Anatolian Journal of Emergency Medicine 2023;6(2):92-97

REVIEW / DERLEME

Nature Activities With Special Child Groups

Özellikli Çocuk Gruplarıyla Doğa Etkinlikleri

Faruk Danış[1], Emre Kudu[2]

ABSTRACT

Spending more time outdoors improves children's social and cognitive development, physical activity, and vision. Regular moderate-intensity physical activity is linked to many health benefits, including a reduced risk of high blood pressure, obesity, heart disease, stroke, cancer, and depression. Besides physical health indicators, physical activity has also been associated with higher academic and cognitive performance, and higher self-esteem. Since children's outdoor activities are primarily in public areas, there is a need for improvement studies to make these areas suitable for all children, including special child groups, and to supervise them. There are some special preparations and points to be considered during the activity when nature activities are desired to be held with child groups with chronic diseases such as epilepsy, diabetes, asthma, autism, or with atopic structure. With this review, we wanted to share some of the information needed to ensure that nature activities start and end happily with both special and healthy child groups.

Keywords: Outdoor activity, toddler, adolescant, sedentary, chronic diseases

ÖZ

Açık havada daha fazla zaman geçirmek, çocukların sosyal ve bilişsel gelişimini, fiziksel aktivitesini ve görüşünü geliştirir. Düzenli yapılan orta-yoğun fiziksel aktivite, yüksek tansiyon, obezite, kalp hastalığı, inme, depresyon ve kanser riskinde azalma dahil olmak üzere birçok sağlık kazanımıyla bağlantılıdır. Düzenli fiziksel aktivite beden sağlığı kazanımlarının yanısıra artmış akademik ve bilişsel performans, daha yüksek benlik saygısı ile de ilişkilendirilmiştir. Çocukların açık hava etkinlikleri daha çok kamusal alanlarda olduğu için bu alanların özellikli çocuk grupları dahil tüm çocuklara uygun hale getirilmesi ve denetlenmesi için bu konuda yapılacak iyileştirme çalışmalarına ihtiyaç vardır. Epilepsi, diyabet, astım, otizm gibi kronik hastalıklara ya da atopik bünyeye sahip çocuk gruplarla birlikte doğa etkinlikleri yapılmak istendiğinde bazı özel hazırlıklar ve etkinlik sırasında dikkat edilmesi gereken hususlar vardır. Bu derleme ile hem özellikli çocuk grupları hem de sağlıklı çocuklar ile doğa etkinliklerinin mutlu başlayıp bitmesi için gereken bazı bilgileri paylaşmak istedik.

Anahtar Kelimeler: Açık hava aktivitesi, oyun çocuğu, ergen, sedanter, kronik hastalıklar

Received: May 22, 2023 Accepted: June 21, 2023

[1] Department of Emergency Medicine, Bolu Izzet Baysal Training and Research Hospital, Bolu, Turkiye

[2] Department of Emergency Medicine, Marmara University Pendik Training and Research Hospital, Istanbul, Turkiye.

Sorumlu Yazar: Faruk Danis, MD **Address:** Department of Emergency Medicine, Bolu Izzet Baysal Training and Research Hospital, Bolu, Turkiye

Telefon: +90 3742534655 **e-mail:** farukdanis@gmail.com

Atıf için/Cited as: Danis F, Kudu E. *Nature Activities with Special Child Groups* Anatolian J Emerg Med 2023;6(2):92-97.

https://doi.org/10.54996/anatolianjem.1300695

Introduction

In recent years, increased screen exposure and sedentary time among children and adolescents have been associated with poor mental health, increased obesity, and behavioral problems in several studies (1). This situation has created a clear need for research and practices focused on developing and evaluating multidisciplinary interventions. The opportunities for physical activity and social connection, especially outdoors, are ideal for preventing these critical health problems among children and adolescents. For this reason, the interest of children and adolescents in nature sports increases over time (2). This increase obliges us as adults and doctors to know more about the health problems that can happen to children in nature and to prevent them when possible.

