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# Use of Phototherapy in Pediatric Patients at Dermatology Department Tripoli Central Hospital (2008-2020)

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***Abstract***

***Background:*** *, phototherapy is a good alternative instead of other systemic therapies In children with severe or wide spread skin diseases*

*The objective of the study was to evaluate the therapeutic response of phototherapy in pediatric patients.*

***Methods:*** *. A case series study of total 350 padiatric patients who were treated in Phototherapy Unit at Tripoli Central Hospital in a period of twelfth years*

***Results:*** *The study included 350children , 200 girls(57.1%), 150 boys (42.9%) their age range 12 years with mean of12 ± 3.1 who were treated with narrow-band UVB phototherapy (86.9%), systemic-PUVA ( 5.4%), bath-PUVA (6.3%) or NB-UVB & systemic-PUVA (1.4%). The majority of patients had vitiligo (52.9%) and psoriasis (34.6%) . Fifty nine (59.2%) patients completed their treatment with good response, Acute side effects of phototherapy were observed in (29.8%) of the patients while ( 70.2%) completed their treatment with-out any complications. The highest number of treatments sessions was 304 sessions of NB-UVB ,with the highest cumulative dose of 686.37 J/Cm2 which given to vitiligo patient with good response.*

***Conclusion****: phototherapy is an effective and well-tolerated treatment in childhood.*

***Keywords:*** *Phototherapy, NB-UVB, Photo-responsive dermatoses, Pediatric*

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## I. Introduction :

Phototherapy has been used in the treatment of dermatological diseases for many years. In children with severe or wide spread skin diseases, phototherapy is a good alternative instead of other systemic therapies [1] . The pediatric population is a special population for whom it is important to avoid systemic agents and their associated potential risks whenever possible. Phototherapy represents a safe alternative for appropriately selected cases[2]. Phototherapy is a form of delivering ultraviolet (UV) radiation to patients to treat dermatologic conditions[3]. In the neonatal nursery blue light (459-460 nm) is used to reduce billirubin levels and prevent kernicterus. While psoralens and UVA (PUVA) has been demonstrated to be efficacious in a variety of pediatric skin conditions, narrowband UVB therapy (311 nm) has largely replaced psoralens and UVA as initial choice in full-body phototherapy for children [4]. Its efficacy and safety have been thoroughly established in adults and some publications indicate that it is also an effective and safe treatment in pediatric patients with refractory skin diseases [5]. Its therapeutic efficacy is due to the following: 1) its anti-inflammatory and immunomodulatory action on different elements of the immune system; 2) inhibition of DNA synthesis and inhibition of keratinocyte proliferation[6] ; and 3) reduction of colonization by Staphylococcus aureus[7]. Light therapy enhances melanocyte proliferation, making it clinically relevant for conditions such as vitiligo[8]. Most of the published reports regarding pediatric concern the treatment of psoriasis, atopic dermatitis, and vitiligo. In addition there are case series regarding phototherapy for the treatment of pediatric mycosis fungoides (MF), particularly hypopigmented MF, which is much more common in children than adults[9]. Short-term side effects of phototherapy, which include erythema, burning, pruritus and xerosis, are usually mild and transient [10]. Another risk can be photo activation of herpes virus[11]. PUVA with oral psoralen is generally not preferred in children younger than 12 years of age because of the potential side effects, including nausea, vomiting, cataract and ocular toxicity, and phototoxic reactions[2]. In children, PUVA bath photochemotherapy is preferred over oral PUVA because it has fewer gastrointestinal side effects and a shorter duration of photosensitization[12]. Long-term safety data of phototherapy and photochemotherapy in children is lacking. Photoaging is a well known side effect of this treatment, but its relevance for children has not been established[13]. The potential of UVB and PUVA treatments in children to induce melanoma and non-melanoma skin cancer has not been proven. Because an association has been established with PUVA in adults, and epidemiological and animal

data supporting a role for UVB, it is reasonable to suppose that children are at similar risk[14]. Absolute contraindications of phototherapy include Xeroderma pigmentosa, systemic lupus erythematosus and basal cell nevus syndrome. Relative contraindications include previous history of skin cancer, treatment of genital area, photosensitive disorders and photosensitizing medications[15]. For the use of PUVA absolute contraindications include age < 10 years[16]. It remains important to limit phototherapy in children to conditions where the benefit is proven, and only after other treatment options have been explored[14].
The aim of the study was to evaluate the therapeutic response of phototherapy in pediatric patients.

