



Brief Report

Therapy Utilization among Children with Vitiligo at an Urban Tertiary Care Center

Sneha Rangu¹, Paige L McKenzie^{1,2} and Leslie Castelo-Soccio^{1,3*}

¹Section of Dermatology, Children's Hospital of Philadelphia, Philadelphia, PA, USA

²University of Texas Southwestern Medical Center, Dallas, TX, USA

³Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA

Abstract

Vitiligo is a skin disorder characterized by depigmentation, and 25% of children develop symptoms by age 10. Children with vitiligo have suffered from social isolation and bullying, and thus many seek treatment for re-pigmentation. However, there is limited data on the use of therapies in pediatric vitiligo patients. To address this knowledge gap, we performed a retrospective chart review of 360 patients who were diagnosed with vitiligo under the age of 18 at The Children's Hospital of Philadelphia. The average age was 10.8 years; average age at diagnosis was 6.21 years. The median household income by zip code was \$78,660. Majority were insured by private insurance (53.9%); 44.2% had Medicaid and 1.9% had no information on insurance coverage. Most subjects used topical steroids (55.6%) and/or topical pimecrolimus (58.9%); only a small proportion (17.2%) received light therapy in clinic or at home. Although vitiligo has been shown to affect patients of color more negatively, of those using Home-Based Phototherapy (HBPT) (13), 8 were self-described Caucasian. Twelve out of the 13 had private insurance and the median household income was \$105,080 for those using HBPT. Our results indicate that certain groups of patients, such as children of color, those without private insurance, and those from lower-income areas, may not have equal access to the most cost-effective vitiligo therapies. These findings support the need for

*Corresponding author: Leslie Castelo-Soccio, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA, Tel: +1 2155902169; E-mail: castelosoccio@email.chop.edu

Citation: Rangu S, McKenzie PL, Castelo-Soccio L (2021) Therapy Utilization among Children with Vitiligo at an Urban Tertiary Care Center J Clin Dermatol Ther 7: 070.

Received: March 20, 2021; Accepted: March 25, 2021; Published: March 31, 2021

Copyright: © 2021 Rangu S, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

creation of educational resources and strategies to ensure access to cost-effective vitiligo treatments for patients from all backgrounds.

Keywords: Children; Pediatric dermatology; Vitiligo; Vitiligo therapy

Introduction

Vitiligo is estimated to affect as many as 5 million people in the United States (U.S.), and prevalence rates around the world vary from 0.5%-2% [1]. It is known that vitiligo causes psychological distress in affected patients and can negatively impact Quality of Life (QoL) due to its stigmatizing nature [2].

Despite its worldwide prevalence no curative therapies currently exist [3,4]. Two common treatments include institution-based Phototherapy (PT) and Home-Based Phototherapy (HBPT). Unfortunately, there are many insurance coverage barriers for institution-based PT, and insurance approval for HBPT can pose its own challenges. According to a 2010 analysis, the Out-of-Pocket (OOP) cost of HBPT devices without insurance coverage varied between \$2,180 and \$7,000 depending on the size and model [5]. This high OOP cost is particularly relevant considering HBPT is much less costly long-term than biologic treatment and frequent institution-based PT visits. In a 2011 study, 43% of patients with a HBPT prescription did not purchase a device; 73% of these cases were due to high OOP expenses [6]. A 2004 study found that the estimated annual direct cost of treating vitiligo, including visits to clinicians, hospital appointments and prescriptions, was \$175,000,000 [7]. As a result, the cost-effectiveness of vitiligo therapies has been questioned [8].

Given the high costs of and barriers to obtaining therapy for vitiligo, our goal was to define the utilization of therapies among children with vitiligo at a large urban tertiary care center. We aimed to identify differences in therapy utilization among different subpopulations within this cohort.

Methods

After obtaining Institutional Review Board approval (IRB#20-018073), we reviewed the records of patients treated at the Children's Hospital of Philadelphia (CHOP) Dermatology practice from 5/01/2010-6/01/2020. Subjects were included if they were diagnosed with vitiligo under the age of 18 years.