Although the title of this review is 'Nature Activities with Special Child Groups,' we will first mention a few special child groups due to their current health conditions. Then we will discuss the issues that should be considered before and during nature activities for all children who are actually 'special'.

Differences Between Child and Adult

Children's physical needs, physiology, and potential emergencies differ from adults. They are of different sizes and body proportions, even within themselves. They are smaller in size compared to adults but have higher head/body ratios and body surface areas. These changes in size and surface area cause children to be more sensitive to poisoning, head injury, topical toxic agents, heat, cold and, solar radiation.

Children are more predisposed to infections due to their immature immune systems and to aspirations due to their tight airways. In traumas, they have insufficient lung protection because their bone ossifications are not completed sufficiently and, abdominal organ protection due to weak abdominal muscles. On the other hand, fractures and spinal traumas are less common thanks to their flexible ligaments and soft bones.

Evaluation of general condition, respiratory effort, consciousness, and peripheral circulation is vital in the first evaluations to be made in children, and the normal ranges of vital signs vary according to age.

The needs of children vary according to the age group and the situation of their special needs. The need for food and beverage with varying features and volumes according to age should be considered and organized before the activity. Due to the risk of developing anaphylaxis, foods that may be allergic and have not been consumed before should not be tried during nature activities. An adequate amount of clean drinking water must be available. Little children are predisposed to dehydration because of their thin skin and relatively large surface area. Dehydration should be suspected in the presence of symptoms such as irritability, loss of appetite in little children and weakness, fatigue, nausea, and vomiting in all children. If the child's urine output is decreased or dark and concentrated, this indicates that the child needs more fluids.

When free time is created for infants/toddlers, a safe area should be created for them to play on a tent or similar ground to prevent them from putting small things on the ground into their mouths.

Nature Activities with Special Groups of Children

Children with Autism and Learning Disabilities

Children between the ages of 2-4, children with attention deficit hyperactivity disorder or autism diagnoses, are very active due to their genesis and may engage in risky behaviors, so they should always be kept in mind during nature activities. It is crucial to support nature experiences as they positively affect academic learning, personal development, and environmental management.

Children with Epilepsy

Traveling with children with epilepsy demands early planning before traveling. Every effort should be made to control the child's seizures with medication, ideally a 3-6 month seizure-free period before travel. In addition to a child's typical seizure triggers (for example, missed medication doses, fever, dehydration), travel to distant countries, jet lag, and sleep deprivation can also trigger seizures. Parents of a child with epilepsy should give the child extra rest when they arrive at a destination to get used to a new time zone and get adequate sleep. The child's activities during travel should be carefully chosen, as recovery after a seizure in remote locations in the developing world can be difficult. Parents should hold plenty of their child's antiepileptic medications with them in case they cannot obtain them where they go. Emergency medication such as rectal diazepam (0.3-0.5 mg/kg) or nasal midazolam (0.2 mg/kg intranasal, maximum dose: 10 mg/dose) should be placed in the medical kit to administer if the child has a prolonged (> 5 minute) seizure or multiple seizures.

Children with Diabetes Mellitus

When going out for nature activities with a diabetic child, a blood glucose meter, spare battery, lancet, measuring stick, short and long-acting insulins (in the cold chain and appropriate conditions) used by the patient, if the patient uses an insulin pump extra pump set, needle, and insulin, urine ketone strip should be carried. Simple sugar, snack foods, and beverages should be available in case of hypoglycemia. A glucagon injection should be available in case of unconsciousness or resistant hypoglycemia.

It should be kept in mind that hypo and hyperglycemia can have more devastating effects due to natural conditions and

opportunities. Intense exercise can reduce the child's insulin needs, predisposing them to hypoglycemia. The low environmental temperature may cause hyperglycemia due to less absorption of injected insulin by reducing peripheral circulation, and high environmental temperature may cause hypoglycemia due to faster absorption (3).

