

ORIGINAL ARTICLE

A 5-years Retrospective Study on Narrowband Ultraviolet B (NB-UVB) Phototherapy Utilisation Experience in A Tertiary Hospital in East Malaysia

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Abstract

Background

Phototherapy had been a less favourable treatment in recent years. Our study aims to audit the usage of NB-UVB phototherapy service in a tertiary hospital in East Malaysia.

Methods

This is a retrospective study. Phototherapy file of patients who underwent NB-UVB phototherapy between year 2016 and 8 March 2021 were reviewed. Demographic data, treatment history, and acute side effects were analysed.

Results

Forty eight subjects were recruited in this study. The majority (33.3%) of the subjects were in 20-29 age group. There was an equal number of male and female subjects. About 66.7% of the subjects had psoriasis and 18.8% of them had vitiligo. Nearly 36.6% of the subjects had 26-50% body surface area involved at initial phototherapy. Almost 54.2% of the subjects had <50 sessions of NB-UVB phototherapy. About 52.1% of the subjects had a cumulative dose of NB-UVB <25 J/cm² while 26.7% of subjects had a cumulative dose >200 J/cm². Acute side effects including burning (17.8%), pruritus (4.4%) and flare of psoriasis (2.2%).

Discussion

Low utilization rate of NB-UVB phototherapy was likely due to logistical and transportation factors. Psoriasis was the commonest indication for NB-UVB in our study followed by vitiligo. Annual skin malignancy surveillance should be done especially on patients received NB-UVB >350 sessions even after the discontinuation of treatment. Most patients tolerate NB-UVB phototherapy well with no major side effects.

Conclusion

In conclusion, NB-UVB phototherapy is a relatively safe yet underutilised treatment in our centre.

Key words: Phototherapy, Narrowband ultraviolet B (nb-UVB), Ultraviolet A, Psoriasis, Vitiligo

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Introduction

Phototherapy is a type of light therapy which had been used in various dermatological diseases such as atopic eczema, psoriasis, vitiligo, morphea and so on. In 1925, Goeckerman was the first person who brought in the advancement in phototherapy as part of important treatment in psoriasis by combining

ultraviolet B (UVB) and crude coal tar.¹ Since then many modern phototherapies had been developed ranging from narrowband UVB (NB-UVB) in 1988, psoralen and UVA (PUVA) in 1974 to targeted phototherapy with excimer lamp in 1997.^{2,3} In the era of biology, however, with the development of systemic treatment including biology therapy since 2000, phototherapy therapy becomes less favourable.

According to a 5 year report in 2002 from the United States, patients visit for phototherapy, in general, was reduced by more than 90%.⁴ The objective of this study is to audit the usage of NB-UVB phototherapy service in Sarawak General Hospital (SGH) for the past five years including phototherapy usage trend, common indications of phototherapy, characteristics of the patients, and side effects of phototherapy. SGH located in East Malaysia. It is a tertiary hospital in the state of Sarawak, Malaysia and it is the only hospital with resident dermatologists in this state.

Materials and Methods

This is a retrospective study carried out at the phototherapy unit Sarawak General Hospital. We recruited patients who had received phototherapy treatment at our phototherapy unit between 2016 and 8 March 2021. Our centre is currently using a Daavlin cabin (UVB) and a hands and feet unit. No UVA phototherapy available at our unit. We excluded subjects on hands and feet phototherapy as data was not complete. Patients' phototherapy folders were reviewed. Data such as demographics, indications, treatment sessions, cumulative dose of the phototherapy, and acute side effects were extracted and analysed by using SPSS.

Results

A total number of 48 subjects received NB-UVB phototherapy between 2016 and 8 March 2021. The demography data of the subjects were shown in Figure 1 & 2. The majority of the patients were in the 20-29 age group. The mean age was 38.7 years old and ranged from 13 to 77 years old. There was an equal number of male and female subjects in the study populations. More than half (n=26, 54.2%) of the subjects were Chinese, followed by Malay (n=12, 25%), Bidayuh (n=5, 10.4%), and Iban (n=3, 6.3%).