## II. Methodology :

Study desigen was a case series study
Study place phototherapy clinic in dermatological department Tripoli central hospital
Study period from January 2008 to February 2020

Study tool & population all medical record of patients attending the clinic for treatment the inclusion criteria was libyan pediatric patient aged under 18 years, who were selected according to diagnosis , failure of previous local treatments or contraindication to other systemic treatments. we have selected also only children who are mature enough to comply with treatment.

Data management and analysis : data was drawn from medical records of patients included : age and gender of patients ,skin type, diagnosis, type of treatments, number of sessions, cumulative dose, side effect or complication, . The data collected was analyzed with SPSS version 20 , descriptive statistics; Frequency, means, standard deviation were used and inferential statistical tests (Chi square test ) was used in Significance level of 5%.

All patients were routinely evaluated for the presence of any contraindications for phototherapy and their parents are explained about the treatment and it's side effects. They were given a written informed consent. Patients who received systemic PUVA were sent to ophthalmologist for exclusion of any contraindications and were explained about Eye protection. Waldmann UV 7001 K cabinets with both UNB and UVA fluorescence lamps are used for total body treatments and Waldmann UV 181 AL , Waldmann UV 200 Al with UVA fluorescent lamps are used as Hand-foot units. All treatments were given three times per week except NB-UVB for patients with psoriasis that was started with five times per week. The starting doses were determined by the patient's skin type except for vitiligo where all patients considered skin type one . The treatment dose was increased by 10 to 20% of the previous dose if there was no erythema. Dose increment was done every session except for vitiligo and CTCL were the increment was only every third session. For systemic PUVA patients were given 8-methoxy psoralen tab ( 0.6 mg per Kg body weight ) then exposed to UVA during the second hour after tablet ingestion. For bath-PUVA 1mg/L water solution of 8-methoxy psoralen is used for 20 minutes, and exposed to UVA immediately after the bath. All children wore UV-blocking goggles or UV-blocking masks during treatment, and in males genitalia was covered from UV exposure. The patients are followed up regularly for evaluation of clinical response and development of any side effects and managed accordingly. When the clearance of the skin lesions is 90% or higher it is considered complete response, when it is less than 25% ( after receiving adequate treatments; which are 24 to 30 sessions for vitiligo and 10 to 12 sessions for other diagnosis ) it is considered therapy failure.

## III. Results :

From the total 2708 patients attending phototherapy clinic 350 of them were children under 18 years they consist about 12.92% of all patient , 42.9% were boys and 57.1% were girls . The minimum age was 5years and maximum age was 17 years with range of 12yr, the mean age was 12±3.1years as shown (Fig-1) . 63.3% of them their residency from Tripoli while 36.7% are from outside Tripoli. Most of them were skin type IV (82.6%), (13.1%) were skin type III, (3.4%) skin type V and (0.9%) skin type VI . Vitiligo was the commonest indication for phototherapy in general in our patients (52.9%) followed by psoriasis (34.6%), as shown in (Fig-2), and the commonest treatment type used was NB-UVB for 304 patients (86.86%) followed by bath-PUVA for 22 patients (6.29%), systemic-PUVA for19 patients (5.43%) and 5 patients received both NB-UVB & systemic-PUVA(1.43%) as shown in ( Table-1) the mean no of session was 51±57.7 and minimum no was one session and maximum was 306 sessions, the minimum cumulative dose o.o2 J/Cm2 and maximum was 715.4 J/Cm2 with mean of 87.74 J/Cm2 . Most of our patients (70.2%) completed their treatment courses without any complications , (18.3%) had developed symptomatic erythema during their treatment, (5.8%) had itching, (5.3%) had dryness and only (0.5%) developed folliculitis (acniform rach ) , we found a significant association between cumulative dose and complications by Kruskal Wallis Test (p=0.001). (59.2% ) of patients; responded well to their treatment only (46.64%) were regular in follow up ,while (12.61%) were irregularly coming . From the remaining; (31.09%) dropped out and (9.66%) had therapy failure as showen in (Fig-3). The highest numbers of treatments & highest cumulative doses of different phototherapy types used in our study and for which diagnosis are shown in (Table-2).