A blood glucose level below 70 mg/dl is defined as hypoglycemia. Typical symptoms of hypoglycemia include drowsiness, confusion, dizziness, nausea, palpitations, tremors, sweating, and anxiety. The primary treatment for hypoglycemia is glucose replacement. In the wild nature, the basic principles of hypoglycemia management are discontinuation of insulin therapy and glucose replacement. High-glycemic-index carbohydrates are the best way to supplement oral glucose, and low-weight options such as sugar packets or cubes, glucose gel or tablets, honey, and corn syrup can be used in the wild easily. Glucagon is the first-line treatment for severe hypoglycemia (severe cognitive impairment requiring external assistance for recovery). Carbohydrate intake should be provided to prevent rebound hypoglycemia that may develop after glucagon therapy (3).

Individuals with type 1 diabetes are at risk for delayed nocturnal hypoglycemia following daytime exercise. This phenomenon has many causes, including increased insulin sensitivity after exercise, increased glucose uptake by skeletal muscles to replenish glycogen stores, and impaired counterregulatory mechanisms in response to hypoglycemia. In patients followed by multiple insulin injections during the day, the risk of nocturnal hypoglycemia can be minimized by reducing the daily basal insulin dose by approximately 20% after nighttime exercise, reducing the postprandial bolus insulin, and feeding with low glycemic index carbohydrates. For insulin pump users, basal rate reductions of 20% for about 6 hours before bedtime after afternoon exercise can prevent nocturnal hypoglycemia. Other strategies include a bedtime snack, overnight glucose checks, and a continuous blood glucose monitor with alarms.

If a person with diabetes is found to be hyperglycemic (plasma glucose level >250 mg/dl), it should be evaluated whether the individual is in a hyperosmolar hyperglycemic state or acute hyperglycemic crisis, including diabetic ketoacidosis. It is recommended to administer fast-acting subcutaneous insulin at a dose of 0.1-0.2 U/kg in patients using subcutaneous insulin to treat hyperglycemia and to increase the basal rate by 20-50% for 2-4 hours in patients using insulin pumps.

Children with Asthma

To prepare for the journey, parents should work with their pediatrician to stabilize their child's asthma as much as possible. Traveling to places where the child may be exposed to heavy particles, and tobacco should be avoided. During travel, parents should carry additional packs of the child's inhalers, an inhaled bronchodilator (such as salbutamol, albuterol), and high-dose steroids to administer during an acute exacerbation unresponsive to bronchodilator. The adrenaline autoinjector is an vital first aid kit item for families with children with life-threatening asthma (4).

Children with Cardiac Diseases

Blood pressure rises with exposure to altitude and remains exceeding baseline with continued exposure. A small, portable wrist blood pressure cuff can be valuable in the wild. Parents should discuss a backup medication plan with the child's doctors if blood pressure cannot be controlled. Those with prehypertension or stage 1 hypertension without end-organ damage can fully participate in nature and sports activities. Those with stage 2 hypertension (>160/100 mm/Hg) should avoid high-resistance and high-intensity sports until their blood pressure returns normal.

Patients using any anticoagulant medication should be informed of the risk of bleeding in activities with a high risk of contact, collision, or falling. Anyone not adequately evaluated or with unstable arrhythmia symptoms should not participate in wilderness and adventure activities. Parents or caregivers should be educated about conventional vagal maneuvers or drug use for acute treatments they can apply when encountering stable, mild arrhythmia (5).

Traveling with children with heart or lung problems can be tough. Travel to high altitudes should only be undertaken with approval by the child's doctor for the same reasons. Respiratory infections are more common during travel. Respiratory tract infections, which generally seem insignificant, may result in more severe clinical manifestations in children with cardiopulmonary disease. For each country included in the child's itinerary, a contingency plan should include a specialist contact person and a complete description of the child's condition and health care needs.

