

ORIGINAL ARTICLE

Medical perspectives on Israeli children after their release from captivity – A retrospective study

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Abstract

Aim: Following the Hamas terror attack on Israeli towns on October 2023, 250 individuals were taken into captivity. On November–December 2023, during the cease-fire deal, 26 women and children were released. This study is the first to describe the physical and behavioural findings in children and their mothers in the immediate phase of returning home from captivity.

Methods: This is a retrospective study describing the clinical characteristics of the returnees after 49–53 days in captivity. Patients were admitted to a designated unit in the Schneider Children's Medical Center of Israel on November–December 2023. The hospitalisation duration was 1–9 days. All patients were evaluated according to a detailed protocol and were treated respectively.

Results: Patient population included 19 children (ranged 2–18 years old) and 7 women (ranged 34–78 years old). The most common clinical findings upon return included significant weight loss, psychological trauma, complications of poor hygiene and complications of recent shrapnel injuries. Microbiology tests were positive for multiple gastrointestinal pathogens. Serologic screening tests were positive for various infectious diseases.

Conclusion: Clinical findings in this time period were diverse and required the attention of a multidisciplinary team. Long term clinical and psychological effects are yet to be known.

KEYWORDS

captivity, children, psychological terror, war trauma, warfare

Abbreviations: HRAD, hyper-reactive airway disease; IgG, immunoglobulin G; IgM, immunoglobulin M.

Noa Ziv and Yael Mozer-Glassberg contributed equally to this work.

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1 | INTRODUCTION

The medical and physical findings related to the immediate phase of returning home from captivity, particularly concerning children, are scarce. Existing data mostly relates to men and soldiers and focuses mainly on the mental and psychological consequences of captivity, rather than the medical, nutritional, infectious and other physical aspects.¹

We report the clinical characteristics of 26 children and women released from Hamas captivity following the terror attack on Israeli towns on 7 October 2023 which led to the Israel–Hamas war. The attack itself resulted in the death of over 1250 Israelis, mostly citizens and the kidnapping and hostage-taking of more than 250 individuals, including men, women, children, infants and elderly, about half of them are still held hostage.

During the hostage–cease-fire deal that took place in November to December 2023, about Israeli 50 women and children were released and returned home to Israel.² The primary aim of this article is to report the health challenges these women and children had experienced during their captivity period and characterise the medical challenges and special needs as presented in the immediate post captivity phase.

2 | METHODS

In this retrospective cohort study, we collected data from the electronic medical records of 26 children and women (age ranged 2–18 years and 34–78 years, respectively) that were admitted to Schneider Children's Medical Center of Israel, a tertiary paediatric centre in the centre of Israel as part of the hostage release deal during November to December 2023. A multidisciplinary team, comprising medical personnel, dietitians and psycho-social team, was tasked in conducting the assessment and treatment of the returnees. Significant attention was devoted to anticipating potential medical issues, taking into account patients past medical history as well as creating the best suitable admission conditions and assuring patients' confidentiality and privacy in light of the immense public attention. Close collaboration was maintained with a range of public services including the IDF (Israeli Defence Forces), community health services, ministry of welfare and more.

During admission to our unit, women and children from the same family unit were accommodated in the same room in attempt to minimise further feelings of separation, uncertainty and trauma. Further data on preliminary multidisciplinary and administrative preparations before the returnee's arrival is detailed in another article by our team.

All patients went through medical evaluation which included a formulated medical admission questionnaire, basic physical examination, blood tests, stool tests and urine tests (see Appendix A). During admission all patients had psychological evaluation and social team assessment in order to define the personal and environmental

Key Notes

- This study reports the physical and psychological findings during the immediate post-captivity period in children and women who were kidnapped during the Hamas terror attack on Israeli towns on October 7th 2023.
- Main clinical findings upon return included weight loss, psychological trauma, complications of poor hygiene and recent shrapnel injuries.
- Further follow up is warranted in order to assess the medium and long term clinical and psychological effects of captivity.

conditions. For each family, an assessment was made of the needs and the existing support circles before discharge and contact was made with the relevant teams in the community for insuring continuity of care in each case.