## IV. Discussion :

During twelve years we have treated two thousand and seven hundred eight patients with different photo responsive dermatoses; three hundred fifty of them were children. The youngest patient in our study aged five years as compared with the study of Eustace et al[3] which was three years old, Two hundred patients were females with 1.33:1 female predominance which is the same in most of the revised studies like that of Jorge et al[5] with female: male ratio 1.56:1 and that of Ersoy-Evans et al[10] with ratio of 1.26:1 . The vast majority of our patients were coming as out patients but few of them were admitted to our inpatient department specially some of those who are coming from outside Tripoli ( 36.7% ). We treated all skin types presented to us but the most common skin type was type IV (82.6%) because it is the most common skin type in our area, in the study of Tan et al[18] the majority of the treated patients were skin type II because they were mainly European. But all patients from skin type III to skin type VI had responded equally regarding the skin type. (59.2%) of our patients completed their treatment with good response and (12.61%) of them were even irregularly coming and took more time to finish their treatment. Owing to the fact that phototherapy are largely hospital based treatments, time consuming and requires regular travel to health care facility, there is significant loss in terms of absenteeism from school for patients as well as loss of working days for their attendants[13] and because of that we had (31.09%) of our patients dropped out of their treatment. Our response rate was59.2% which was good compared with previous studies like that of M.T.Joge et al[5] with response rate of ( 34.7%) , Pasic et al[12] with over all response rate (35.9%) and Sen et al[1] with over all response rate ( 22.5%). In (9.7%) of the patients treatment was stopped and labeled as therapy failure when there is no clinical response after receiving adequate number of treatment , these results are similar to the previous studies in literature like that of M.T.Joge et al[5] in which ( 10.2%) of patients had no response. NB-UVB was the most commonly used type of treatment in our study (86.86%) like most of the previous studies like that of M.T. Joge et al[5] (86%). Systemic PUVA (5.43%) was used in few patients with vitiligo and psoriasis who didn't respond well to NB-UVB, in only two cases of scleroderma who had deep sclerosis and in all cases of alopecia areata. Bath-PUVA(6.29%) was used to treat patients with palmoplanter psoriasis and palmoplanter eczema who have used topical steroid long time or had poor compliance to local treatments . The skin conditions treated in our studied children were almost the same as that recorded in previous studies with the difference that more than half of our patients (52.86%) were vitiligo cases and although atopic dermatitis was the most common indication in some of the previous studies and NB-UVB were considered clinically effective treatment for moderate to severe atopic dermatitis like that of S. Darne et al [17] and E. Tan et al [18], we didn't treat any child with atopic dermatitis because we didn't have good results with atopic dermatitis in adult patients, because most of our childhood dermatitis responded satisfactorily to local therapies and it is less common than infantile atopic dermatitis in our area. Most of our patients (70.2%) had no complications but mild symptomatic erythema as the most frequent complication reported ( 18.3%) which is , although higher frequency of erythemas are reported in the study of Ersoy-Evans et al[10] which was 51.6% , Tan et al[18] (36%) and Jury et al[19] (30%). We couldn't find sufficient data available or guide lines regarding the safe maximum cumulative doses or number of treatments of different types of phototherapy in children. We found that number of treatments and cumulative doses of all types of phototherapy was related to the diagnosis of the patient because the starting doses, percent of increment and number of sessions required differs according to diagnosis e.g patients with vitiligo require more number of treatments than patients with any other diagnosis to achieve good response .