Children with Cancer

The five-year survival rate for all childhood cancers was 58% in the mid-1970s; In 2017, it increased to over 80% [6]. Late effects may be seen in patients who are survivors of childhood cancer. Psychosocial and behavioral diseases such as depression, anxiety and risky health behaviors, cardiovascular diseases, secondary malignancies, and hormone and immune deficiencies are some of them. In these children, nature activities reduce these effects.

Nature Activities for All Children

Accidents

The most determinant risk factor for deaths that may cause accidents in nature is the type of activity. Drowning, especially during activities such as swimming in the river,

boating, scuba diving, and rafting; in activities such as rock climbing and mountaineering, the risk of injury and death is higher by falling from a height. Not taking the necessary safety precautions before performing these activities, lack of equipment, and risky behaviors are the most critical factors that can cause an accident. Drowning and head trauma are the most common causes of death during childhood accidents.

Accidents During Water Sports

According to the Centers for Disease Control and Prevention (CDC), drowning is the second leading cause of injury-related deaths in children ages 1-14 in the United States (7). The American Academy of Pediatrics has published a review that provides basic recommendations based on different age groups for preventing drowning (Table1) (8). Children aged 0-4 are the most risky group for drowning. In this period, the most critical factor that prepares the ground for drowning is the absence of physical barriers that should be placed between the water and the child. While most babies drown in tubs and buckets, most preschoolers drown in swimming pools. In addition, children with additional medical problems such as epilepsy, autism, and cardiac arrhythmias are also at increased risk for drowning (8).

American Academy of Pediatrics Policy on Prevention of Drowning
1. Assess all children for drowning risk
2. Set an age and evidence-based strategy
3. Put physical barriers between water and child if necessary
4. Keep the child under constant supervision
5. Have the child take swimming lessons
6. Dress the child in a life jacket
7. Perform cardiopulmonary resuscitation as needed

Table 1. American Academy of Pediatrics Policy on Prevention of Drowning (8)

The second age group with the highest drowning rate is adolescents (9). The reasons for this peak; it is thought that this age group's characteristics are an exaggeration of their own skills, underestimation of dangerous situations, exhibiting high-risk and impulsive manners more frequently, and increased rates of alcohol and substance use.

It should not be forgotten that an untrained rescuer is also at risk of drowning when faced with a drowning event. Reaching the drowning person with an object such as a pole, towel, tree branch, or throwing an object that is not submerged are safe rescue techniques.

When the first contact with the drowning person is made, his/her vital functions should be evaluated immediately. Post-suffocation cardiopulmonary resuscitation (CPR) recommendations differ slightly from CPR recommendations after classic cardiac arrest. It should be kept in mind that it may be abnormal breathing in drowning while the heart is beating normally. Therefore, it is necessary to initiate rescue breaths even while the patient is in the water. While on land, CPR should begin with five rescue breaths followed by 15:2 chest compressions/rescue breaths for the pediatric patient and 30:2 for the adult patient. While the recommended chest compression depth in the adult patient is 5-6 cm (10) the recommended depth for children is compression to create a depression of at least 1/3 of the anterior-posterior diameter of the chest (11). The recommended compression rate for both pediatric and adult age groups is 100-120/min. CPR should be continued until the drowning victim's spontaneous circulation returns or the ambulance arrives. On-scene rewarming should only be applied to conscious patients without cardiovascular or respiratory distress. In these cases, wet clothing should be replaced with warm and dry clothing, blankets, or towels. In the unconscious patient, resuscitation efforts should take precedence over rewarming.

Accidents During Skiing

The most typical mechanism of injury in children during skiing is falls and non-collision events. The leading causes of morbidity and mortality in this population are; head injuries, blunt abdominal trauma, and spinal trauma. Lower extremity injuries account for approximately half of all ski injuries. Helmets and ski goggles must be used to reduce the risk of head, neck, or face injury. In addition, little children should be under adult supervision while using chairlifts, teleskis, and cable cars, and adolescents should avoid risky behaviors (12).