Figure 1. Age distribution at the time of first nbUVB Phototherapy

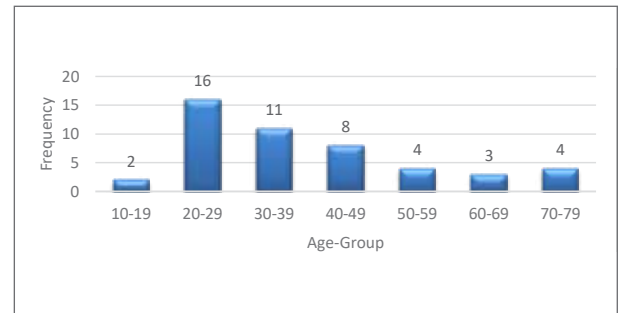
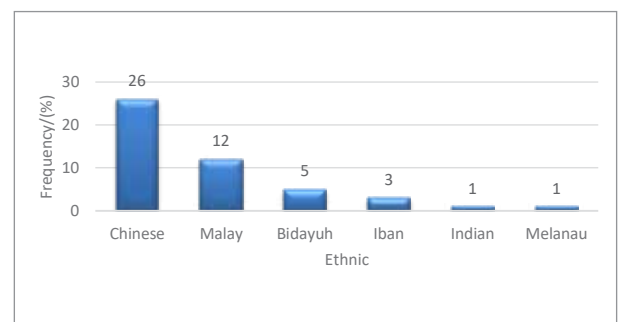
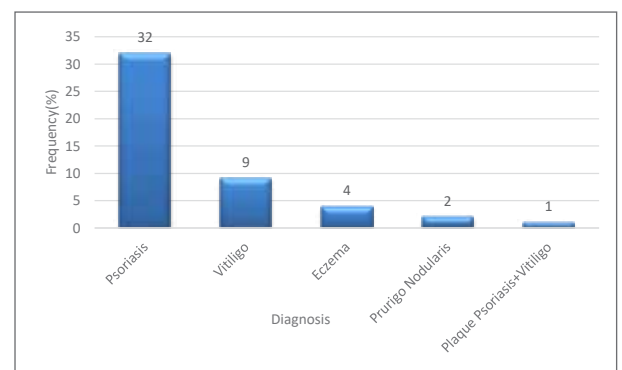


Figure 2. Ethnic groups of the nbUVB Phototherapy subjects



For the indication of NB-UVB phototherapy, 66.7% (n=32) of the subjects were started on nb-UVB phototherapy for their underlying psoriasis in which 2 (4.2%) of the subjects had erythrodermic psoriasis while the remaining of them had plaque psoriasis. This was followed by vitiligo in 18.8% (n=9) of the subjects, while eczema and prurigo nodularis were diagnosed in 8.3% (n=4) and 4.2% (n=2) of the study populations, respectively. One subject (2.1%) was started on NB-UVB phototherapy for both psoriasis and vitiligo. (Figure 3)

Figure 3. Diagnosis of subjects receiving nbUVB



Body surface area (BSA) involved, total number of phototherapy sessions, cumulative dose, and acute side effect were summarised in Table 1.

Among the 41 subjects with complete data on BSA involved, 36.6% (n=15) of them had BSA of 26-50%, followed by subjects with 6-10% BSA (n=8, 19.5%) and 11-25% BSA involvement (n=5, 12.2%). 3 (7.3%) of them had BSA of >95%, which included 2 erythrodermic psoriasis subjects and one patient with erythroderma secondary to eczema.

Table 1. Baseline BSA and treatments and side effects of the study populations

		Frequency (n)	Percentage (%)
Body surface area/BSA (n=41) *	1-5	2	4.9
	6-10	8	19.5
	11-25	5	12.2
	26-50	15	36.6
	51-75	4	9.8
	76-95	4	9.8
	>95	3	7.3
	Total	41	100.0
Total NB-UVB sessions (n=48)	0-50	26	54.2
	51-100	11	22.9
	101-150	1	2.1
	151-200	1	2.1
	201-250	2	4.2
	251-300	2	4.2
	>300	5	10.4
	Total	48	100.0
Cumulative dose (J/cm ²) (n=48)	1-25	25	52.1
	>25-50	4	8.3
	>50-75	8	16.7
	>100-125	1	2.1
	>125-150	1	2.1
	>150-175	1	2.1
	>200	8	16.7
	Total	48	100.0
Acute side effect (n=45) #	No side effects	34	75.6
	Burning	8	17.8
	Itching	2	4.4
	Flare of disease	1	2.2
	Total	45	100.0