## V. Conclusion:

We concluded that most of our pediatric patients were females with mean age of twelve years and most of them of skin type IV, Most of our patients completed their treatment courses without any complications

## VI. Recommendations

- Phototherapy should be considered as second-line therapy if standard local regimens are unsuccessful or if there is any contraindications to systemic treatments in children with generalized photo-responsive dermatoses.
- Phototherapy is an effective and well-tolerated in children and its response depends on the disease treated and the rate of adherence to the treatment.
- NB-UVB remains the safest and most widely used in children, while systemic-PUVA is not recommended before the age of 10 years.
- Choice of type of phototherapy and close monitoring, with parental partnership and scheduling the treatment time in the early morning or late afternoons to insure treatment adherence is the key to successful treatment.

Limitation of study: it is a retrospective study ; based on single center experience.

## References:


[1]. Bilge Bulbul Sen, Emine Nur Rifaioglu, Ozlem Ekiz, Tugba Sen, Ebru Celik, Asena C. Doramaci. Narrow-band ultraviolet B phototherapy in childhood. Cutan Ocul Toxicol, 2014;33(3): 189-191

[2]. Rupa Pugashetti, John Koo. Phototherapy in pediatric patients: choosing the appropriate treatment option. Semin Cutan Med Surg 2010; Jun.29(2): 115-120

[3]. Karen Euustace, Sophie Dolman, Ali Alsharqi, Graham Sharpe, Richard Parslew. Use of phototherapy in children. Pediatric Dermatology 2017; vol.34(2): 150-155

[4]. W. Veith, V Deleo, N Silver berg. Medical phototherapy in childhood disease. Minerva Pediatr.2011; August.63(4):327-333

[5]. Magdaleno-T Jorge, Ortiz-S Jose Mari, ValenzuelaOnate, Cristian M-C Pedro, Esteve-M Altea, Perez-F Amparo. Actas Dermosifiliogr. 2020;111(1): 14-46.

[6]. J. Thomas, K. ParimalamTreating pediatric plaque psoriasis: challenges and solutions. Pediatr Health Med Ther. 2016; 25-38

[7]. 7- V.R. Dimitriades, E. Wisner. Treating pediatric atopic dermatitis: current perspectives. Pediatr Health Med Ther. 2015; 6, pp. 93-99

[8]. Irena L. Corales, Sabrina Ramnarina, Perla Lansag. Treatment of childhood psoriasiswith hpototherapy and photochemotherapy. Clinical medicine insight: pediatrics 2013:7; p 25-33

[9]. Eunice Song, Debashis Reja, Nanette Silverberg. Phototherapy: Kids are not just little people. Clinics in Dermatology 2015:33,672-680

[10]. Sibel Ersoy-Evans, Ash Altaykan, Sedef Sahin, Fikret Koelemen, Phototherapy in Childhood. Pediatric Dermatology 2008: vol 25(6); 599-605.

[11]. Wong GA, Kaye SB, Parslew R. Reactivation of herpes simplex keratitis during TL01 phototherapy for psoriasis. Clin Exp Dermatol. 2003;28:453-454.

[12]. Aida Pasic, RomanaCeovic, Jasna Lipozencic, Karmela Husar, Slobodna M. Susic, Mihael Skerlev, Damir Hrsan. Phototherapy in Pediatric Patients. Pediatric Dermatology 2003: vol.20(1);71-77.

[13]. Dogra S, De D. Phototherapy and photochemotherapy in childhood dermatosis. Indian J Dermatol Venereol Leprol. 2010;76:521-6.

[14]. S. A. Holme, A. V. Anstey. Phototherapy and PUVA photochemotherapy in children .photodermatol photoimmunol photomed 2004:20;69-75.

[15]. Osorio F, Magina S. Phototherapy and Photopheresis: old and new indications; Expert Rev Dermatol. 2011;6: 613-23.

[16]. Sage RJ, Lim HW. UV-based therapy and vit D. Dermatol Ther. 2012;23: 72-81.

[17]. S. Darne, S.N. Leech, A.E.M. Taylor. Narrow-band ultraviolet B phototherapy in children with moderate to severe eczema:: a comparative cohort study. Britich Journal of Dermatology. 2014;170(1): 150 156.