Age, gender, self-described race/ethnic background, zip code of primary residential address, past medical history (history of autoimmune diseases and atopic dermatitis), family history of vitiligo, family history of other autoimmune diseases and hypothyroidism, age at first presentation of vitiligo, and treatment type were abstracted. Median household income was obtained by zip code through data from the U.S. Census Bureau in 2019 [9].

Baseline and demographic characteristics were summarized by standard descriptive methods (e.g. means and standard deviations for continuous variables such as age, and numbers with percentages for categorical variables such as gender).

Results

Our study identified 360 children that met inclusion criteria. Average age was 10.8 years and average age at diagnosis was 6.21 years; 41.9% were males, and 58.1% were females. Forty percent were Caucasian and 83.3% identified as non-Hispanic/LatinX. Location of vitiligo was as follows: head/face/neck/scalp (215, 59.7%), trunk (159, 44.2%), arms (not including hands) (123, 34.2%), hands (52, 14.4%), legs/feet/toes (175, 48.6%), and genitalia (92, 25.6%). Fitzpatrick skin phototype varied from Type I to Type VI (Table 1).

Characteristic	Value
Sex assigned at birth, n (%)	
Male	151 (41.9%)
Female	209 (58.1%)
Age, mean (range)	10.8 (2-17)
Age at diagnosis, mean (range)	6.21 (1-17)
Race, n (%)	
American Indian or Alaska Native	0 (0%)
Asian	21 (5.8%)
Black or African American	88 (24.4%)
Indian	24 (6.7%)
Native Hawaiian or Other Pacific Islander	1 (0.3%)
White/Caucasian	144 (40.0%)
Other	77 (21.4%)
Refused	5 (1.4%)
Ethnicity, n (%)	
Hispanic or Latino	55 (15.3%)
Non-Hispanic or Latino	300 (83.3%)
Unknown/Not reported	5 (1.4%)
Private Insurance, n (%)	
Yes	194 (53.9%)
No (Medicaid)	159 (44.2%)
Not reported/Other	7 (1.9%)
Median Household Income, mean (range)	\$78,660 (\$23,353 - \$218,571)
Location of Vitiligo, n (%)	
Head/face/neck/scalp	215 (59.7%)
Trunk	159 (44.2%)
Arms (not including hands)	123 (34.2%)
Hands	52 (14.4%)
Legs/feet/toes	175 (48.6%)
Genitalia	92 (25.6%)
Fitzpatrick Skin Phototype, n (%)	
Type I	15 (4.2%)
Type II	97 (26.9%)
Type III	78 (21.7%)
Type IV	91 (25.3%)
Type V	68 (18.9%)
Type VI	11 (3.1%)
Relevant PMH, n (%)	
Hypothyroid	7 (1.9%)
Hyperthyroid	1 (0.3%)

Type I diabetes	5 (1.4%)
Alopecia areata	13 (3.6%)
Celiac's disease	4 (1.1%)
Psoriasis	5 (1.4%)
Other	64 (17.8%)
None	185 (51.4%)
Family history (FH) of vitiligo or other, n (%)	
Vitiligo - 1st degree relative	Vitiligo - 1st degree relative
Vitiligo - 2nd degree relative	60 (16.7%)
Hypothyroid - 1st degree relative	18 (5.0%)
Hypothyroid - 2nd degree relative	28 (7.8%)
Hyperthyroid - 1st degree relative	2 (0.6%)
Hyperthyroid - 2nd degree relative	6 (1.7%)
Thyroid disease - 1st degree relative	12 (3.3%)
Thyroid disease - 2nd degree relative	32 (8.9%)
Hashimoto's thyroiditis - 1st degree relative	7 (1.9%)
Hashimoto's thyroiditis - 2nd degree relative	2 (0.6%)
Grave's disease - 1st degree relative	1 (0.3%)
Grave's disease - 2nd degree relative	1 (0.3%)
Type I diabetes - 1st degree relative	4 (1.1%)
Type I diabetes - 2nd degree relative	6 (1.7%)
Alopecia areata - 1st degree relative	4 (1.1%)
Alopecia areata - 2nd degree relative	1 (0.3%)
Celiac's disease - 1st degree relative	2 (0.6%)
Celiac's disease - 2nd degree relative	1 (0.3%)
Psoriasis - 1st degree relative	9 (2.5%)
Psoriasis - 2nd degree relative	3 (0.8%)
Psoriatic arthritis - 1st degree relative	1 (0.3%)
Psoriatic arthritis - 2nd degree relative	1 (0.3%)
Rheumatoid arthritis - 1st degree relative	0 (0%)
Rheumatoid arthritis - 2nd degree relative	8 (2.2%)
Other	56 (15.6%)
None	173 (48.1%)