*7 vitiligo subjects were not documented regarding their BSA finding in their phototherapy folders

#3 subjects had missing data regarding phototherapy side effects as they defaulted our clinic follow up

Fifty-four percent (n=26) of the study populations had less than 50 sessions of NB-UVB phototherapy. Around twenty three percent (n=11) of them had 51-100 sessions of the same phototherapy treatment. Of note, there were 5 (10.4%) subjects who received more than 300 sessions of NB-UVB phototherapy in their lifetime, with the highest record of 963 sessions

in 1 subject. All the 5 subjects were diagnosed with vitiligo, and until the closure of the study, there was no evidence of skin malignancy in all the 5 subjects.

The study populations had a wide range of cumulative UVB exposure dosage, which range from 0.15 to 924 J/cm² with a median dose of 21 J/cm². 52.1% (n=25) of them had a cumulative dose of UVB of 1-25 J/cm² followed by >50-75 J/cm² group and >200 J/cm² group, which consisted of 16.7% (n=8) of the study population respectively.

With regards to acute side effects after the NB-UVB phototherapy, there were 3 subjects who defaulted the phototherapy during the first few sessions, and no clinical records of acute side effects were documented. Among 45 of the remaining subjects, 75.6% (n=34) of them tolerate NB-UVB without significant side effects, while 17.8% (n=8) and 4.4% (n=2) of them complained of burning sensation and pruritus, respectively. 1 (2.2%) subject documented flare of underlying psoriasis. 3 (6.7%) of subjects stopped the NB-UVB phototherapy due to not tolerating acute side effects.

Discussion

Our study showed that in the past 5 years, we have only 48 subjects who received treatment of NB-UVB phototherapy for their underlying skin diseases. There were a few possible reasons for the low prescribing rate of NB-UVB in our centre. The most important reason is the logistical and transportation factors as many of our subjects stay far from Kuching city and some even come from different divisions. They have difficulties to go to hospital 2 to 3 times a week for the phototherapy treatments. The COVID-19 pandemic has an impact on this as well. Dermatologists try to minimise patients' visit to the hospital to reduce the risk of COVID-19 transmission. Therefore, phototherapy was avoided if alternative treatments were available.

Most of our subjects who received NB-UVB phototherapy were in the age group of 20-29, with a mean age of 38.7 years old. This finding was similar to another study done in Hospital Kuala Lumpur, Malaysia during 2011-2015 in which the mean age of the study was 38.8 years old.⁵ Another study by Park et al. in Korea showed a similar finding with the majority of the subjects receiving UVA or UVB in their study were in the age of 20-29 years old.⁶

Table 2. Indications for phototherapy in different studies

Study	Country	Treatment	Diagnosis (%)					
			Psoriasis	Atopic Dermatitis	Vitiligo	CTCL	Prurigo Nodularis	Others
Park <i>et al.</i> , 1996	Korea	UVB	94.8	2.4	-	-	0.5	2.4
Vaani <i>et al.</i> , 2018	Malaysia	UVA	28.0	0.5	70.2	0.5	-	0.7
		Oral PUVA	17.4	4.3	21.7	47.8	-	8.6
		Topical PUVA	2.8	1.4	85.1	0.7	--	9.8
		nbUVB	57.2	11.4	15.4	3.2	-	12.8
Current study	Malaysia	nbUVB	66.7	8.3	18.8	-	4.2	2.1

In term of indication for NB-UVB treatment, our study finding was consistent with other studies in Korea and Malaysia in which psoriasis was the commonest indication for UVB/NBUVB (Table 2).^{5,6} Duarte *et al.* reported, in their study on prescribing behaviour for 67 psoriasis subjects in Sao Paolo, Brazil, that 76% of the subjects received NB-UVB phototherapy with only 34 % was given PUVA.⁷ However, in our study, vitiligo is the second commonest indication for NB-UVB phototherapy. This is in contrast with the above studies in which Park *et al.* and Vaani *et al.* reported atopic dermatitis as the second commonest indication for UVB/NB-UVB. In their study, UVA is the preferred mode of phototherapy for vitiligo. PUVA or topical UVA was not available in our centre, and this can explain the difference between the studies. Unlike the other centre, we did not have subjects with cutaneous T cell lymphoma in our study.