Treatment protocol was outlined prior to the patient's arrival and was designed to address unique medical conditions that were expected to arise during captivity. Children who refused phlebotomy and were in an overall good physical condition were excused from mandatory lab tests. Overall, blood samples were drawn from 21 patients, urine samples were collected from 17 patients and stool samples were collected from 16 patients.

This study was approved by the Institutional Ethics Committee of Rabin Medical Center (RMC-23-0900). Due to the retrospective nature of the study, informed consent was waived by the Ethics Committee.

2.1 | Statistical analysis

Due to the small sample size and its heterogeneity, descriptive measures were the main statistic tool used in this study. Quantitative variables with non-normal distributions were described as median and interquartile range and categorical variables were expressed as the mean and proportion. Data were analysed using statistical functions on Office Excel 2021.

3 | RESULTS

Over a course of 8 days, a total of 26 patients were admitted to our designated inpatient unit in Schneider Children's Medical Center of Israel. The patient population was diverse, consisting of 19 children, with a median age of 12.1 years (range: 2–18 years) upon admission and 7 women (aged 34–78 years old). Patients' demographic data are presented in Table 1. The cohort included 6 nuclear families that were abducted as family units (children, parents and grandparents) as well as 7 children who were abducted alone and held separately.

TABLE 1 Demographic data of patients returning from captivity.

	Patients held in captivity (n = 26)
Age, median (IQR)(years)	12.6 (2.9, 78.7)
Female, n (%)	19 (73%)
Number of days in captivity, median (IQR)	51 (49, 53)
Hospitalisation duration, median (IQR) (days)	4 (1, 9)
Background illness, n (%)	16 (61%)
Have other family members	
Murdered, n (%)	15 (57%)
Captive, n (%)	21 (80%)
Returned home, n (%)	8 (30%)
Returned to alternate living residence, n (%)	18 (70%)

The median duration of admission was 4 days (range: 1–9 days). Of the returnees 18/26 individuals (70%) did not have a home to return to, as some of the houses were burned during the attack while others were located in declared war zones, leading to displacement of the residents.

According to the patients' medical records, 16/26 (61%) patients had at least one background diagnosis, with 8 of them regularly taking prescription medications. Of these patients, 5 were women with background diagnoses of hypertension, anxiety disorder, hypothyroidism and depression and 3 children with background diagnoses of asthma and hyper-reactive airway disease (HRAD). None of the patients had chronic medication taken with them when they were taken to the Gaza strip on October 7th. Chronic medications were not supplied on a regular basis during captivity. One patient reported receiving antihypertensive drugs albeit sporadically. Mothers with young children reported that on a few occasions paediatric anti-pyretic and inhalation therapy were provided. None of the patients received assessment or treatment from medical personnel during captivity.

The vital signs on arrival were within the normal range for all patients, except for one woman with a background diagnosis of hypertension that was untreated during her captivity and thus had high blood pressure on arrival.

System-oriented clinical manifestations recorded immediately after release from captivity is described in the following sections.

3.1 | Gastrointestinal

Prolonged constipation was reported in 10 patients. Two patients (one women, one child) required pharmacologic treatment during admission. In the other 8 patients (2 women, 6 children) the complaint had subside during the first few days with adequate food and water intake. A toddler presented with new onset encopresis and was treated accordingly.

Diarrhoea during the captivity period was reported in 11 patients (42.3%) (2 women, 9 children). One woman reported prolonged

diarrhoea of more than 3 weeks. Infectious pathogens isolated in the patient's stool sample are discussed below.

Nutritional status on return was uniformly poor. Significant weight loss was recorded in 15/26 individuals. Most hostages reported limited food supply. Diet was rice and white bread based, with low quality ingredients and minimal or no intake of vegetables, protein and fat. Weight loss was different for each age group, with a more significant weight loss noted in all adult women (loss of 7.5%–14.3% of body weight). Eight children aged 8–18 years old, exhibited weight loss of 4.7%–10.6%. Children under the age of 8 years did not show significant weight loss. Of note, Children that were held with adult family members showed minimal or no weight loss (8 out of 13 did not lose weight, 5 lost 4.7%–10.6% of body weight). Upon arrival all patients were given a specific, gradually increasing dietary regimen, adjusted to recommended dietary allowance needs, in order to avoid the risk for re-feeding syndrome. All patients were treated with multivitamins during admission.