Table 1: Demographics (N=360).

A high percentage (32.5%) of cases also had a history of atopic dermatitis, while a small percentage had hypothyroidism (1.9%), hyperthyroidism (0.3%), T1DM (1.4%), alopecia areata (3.6%), Celiac disease (1.1%), and psoriasis (1.4%) (Table 1). A FH of vitiligo, thyroid condition or other autoimmune diseases were found in 51.9% (Table 1). Twenty-eight (7.8%) subjects had a 1st degree relative with vitiligo and 60 (16.7%) subjects had a 2nd degree relative with vitiligo (Table 1).

The median household income by zip code was \$78,660 (range: \$23,353 - \$218,570). One hundred and ninety-four subjects had private insurance (53.9%), 159 (44.2%) had Medicaid, and 7 (1.9%) had no information regarding insurance coverage available (Table 1).

Thirteen (3.6%) used narrow-band ultraviolet light B, 45 (12.5%) used excimer laser (XTRAC) in clinic, 13 (3.6%) used HBPT, 1 (0.3%) used psoralen plus ultraviolet light A, 200 (55.6%) used topical steroids, 35 (9.7%) used topical pimecrolimus, 212 (58.9%) used topical tacrolimus, and 4 (1.1%) used other treatments. Sixty (16.7%) elected for no therapy (Table 2).

Characteristic	Value
Therapy, n (%)	
nbUVB (Narrow-band ultraviolet light B), in clinic	13 (3.6%)
Excimer laser (XTRAC), in-clinic	45 (12.5%)
Home based phototherapy	13 (3.6%)
PUVA (Psoralen plus ultraviolet light A)	1 (0.3%)
Topical steroids	200 (55.6%)
Pimecrolimus	35 (9.7%)
Tacrolimus	212 (58.9%)
None	60 (16.7%)
Other	Other

Table 2: Treatments (N=360).

Discussion

Our study had a higher median household income of \$78,660 compared to the median household income of \$68,703 in the United States in 2019 [10]. In an online survey study, results showed that treatment cost, relationships, and work schedule may be barriers to receiving care for vitiligo [11]. As household income is affected by relationships and work schedules, parental income may play an integral role in treatment compliance for vitiligo pediatric patients.

Only a small proportion of our population, 62 (17.2%) used light based therapies at home or in the clinic. Of the 62, 40 had private insurance and 22 were enrolled in Medicaid. The median household income for this subpopulation was \$89,790, which was higher than the median income of our overall cohort. Light therapy in a clinic or hospital requires frequent visits to the doctor, which may pose a financial and time burden for families. Additionally, 48/62 (77.4%) were described as Skin Type III-IV, suggesting that those with darker skin tones may be more likely to undergo light therapy in clinic or at home.

Despite being more convenient, effective, and cost-efficient overall, only 13 subjects used HBPT. Of these 13 subjects, 12 had private insurance and 1 was enrolled in Medicaid. The median household income for these 13 subjects was \$105,080, which is higher than our overall cohort's income and those using light therapy in general. Many insurances do not cover HBPT and perhaps only those who can afford OOP costs can undergo treatment.

A pilot study found that the cost of phototherapy in the hospital exceeded the cost of home phototherapy after 7 weeks of treatment [12]. Information and support should be provided to patients and families to guide management in the most cost-effective manner as costs for vitiligo treatments can add up in the long-term. The majority of our subjects using HBPT were self-described Caucasian (8, 61.5%). Despite vitiligo patients with darker skin tones having a lower QoL, there may be disparities in HBPT utilization by race [13]. Identifying the strategies by which these barriers can be reduced may allow more pediatric patients to successfully receive treatment for their vitiligo.