Accident During Riding a Bicycle

The most critical injury in bicycle accidents is traumatic brain injury (13). Policies recommending bicycle helmets have resulted in a 20-55% reduction in bicycle-related head injuries.

Accident During Climbing

Although epidemiological data are available for adult injuries, these data are insufficient for young climbers. These sports should be performed under the guidance or supervision of adults, taking age-related self-responsibilities. Injuries are caused mainly by falling (e.g., mountain environment) or overstraining. Training exercises before the activities should be conducted.

Protection from the Harmful Effects of the Sun in Children

Recommended sunscreen practices for all ages include wearing UVR protective clothing (including hats and sunglasses), staying in the shade, and applying broad-spectrum sunscreen with SPF ≥30 every 2 hours to skin exposed to the sun outdoors (14). If redness occurs on the skin when exposed to the sun despite the use of sunscreen (redness occurs before sunburn), it should be considered that the protective cream is insufficient and should be reapplied.

Protection from the Hypo and Hyperthermia in Children

Hypothermia is a body temperature below 35°C, although there is no defect in the thermoregulatory system [15]. Hypothermia is a severe threat to life, as it can also cause acidosis and coagulopathy in injured patients. Hypothermia clinics can range from syncope to ventricular fibrillation and cardiac arrest. Treatment for hypothermia should begin pre-hospital to prevent the worsening of the hypothermic patient. Any application that increases blood flow to cold limbs (especially legs) can cause the rapid return of harmful metabolites from the cold periphery, which can directly cause hypotension and deepen hypothermia as chilled peripheral blood returns to the heart. This should be kept in mind during treatment.

The first essential prehospital treatment for accidental hypothermia is to terminate the victim's exposure to cold. If we can protect the victim from the cold, wet clothes should be removed, and the patient's body should be insulated and rewarmed by the recommendations. Many sources of active external heating can be used, such as chemical (a gel or dry) heat packs or blankets, electric and charcoal heat packs, warm water bottles, and even portable heaters. Heat should be focused on the body, as long as it does not involve hot water immersion or dry heat; different heating methods can be safely used in prehospital use (15,16).

Recommendations for the prevention of burns during reheating:

- Placing insulation between all heat sources and the skin
- Regular monitoring of heated skin
- Pay attention to this in the areas where the heat source is placed, as the pressure increases the risk of burns.

Two main etiologies cause hyperthermia (>40 °C); effort-related hyperthermia that occurs during physical activity and hyperthermia that occurs due to high environmental temperature in sensitive individuals such as the elderly, children, and infants without physical exertion (17,18). Both can cause morbidity and mortality if left untreated.

Protection From the High Altitude Disease in Children

High altitude-related diseases generally occur when climbers exceed 2500m (19). High-altitude-related cerebral and pulmonary edema, a life-threatening condition, is at the most severe end of the spectrum of high-altitude diseases (20). Early recognition of symptoms such as headache, nausea, vomiting, shortness of breath, fatigue, loss of appetite, dizziness, and difficulty falling asleep is significant. If any of these symptoms are present, the ascent should be terminated. If the symptoms are mild, staying at the current altitude and resting is an option. For severely symptomatic children, worsening and not responding to pharmacological treatment, descent is mandatory. Deciding gradually (500-1000 m) to the lowest altitude where symptoms improve is safest. If the patient develops neurological symptoms such as impaired consciousness and ataxia, it should be considered to transport the patient from the mountain by helicopter.