Laboratory tests after gradually resuming adequate intake did not reveal signs of refeeding syndrome. One woman had evidence of vitamin D deficiency (vitamin D value -25 ng/mL). Of note, albumin and magnesium values were in the high range (adjusted for age). Main laboratory workup and results are presented in [Table 2](#).

3.2 | Hygiene

All 26 patients reported poor sanitation and low hygiene conditions. Eight patients (2 women, 6 children) were kept underground for most of the duration of captivity. The majority of patients reported restricted access to running water throughout the entire duration of their captivity. Severe head lice infestation was apparent in 6/26 of the patients on admission and required multiple pharmaceutical treatments and hair trimming.

3.3 | Dermatology

Six patients presented with multiple insects' bites and diffuse skin irritation (one women, 5 children). One child had a flair up of atopic dermatitis and was treated topically during admission. All symptoms resolved with topical treatment and improved hygiene.

3.4 | Respiratory

Four children had a medical history of HRAD or asthma. Three children experienced exacerbations during captivity and required frequent symptomatic inhalation therapy during their time in captivity (information of the specific agents was not available). Additionally, three children reported persistent dry cough. Both chest X-rays and nasopharyngeal swabs for viral pathogens yielded negative results.

TABLE 2 Summary of significant laboratory findings in the returnee cohort.

	Median (IQR)
Laboratory findings	
White blood cells (K/micl)	8.14 (5, 13.35)
Eosinophils (K/micl)	1.6 (0, 9)
Haemoglobin (g/dL)	13.1 (12.4, 16.1)
Magnesium (mg/dL)	2.11 (1.9, 2.4)
Phosphors (mg/dL)	4.2 (2.7, 4.9)
Sodium (mEq/L)	140 (133, 143)
CPK (U/L)	101 (37, 322)
Vitamin D (ng/mL)	66 (25, 115.3)
Albumin (g/DL)	4.75 (4.2, 5.8)
	Number of positive patients
Positive stool FilmArray gastrointestinal PCR panel	
Aggregative <i>E. coli</i>	9
Pathogenic <i>E. coli</i>	7
Toxigenic <i>E. coli</i>	5
Campylobacter jejune	2
Salmonella	2
Giardia lamblia	1
Invasive <i>E. coli</i>	2
Vibrio cholera	1
Shigella	1
<i>Clostridium difficile</i>	3

3.5 | Musculoskeletal

Three individuals (one women, 2 children) experienced diffuse myalgia shortly after admission. Laboratory work-up showed elevated levels of creatinine phospho-kinase (CPK) in 2/3 patients (one women, one child).

3.6 | Infectious

During their time in captivity, 3 children (aged 2.3–4 years) experienced febrile illnesses. They did not receive medical evaluation and care other than antipyretics.

As discussed previously, at least one episode of acute diarrhoea during the captivity period was reported by 11 individuals; 9 children (2.9–15 years old) and 2 women. Stool FilmArray gastrointestinal PCR panel (Idaho Technology, Inc., Salt Lake City, Utah, USA) obtained soon after arrival to our unit detected positive signals for various enteric pathogens, as presented in Table 2.

Blood serology assessment showed 5 positive Immunoglobulin M (IgM) antibodies for Spotted fever, 2 positive Q fever Immunoglobulin G (IgG) antibodies (phase 2), 2 positive Murine

typhus fever IgM antibodies and 2 positive Murine typhus fever IgG antibodies. None of the patients exhibited related symptoms upon admission and none were treated. Laboratory screenings for various infectious diseases including common sexually transmitted diseases were all negative (Table 2).

3.7 | Trauma

Out of the 26 patients, 14 individuals sustained injuries during the attack and kidnapping. Among these, nine patients reported shrapnel injuries, with eight of them having positive X-ray results confirming the presence of shrapnel (3 women, 5 children). Five patients exhibited shrapnel injuries in lower limbs, two patients had injuries in their upper limbs. One patient had evidence of multiple shrapnel injuries including the pelvis, upper limbs and chest. Following orthopaedic consultation, it was concluded that due to the prolonged duration since the trauma and absence of immediate intervention necessity, conservative treatment was recommended.