Conclusion

Given that only a small percentage of our population utilized HBPT, our study demonstrates a need for increasing access to streamlined care and insurance coverage for those that wish to

obtain HBPT. Patient education programs have shown to improve management of atopic dermatitis in children [14]. Similar education programs may advance the use and understanding of the most cost-effective vitiligo therapies. The high median income for those who used HBPT suggest that targeted efforts should be placed on groups that have limited access to care such as those from low-income neighborhoods. However, our study is limited by its small sample size and retrospective design. We were not able to determine status or severity of disease through retrospective review, given that vitiligo can flare and remit in the time interval between visits. To improve access to treatment for children with vitiligo, prospective longitudinal cross-sectional studies with a larger sample are needed.

References

1. Palit A, Inamadar AC (2012) Childhood vitiligo. *Indian J Dermatol Venereol Leprol* 78: 30-41.
2. Bonotis K, Pantelis K, Karaoulanis S, Katsimaglis C, Papaliaga M, et al. (2016) Investigation of factors associated with health-related quality of life and psychological distress in vitiligo. *J Dtsch Dermatol Ges* 14: 45-49.
3. Alikhan A, Felsten LM, Daly M, Petronic-Rosic V (2011) Vitiligo: a comprehensive overview Part I. Introduction, epidemiology, quality of life, diagnosis, differential diagnosis, associations, histopathology, etiology, and work-up. *J Am Acad Dermatol* 65: 473-491.
4. Vitiligo Support International. Frequently asked questions. (<https://www.vitiligosupport.org/faq.cfm>)
5. Yentzer BA, Yelverton CB, Simpson GL, Simpson JF, Hwang W, et al. (2009) Paradoxical effects of cost reduction measures in managed care systems for treatment of severe psoriasis. *Dermatol Online J* 15: 1.
6. Yentzer BA, Feldman SR (2011) Trends in home phototherapy adoption in the US: monetary disincentives are only the tip of the iceberg. *J Dermatolog Treat* 22: 27-30.
7. Bickers DR, Lim HW, Margolis D, Weinstock MA, Goodman C, et al. (2006) American Academy of Dermatology Association; Society for Investigative Dermatology. The burden of skin diseases: 2004 a joint project of the American Academy of Dermatology Association and the Society for Investigative Dermatology. *J Am Acad Dermatol* 55: 490-500.
8. McManus E, Sach T, Levell NJ (2018) Are vitiligo treatments cost-effective? A systematic review. *Br J Dermatol* 178: 57-58.
9. United States Census Bureau (2019) Income in the past 12 months (in 2019 inflation-adjusted dollars). United States Census Bureau, Maryland, USA.
10. United States Census Bureau (2020) Income and Poverty in the United States: 2019. United States Census Bureau, Maryland, USA.
11. Chen T, Grau C, Suprun M, Silverberg NB (2016) Vitiligo patients experience barriers in accessing care. *Cutis* 98: 385-388.
12. Liu B, Sun Y, Song J, Wu Z (2020) Home vs hospital narrowband UVB treatment by a hand-held unit for new-onset vitiligo: A pilot randomized controlled study. *Photodermatol Photoimmunol Photomed* 36: 14-20.
13. Amer AA, Gao XH (2016) Quality of life in patients with vitiligo: an analysis of the dermatology life quality index outcome over the past two decades. *Int J Dermatol* 55: 608-614.
14. Zhao M, Liang Y, Shen C, Wang Y, Ma L, et al. (2020) Patient Education Programs in Pediatric Atopic Dermatitis: A Systematic Review of Randomized Controlled Trials and Meta-Analysis. *Dermatol Ther (Heidelb)* 10: 449-464.