[18]. Eugene Tan, David Lim, Marius Rademaker. Narrowband UVB phototherapy in children: A New Zealand experience. Australasian Journal of Dermatology. 2010;51:268-273.

[19]. Jury CS, McHenry P, Burden AD, Lever R, Bilsland D. Narrowband ultra violet B (UVB) phototherapy in children. Clin Exp Dermatol. 2006;31:196-199.

[20]. Njoo MD, Bos JD, Westerhof W. Treatment of generalized vitiligo in children with narrow-band( TL-01) UVB radiation therapy. J Am Acad Dermatol. 200;42:245-253.

[21]. Percivalle S, Piccinno R, Caccialanza M, Forti S. Narrowband ultraviolet B phototherapy in childhood vitiligo: evaluation of results in 28 patients. Pediatr Dermatol 2003;20:71-77.

[22]. Doanh Le Huu,Thao Ngo Minh,Thuong Nguyen Van, Phuong Pham Thi Minh,Nghi Dinh Huu,Van Tran Cam,My Le Huyen,Minh Vu Nguyet,Mai Le Thi, Hien Do Thi Thu,Khang Tran Hau, Marco Gandolfi, Francesca Satolli, Claudio Feliciani,Michael Tirant, Aleksandra Vojvodic,Torello LottiThe . Effectiveness of Narrow Band Uvb (Nb-Uvb) In the Treatment of Pityriasis Lichenoides Chronica (PLC) In Vietnam. Open Access Maced J Med Sci. 2019 ;7(2): 221–223.


