we evaluated with ENMG had different levels of single or combined peripheral nerve damage. While most of these patients had axonal damage and progressed very slowly, a few of the children had only neuropraxia without axonal damage. Due to the difficulties in ENMG examination in the pediatric population previously mentioned, we did not perform a check-up ENMG on patients with neuropraxia, and they recovered rapidly within one to two months.

We struggled with NP in many cases due to damage to peripheral nerves. The most challenging case for us in terms of NP was case 57. The patient with left brachial plexus and bilateral sciatic nerve injury had NP which disrupted sleep and activities of daily living (ADL). The NP of the patient, whose LANSS Scale was 19/24 before rehabilitation, was so severe that it was observed that he had self-mutilation. The patient's physical therapy program included: joint range of motion to the left upper and bilateral lower extremities, stretching, strengthening exercises, electrical stimulation, occupational therapy, electrotherapy to the left lower extremity and desensitization to the left sole of the foot. At admission to our clinic, the patient was using tramadol 2x100 mg/day iv and paracetamol 10 mg/mL 2x1/day iv. Gabapentin was started due to severe NP and the dose was gradually increased to 1.800 mg/day. The patient, who could not sleep for more than 15 min-1 hour for days, was first started on zopiclone 7.5 mg/day with the recommendation of psychiatry, was changed to quetiapine due to unresponsiveness and the dose was increased to 50 mg/day. Radiofrequency ablation was performed first on the left posterior tibial nerve and then on the left sciatic nerve on the patient but the complaints continued. When NP continued despite all these treatments, 4x10 cc bupivacaine was administered first with a popliteal catheter and then with an epidural catheter. As the patient's complaints continued, bupivacaine was stopped and oxycodone 3x5 mg was started. The medical treatment of the patient, who had difficulty in ADL due to NP and had sleep problems, was through psychiatry and algology consultations with tramadol 2x100 mg/day iv, gabapentin 1.800 mg/day po, quetiapine 25 mg/day po, oxycodone 3x5 mg/day po, duloxetine 30 mg/day po, lorazepam 1mg/day po, pantoprazole 40 mg/day po and 250 mg B1/250 mg B6/1 mg B12 po. After two months of pharmacological, non-pharmacological and algological treatments, an increase in ADL and sleep duration and a decrease in NP level were observed. After the treatment, the patient with a LANSS Scale of 8/24 was discharged while walking independently.

In addition, patients 11, 24, 41 and 46 were consulted to the Hand Surgery Clinic due to multiple nerve damage and tissue defect in the forearm. Patient 46 had a functional muscle transfer from the latissimus dorsi muscle to the forearm. Their splints were revised and they were continuing to receive physical therapy at the time of writing.

Another common type of musculoskeletal injury associated with earthquakes is fractures. In our patients, the fracture site was mostly in the lower extremity, similar to the literature (12). Patient 29 was operated under emergency conditions because of right femoral shaft and left intertrochanteric femur fractures. The patient, who was recommended to be immobilized for 4 weeks postoperatively, was recommended to be immobilized for 4 more weeks after orthopedic consultation, and then the patient was re-operated because there was insufficient callus formation on the left side on X-ray. After that, immobilization was recommended for another 6 weeks. In the follow-up X-ray, sufficient callus formation did not form and she was operated on for the third time and remained immobile for about 6 weeks. During the immobilization period, knee and ankle joint range of motion exercises, ankle pumping exercises and frequent position changes were applied in order to prevent decubitus formation. The patient started walking with partial weight bearing with a walker with control graphs and orthopedic consultations. The patient was still being rehabilitated in our clinic at the time of writing.

In post-earthquake musculoskeletal disorders, after soft tissue disorders, peripheral nerve injuries and fractures, there were amputations in our patient group, similar to the literature (4,7,13). Preparation of the stump for prosthesis, prescription of the appropriate prosthesis and adaptation to a prosthesis were included in our rehabilitation plan.

Kinesiophobia was another of the issues we tried to deal with during the walking training of these children who had experienced major traumas materially and spiritually and remained immobile for a long time. Kinesiophobia was prominent especially in patients 17, 35 and 36. Reflex Sympathetic Dystrophy syndrome Type-1 developed in the left foot of patient 35, and electrotherapy was added to the

treatment in addition to weight-bearing exercises. Their fear of movement and pain decreased and their mobilization skills improved over time.

Most of the children were in serious need of psychological support due to the loss of family members or the disruption of their own physical integrity and were provided with both medical treatment and psychological support through relevant consultations.

In addition to all these, the renal function values and electrolytes of the patients who needed hemodialysis before admission to our clinic were at normal levels during their hospitalization.

Conclusion

We believe that performing rehabilitation treatments after natural disasters such as earthquakes and planning these practices specifically for earthquakes are important. In the pediatric population, which is a rare patient group due to its features in both follow-up and treatment, musculoskeletal injuries caused by earthquakes and their complications are very important in the development and realization of disaster rehabilitation strategies. However, multicenter studies including long-term follow-up results of these patients are needed.

Ethics

Ethics Committee Approval: The study was approved by the Ethics Committee of Ankara Etlik City Hospital (date: 20.06.2023, approval number: AEŞH-EK1-2023-265) before the study, and the study was conducted in accordance with the rules of the Declaration of Helsinki.

Informed Consent: Retrospective study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: Z.K.Ü., K.K., E.A., E.Ü.A., Concept: Z.K.Ü., K.K., E.A., E.Ü.A., Design: Z.K.Ü., E.A., E.Ü.A., Data Collections or Processing: Z.K.Ü., K.K., E.A., E.Ü.A., Analysis or Interpretation: Z.K.Ü., E.A., E.Ü.A., Literature Search: Z.K.Ü., E.Ü.A., Writing: Z.K.Ü., E.Ü.A.

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