Protection from Insect and Reptile Bites and Stings in Children

The stings of bees, wasps, hornets, and ants are the most common cause of poisoning in children in nature (21). If a child has previously had a severe allergic reaction to something, their doctor should educate parents about possible bee sting management. Bee stings usually cause local pain, swelling, and erythema. If the bee's sting is buried, it should be removed as soon as possible. Applying ice or cold compresses will reduce pain and swelling. Elevation and immobilization are necessary for significant local reactions in the extremities. In older children, oral antihistamines provide additional symptomatic relief. Venom components are potent antigens that can cause immunoglobulin E-mediated anaphylaxis in sensitive individuals. Early manifestations of anaphylaxia are diffuse pruritus, urticaria, angioedema, bronchospasm, and laryngeal edema. In the presence of these signs or symptoms, an anaphylaxis plan should be implemented by making an emergency medical evaluation. Epinephrine (at a concentration of 1/1000) is the drug of choice for systemic reactions and should be administered in the field if possible. (0.01 mg/kg intramuscularly (IM), maximum dose 0.3 mg in little children, 0.5 mg in adolescents) Spring autoinjectors are available to inject epinephrine IM. Carrying two epinephrine autoinjectors during travels is recommended, as the time for children to reach definitive medical care is often longer than the effective half-life of a single dose.

If a snake bite occurs, the wound should be cleaned quickly, and any jewelry or clothing pressing on the affected area should be removed. The bitten limb should be immobilized and positioned at heart level. All potentially venomous snake bite victims should be transported to an appropriate medical facility for prompt evaluation, local wound care, and possible antivenom administration. Antivenom has been shown to be safe and effective in children, especially when administered early (22).

Mosquitoes and ticks plays role as disease vectors (Lyme, Congo Hemorrhagic fever etc.) (23-25). The use of clothes that can create a physical barrier and the use of mosquito nets in the sleeping area reduce mosquito and tick attack.

Conclusion

A sedentary lifestyle and spending time in front of a screen for long periods are becoming increasingly ingrained in every aspect of children's lives. Increasing exposure to developing technology seems unavoidable. In order to neutralize the

adverse health effects of this situation, children should be directed and encouraged to active life and nature activities. Special child groups have increased and different needs. These situations should be considered to prevent the activities that start with fun from ending with bad endings.

Conflict of Interest: The Authors declared that there is no conflict of interest.

Financial Disclosure: This research received no specific grant from any funding agency in the public commercial, or not-for-profit sectors.

Authors' Contributions: All authors contributed equally for this study.

Ethical Approval: The authors declares that they comply with research and publication ethics.