One patient with several shrapnel injuries was re-admitted 3 days after discharge from our unit for symptoms consisting fever, dyspnea and pleuritic pain. Physical examination revealed diminished breath sounds on the right lung, Laboratory results demonstrated elevated inflammatory markers and chest CT revealed a recent fracture in the 7th rib and a large pleural effusion, adjacent to the shrapnel site (T4). Thoracentesis yielded large amount of sterile exudate (>700 mL). The patient was treated with 3rd generation IV Cephalosporin and gradually improved. Her diagnosis was concluded as infected hematoma with reactive pleural effusion secondary to shrapnel injury.

One patient suffered a superficial, through and through gunshot wound to the lower abdominal wall, with no apparent intra-abdominal damage. As per the patient anamnesis he had a haemorrhage that was controlled with prolonged external pressure. He also reported symptoms of wound infection (wound site pain, purulent discharge, fever, malaise) and was treated topically in the first days of captivity (information of specific treatment is not available).

3.8 | Psychological trauma

All patients were forcefully taken from their homes. Of 26 patients, 24 patients witnessed the murder/kidnap of other family members during the attack.

All patients went through mental evaluation and received social and psychological support during their stay in the hospital. They all reported psychological terror, with different psychological warfare strategies including isolation, intimidation, food and water restriction and psychological abuse. On admission to our unit all young children (less than 7 years) demonstrated submissive behavioural pattern, some suffered from repeated nightmares. In addition, children were trained to speak in low whispering voice and after their admission to our unit they gradually resumed normal volume of speech. Three

toddlers presented with food craving behaviour (picking on the food and keeping food for later).

One patient, a toddler who had been separated from her family for 10 days and held alone, demonstrated events of unprovoked crying during the stay in our unit. Another toddler demonstrated new onset trichotillomania. Five patients (3 women and 2 adolescents) were treated with anxiolytics during admission. One woman who had a prior diagnosis of mild anxiety disorder, experienced exacerbations during captivity and reported treatment with short acting benzodiazepine on an irregular basis during captivity. Another adult woman expressed feelings suggestive of Stockholm syndrome.

4 | DISCUSSION

In this report, we outline the primary findings of medical issues observed during the immediate phase following the return from captivity in 19 children and 7 adult women, after approximately 50 days in Hamas captivity. The key observations included weight loss, complications of poor hygiene as severe head lice infestation and recent shrapnel injuries with related complications. We also recorded multiple gastrointestinal pathogens colonisation with or without corresponding clinical symptoms at the time of return.

To the best of our knowledge, this is the first report relating to the medical and physical findings during the immediate post-captivity period in women and children.

Weight loss was the most common finding in our cohort and was far more prevalent in the adult women and adolescents than in young children. This observation is attributed to the fact that the adults and adolescents in each group/family of hostages deprived food from themselves and kept it in order to feed the younger children in each group/family.

Robson et al.³ reviewed the health consequence of captivity in war prisoners in the far-east during World War II. They reported severe and universal weight loss as well. The authors also reported high rates of nutrition deficiency syndromes, mostly related to vitamin deficiencies, which was not frequent in our cohort. This difference could perhaps be explained by the differences in patients' characteristics (mainly adult males vs. children and women) as well as differences in the imprisonment periods (3.5 years vs. 50 days). Robson et al. also reported high rates infective diseases including dysentery. The patients in our cohort also reported high rate of diarrhoea and the findings in stool PCR panel supports these reports. The high rate of diarrheal episodes in our cohort can be explained by the poor sanitation, crowdedness and lack of running water in captivity.⁴ The observation that some asymptomatic patients had positive PCR stool tests for several pathogens supports poor hygiene status as well. Moreover, the extremely severe infestation of head lice in our cohort also highlights the poor hygiene conditions in which the hostages were held.

Our infectious diseases assessment yielded high rate of positive antibodies titre for Murine Typhus, Spotted fever and Q fever

in apparently asymptomatic patients. These rates are higher than the usual prevalence of these illnesses in the general Israeli population. Data regarding the prevalence of positive antibodies to coxiella burnetii and various rickettsial diseases in the general population of Gaza are not available. We believe that in part these findings can be explained by mild or asymptomatic infections that took place during the captivity period.