The total number of NB-UVB sessions in our study ranged from 1 to 963 sessions, while Vaani *et al.* reported that subjects who underwent NB-UVB phototherapy in their study ranged from 1-252 sessions. More than half of our subjects underwent NB-UVB phototherapy for less than 50 sessions. Another 22.9% underwent 51-100 sessions of NB-UVB phototherapy. This finding is similar to the study by Park *et al.* in Korea.⁶ However, from our study, there were 5 (10.4%) subjects who had NB-UVB phototherapy of more than 300 sessions (963,922,818,547,324 sessions respectively). All 5 subjects had vitiligo. Although NB-UVB is effective in vitiligo from several studies done previously, our subjects seem to require long-term phototherapy to maintain their disease.^{8,9}

Although they had undergone an extremely high number of phototherapy sessions, there was no skin malignancies reported in our subjects. Although NB-UVB phototherapy increases lifetime exposure

to UVB, there is no evidence of increased risk of skin malignancies from the previous studies.¹⁰ Therefore, based on currently available data, the number of allowable UVB treatments can't be defined, although Malaysia Clinical Practical Guideline on the management of psoriasis Vulgaris recommends UVB treatments of not more than 350 sessions.¹¹ Nevertheless, close monitoring of the side effects and annual skin examinations is important to monitor any skin tumours even after the discontinuation of phototherapy.¹² Subjects who received >350 sessions should be reassessed on the risk and benefit of continue phototherapy.

In our centre, all patients with different skin types were initiated with a low dose NB-UVB of 150m J/cm². This was followed by a 20% increment during subsequent treatments if subjects tolerate the previous dose. Parlak *et al.* did a study on the different regimes of NB-UVB phototherapy treatments.¹³ Group 1 subjects were started with 50% of the minimal erythema dose followed by 20% increment in the next sessions as practised in our center, while group 2 subjects were given the starting dose and dose increment based on the skin types and applied with fixed doses. They concluded that there was no significant difference in terms of cumulative dose, side effect profiles, and improvement in PASI score between the 2 groups.

Among 45 of the subjects with complete data, 75.6% of them tolerate NB-UVB without significant side effects, while 17.8% of them experienced burning sensation after phototherapy, and 4.4% of them complained of pruritus. Most of the side effects resolved with time or after dosage adjustment. One (2.2%) of the subjects documented flare of underlying psoriasis and phototherapy. However, the patient had only received 4 sessions of NB-UVB phototherapy with a cumulative dose of 896m J/cm², which is less likely the cause of flare in this

case. Two (4.4%) of them stopped the NB-UVB phototherapy and opted for other systemic therapy as they couldn't tolerate the phototherapy due to the burning sensation.

Our study revealed lower rate of side effects from NB-UVB phototherapy compared to Vaani *et al.*, who reported a 30% rate of adverse reactions. On the other hand, their study reported that 17% and 14% of the subjects reported pruritus and erythema, respectively. In our study population, commonest side effects reported were burning sensation (17.8%) followed by pruritus (4.4%). These data may be underreported as there was no standard protocol to report any adverse reaction to NB-UVB treatment and the data was taken from documentation in clinical record and phototherapy folders and subjected to bias.

Conclusion

Our study concluded that NB-UVB phototherapy is underutilised at least in our centre. Psoriasis subjects with a moderate disease or failed topical treatments should be offered phototherapy if transportation is not an issue before we add in other systemic treatments which bring more side effects or biologic treatments which are costly. Lastly, well-designed prospective studies in the future on the effectiveness of NB-UVB phototherapy and their common side effects will give a clearer picture of the NB-UVB phototherapy treatment in different cutaneous diseases and to identify the factors affecting the utilisation of NB-UVB in our centre.

Conflict of Interest Declaration

The authors have no conflict of interest to declare.

Acknowledgement

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