References

1. Wray A, Martin G, Ostermeier E, et al. Physical activity and social connectedness interventions in outdoor spaces among children and youth: a rapid review. *Health Promot Chronic Dis Prev Can*. Apr 2020;40(4):104-115. Interventions pour favoriser l'activité physique et l'appartenance sociale chez les enfants et les jeunes dans des espaces extérieurs : revue rapide de la littérature. doi:10.24095/hpcdp.40.4.02
2. Heggie TW, Küpper T. Pediatric and adolescent injury in wilderness and extreme environments. *Research in Sports Medicine*. 2018;26(sup1):186-198. doi:10.1080/15438627.2018.1438280
3. VanBaak KD, Nally LM, Finigan RT, et al. Wilderness Medical Society Clinical Practice Guidelines for Diabetes Management. *Wilderness Environ Med*. Dec 2019;30(4s):S121-s140. doi:10.1016/j.wem.2019.10.003
4. Doan D, Luks AM. Wilderness and adventure travel with underlying asthma. *Wilderness & Environmental Medicine*. 2014;25(2):231-240.
5. Baggish A, Levine B. Wilderness cardiology. *Auerbach P Wilderness Medicine 6th ed Philadelphia, PA: Elsevier*. 2012;632
6. Joy E, Van Baak K, Dec KL, et al. Wilderness Preparticipation Evaluation and Considerations for Special Populations. *Wilderness & Environmental Medicine*. 2015;26(4):76-91. doi:10.1016/j.wem.2015.09.010
7. Injuries Among Children and Teens. Avaliable at: https://www.cdc.gov/injury/features/child-injury/. Accessed May 22,2023.
8. Denny SA, Quan L, Gilchrist J, et al. Prevention of Drowning. *Pediatrics*. 2019;143(5):e20190850. doi:10.1542/peds.2019-0850
9. Guevarra JP, Franklin RC, Basilio JA, Orbillo LL, Go JJL. Child drowning prevention in the Philippines: the beginning of a conversation. *International journal of injury control and safety promotion*. 2015;22(3):243-253.
10. 1Danış F, Kudu E. The evolution of cardiopulmonary resuscitation: Global productivity and publication trends. *The American Journal of Emergency Medicine*. 2022;54:151-164.
11. Topjian AA, Raymond TT, Atkins D, et al. Part 4: Pediatric Basic and Advanced Life Support: 2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. Oct 20 2020;142(16_suppl_2):S469-s523. doi:10.1161/cir.0000000000000901
12. Glissmeyer EW, Metzger RR, Bolte R. Chair Lift Falls and Injuries in Children. *Pediatr Emerg Care*. Feb 2018;34(2):106-108. doi:10.1097/pec.0000000000001398
13. Sarmiento K, Haileyesus T, Waltzman D, Daugherty J. Emergency Department Visits for Bicycle-Related Traumatic Brain Injuries Among Children and Adults — United States, 2009–2018. *MMWR Morbidity and Mortality Weekly Report*. 2021;70(19):693-697. doi:10.15585/mmwr.mm7019a1
14. Julian E, Palestro AM, Thomas JA. Pediatric Sunscreen and Sun Safety Guidelines. *Clinical Pediatrics*. 2015;54(12):1133-1140. doi:10.1177/0009922815591889
15. Haverkamp FJ, Giesbrecht GG, Tan EC. The prehospital management of hypothermia—An up-to-date overview. *Injury*. 2018;49(2):149-164.
16. Zafren K, Giesbrecht GG, Danzl DF, et al. Wilderness Medical Society practice guidelines for the out-of-hospital evaluation and treatment of accidental hypothermia. *Wilderness & environmental medicine*. 2014;25(4):425-445.
17. Douma MJ, Aves T, Allan KS, et al. First aid cooling techniques for heat stroke and exertional hyperthermia: a systematic review and meta-analysis. *Resuscitation*. 2020;148:173-190.
18. Kallinich T, Keitzer R, Puskas E, Boldt F. Exercise-induced hyperthermia in childhood: a case report and pilot study. *Acta Paediatr*. Jul 2009;98(7):1217-9. doi:10.1111/j.1651-2227.2009.01272.x
19. Cheng FY, Jeng MJ, Lin YC, et al. Incidence and severity of acute mountain sickness and associated symptoms in children trekking on Xue Mountain, Taiwan. *PLoS One*. 2017;12(8):e0183207. doi:10.1371/journal.pone.0183207
20. Church BJ, Basnyat B, Mattingly B, Zafren K. Pediatric High Altitude Cerebral Edema in the Nepal Himalayas. *Wilderness & Environmental Medicine*. 2019;30(3):306-309. doi:10.1016/j.wem.2019.05.003
21. Brown TC, Tankersley MS. The sting of the honeybee: an allergic perspective. *Annals of Allergy, Asthma & Immunology*. 2011;107(6):463-470.
22. Goto CS, Feng S-Y. Crotalidae polyvalent immune Fab for the treatment of pediatric crotaline envenomation. *Pediatric emergency care*. 2009;25(4):273-279.
23. Christenson JC. Preparing families with children traveling to developing countries. *Pediatr Ann*. 2008;37(12):806-13.
24. Wright WF, Riedel DJ, Talwani R, Gilliam BL. Diagnosis and management of Lyme disease. *American family physician*. 2012;85(11):1086-1093.
25. Pace EJ, O'Reilly M. Tickborne Diseases: Diagnosis and Management. *Am Fam Physician*. May 1 2020;101(9):530-540.