The mental challenges faced by people that go through abduction and captivity has been documented in several reports in the literature.⁵ In this report we describe the immediate findings as noted in the first few days after return. We noted submissive behaviour and disturbances related to sleep and eating patterns, as well as anxiety related behaviours. Nevertheless, it is obvious that the immense magnitude of psychological trauma of kidnapped and hostage victims cannot be properly assessed or treated in the immediate return phase and thus is not in the scope of this article.

Our study had some limitations. The cohort in this report is selective (women and children only), however, it is still heterogenic as these individuals were held in different setups, transferred several times from one place to another, some were held in family houses, others were held in medical facilities or in underground tunnels. There was no uniform conditions and consequently diverse findings as well. Additionally, our cohort is relatively small, though it includes all patients released from captivity and hospitalised in our facility. Yet, in light of the absence of data in the literature we believe our findings are significant and shed some light on health concerns in these complex circumstances of children and women returning from captivity.

Certainly, the medical investigation and treatment strategy outlined in our report serve as only one component of a comprehensive support plan designed to address the mental, medical and social needs of these children and women.

In summary, our study highlights the primary medical issues that may present in the immediate post-captivity period. These include weight loss, sequela of poor hygiene, complications of recent trauma injuries and psychological impact of being held captive. The insights gained in this report could potentially offer assistance in other scenarios involving individuals returning from captivity such as kidnapping and related circumstances.

It is evident that the primary objectives and most critical challenges are not assessed and treated in the initial phase of returning home. The main hurdles ahead are anticipated to be social, psychological and mental in nature and these aspects are yet to be addressed and confronted in the lengthy process of reintegrating into society.

As paediatricians, we are hopeful that the insights gained from our experience and detailed in this article will never again be clinically relevant in the future as children and their mothers should be spared from these atrocious situations.

AUTHOR CONTRIBUTIONS

Noa Ziv: Conceptualization; data curation; methodology; writing – original draft; formal analysis. **Yael Mozer-Glassberg:** Conceptualization;

writing – original draft; methodology; data curation; formal analysis.

Efrat Bron-Harlev: Conceptualization; project administration; writing – review and editing. **Lotem Goldberg:** Conceptualization; methodology; writing – review and editing. **Omer Niv:** Conceptualization; writing – review and editing. **Shirley Saar:** Conceptualization; writing – review and editing. **Shlomit Yaron:** Conceptualization; writing – review and editing. **Dana Singer-Harel:** Conceptualization; methodology; writing – review and editing. **Noa Eliakim-Raz:** Conceptualization; methodology; writing – review and editing. **Silvana Fennig:** Conceptualization; writing – review and editing. **Gilat Livni:** Conceptualization; project administration; writing – review and editing. **Havatzelet Yarden-Bilavsky:** Conceptualization; writing – review and editing; project administration; formal analysis.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest relevant to this article to disclose.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

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APPENDIX A

Formulated admission protocol for returnees.

Past medical history:

Age: ____ Chronic illnesses: _____ medications: _____

Known allergies: _____ last known weight: ____ Family status: _____

Anamnesis regarding captivity period:

Days in captivity: _____

Events of the day of attack: _____

Infectious events: _____

Pain: _____ Contusions / Lesions
/ Shrapnel injury: _____Nutrition and sanitation conditions:
_____Diarrhea / Vomiting / GI Symptoms:

Skin lesions / Rash: _____

Visual disturbances: _____

Other adverse events: _____

Physical and psychological evaluation:

Heart rate: _____

Blood pressure: _____

O₂ saturation: _____

Fever: _____

Height: _____

Weight: _____

Basic physical examination: _____

Hydration status: _____

Basic neurological examination: _____

Basic psychological and social
evaluation: _____
_____**Blood, stool and urine tests:**

Complete blood count	HBsAg + HBsAb + HepC
Electrolytes (Glucose, Urea, Cl, Na, K, P, Mg, Ca, Uric acid, Albumin)	HIV
Liver enzymes	Borrelia Ab
Bilirubin	Rickettsia Ab
Cholesterol (HDL, LDL)	Q fever Ab
LDH	Brucella Ab
Triglycerides	VDRL
Creatinine level	Urine STD (Chlamydia Trachomatis, Neisseria Gonorrhoea, trichomonas vaginalis, mycoplasma Genitalium.)
Iron, ferritin, Vitamin D	Urine B-HCG (for women)