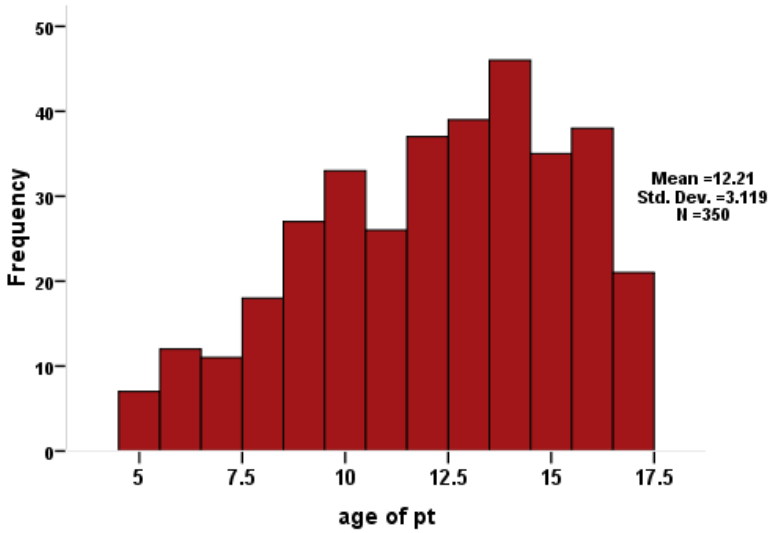


**Fig- 1 : Age of patients ( years )**

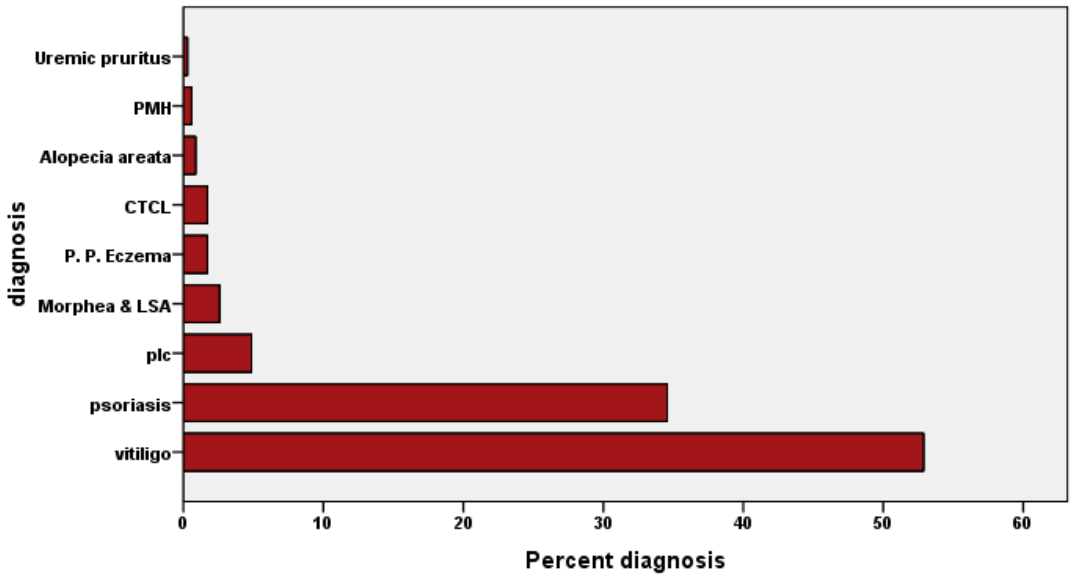


**Fig- 2 : Distribution of patients according to diagnosis .**

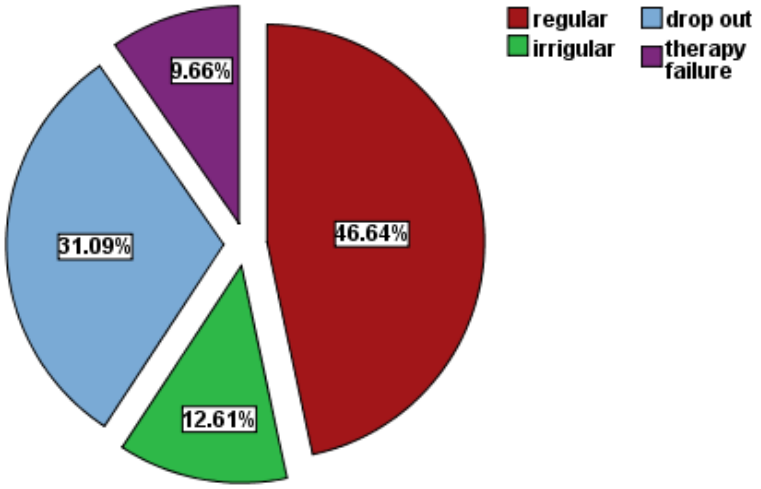


**Fig- 3 : distribution of the patients according to follow up**

**Table- 1: Treatment type according to diagnosis .**

| | treatment type | | | | Total |
|---|---|---|---|---|---|
| | systemic PUVA | bath PUVA | NB-UVB | NB-UVB&PUVA | |
| psoriasis | 2 | 14 | 105 | 0 | 121 |
| vitiligo | 12 | 2 | 167 | 5 | 186 |
| CTCL | 0 | 0 | 5 | 0 | 5 |
| plc | 0 | 0 | 17 | 0 | 17 |
| PMH | 0 | 0 | 2 | 0 | 2 |

| | | | | | |
|---|---|---|---|---|---|
| **Morphea & LSA** | **2** | **0** | **7** | **0** | **9** |
| **Alopecia areata** | **3** | **0** | **0** | **0** | **3** |
| **P. P. Eczema** | **0** | **6** | **0** | **0** | **6** |
| **Uremic pruritus** | **0** | **0** | **1** | **0** | **1** |
| **Total (percent )** | **19 ( 5.43%)** | **22 ( 6.29% )** | **304 ( 86.86% )** | **5 (1.43% )** | **350 ( 100% )** |

**Table - 2 : Highest numbers of treatments & Highest cumulative doses of different phototherapy types & for which diagnosis used in our study :**

| Treatment type | Number of sessions | Cumulative doses ( J/Cm2 ) ؤؤ | Diagnosis |
|---|---|---|---|
| **NB-UVB** | **304** | **686.37** | **Vitiligo** |
| **Systemic PUVA** | **68** | **715.46** | **Morphea** |
| **Bath PUVA** | **65** | **539.15** | **Palmoplanter psoriasis** |

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