- Advances In Industrial Biotechnology | ISSN: 2639-5665
- Advances In Microbiology Research | ISSN: 2689-694X
- Archives Of Surgery And Surgical Education | ISSN: 2689-3126
- Archives Of Urology
- Archives Of Zoological Studies | ISSN: 2640-7779
- Current Trends Medical And Biological Engineering
- International Journal Of Case Reports And Therapeutic Studies | ISSN: 2689-310X
- Journal Of Addiction & Addictive Disorders | ISSN: 2578-7276
- Journal Of Agronomy & Agricultural Science | ISSN: 2689-8292
- Journal Of AIDS Clinical Research & STDs | ISSN: 2572-7370
- Journal Of Alcoholism Drug Abuse & Substance Dependence | ISSN: 2572-9594
- Journal Of Allergy Disorders & Therapy | ISSN: 2470-749X
- Journal Of Alternative Complementary & Integrative Medicine | ISSN: 2470-7562
- Journal Of Alzheimers & Neurodegenerative Diseases | ISSN: 2572-9608
- Journal Of Anesthesia & Clinical Care | ISSN: 2378-8879
- Journal Of Angiology & Vascular Surgery | ISSN: 2572-7397
- Journal Of Animal Research & Veterinary Science | ISSN: 2639-3751
- Journal Of Aquaculture & Fisheries | ISSN: 2576-5523
- Journal Of Atmospheric & Earth Sciences | ISSN: 2689-8780
- Journal Of Biotech Research & Biochemistry
- Journal Of Brain & Neuroscience Research
- Journal Of Cancer Biology & Treatment | ISSN: 2470-7546
- Journal Of Cardiology Study & Research | ISSN: 2640-768X
- Journal Of Cell Biology & Cell Metabolism | ISSN: 2381-1943
- Journal Of Clinical Dermatology & Therapy | ISSN: 2378-8771
- Journal Of Clinical Immunology & Immunotherapy | ISSN: 2378-8844
- Journal Of Clinical Studies & Medical Case Reports | ISSN: 2378-8801
- Journal Of Community Medicine & Public Health Care | ISSN: 2381-1978
- Journal Of Cytology & Tissue Biology | ISSN: 2378-9107
- Journal Of Dairy Research & Technology | ISSN: 2688-9315
- Journal Of Dentistry Oral Health & Cosmesis | ISSN: 2473-6783
- Journal Of Diabetes & Metabolic Disorders | ISSN: 2381-201X
- Journal Of Emergency Medicine Trauma & Surgical Care | ISSN: 2378-8798
- Journal Of Environmental Science Current Research | ISSN: 2643-5020
- Journal Of Food Science & Nutrition | ISSN: 2470-1076
- Journal Of Forensic Legal & Investigative Sciences | ISSN: 2473-733X
- Journal Of Gastroenterology & Hepatology Research | ISSN: 2574-2566
- Journal Of Genetics & Genomic Sciences | ISSN: 2574-2485
- Journal Of Gerontology & Geriatric Medicine | ISSN: 2381-8662
- Journal Of Hematology Blood Transfusion & Disorders | ISSN: 2572-2999
- Journal Of Hospice & Palliative Medical Care
- Journal Of Human Endocrinology | ISSN: 2572-9640
- Journal Of Infectious & Non Infectious Diseases | ISSN: 2381-8654
- Journal Of Internal Medicine & Primary Healthcare | ISSN: 2574-2493
- Journal Of Light & Laser Current Trends
- Journal Of Medicine Study & Research | ISSN: 2639-5657
- Journal Of Modern Chemical Sciences
- Journal Of Nanotechnology Nanomedicine & Nanobiotechnology | ISSN: 2381-2044
- Journal Of Neonatology & Clinical Pediatrics | ISSN: 2378-878X
- Journal Of Nephrology & Renal Therapy | ISSN: 2473-7313
- Journal Of Non Invasive Vascular Investigation | ISSN: 2572-7400
- Journal Of Nuclear Medicine Radiology & Radiation Therapy | ISSN: 2572-7419
- Journal Of Obesity & Weight Loss | ISSN: 2473-7372
- Journal Of Ophthalmology & Clinical Research | ISSN: 2378-8887
- Journal Of Orthopedic Research & Physiotherapy | ISSN: 2381-2052
- Journal Of Otolaryngology Head & Neck Surgery | ISSN: 2573-010X
- Journal Of Pathology Clinical & Medical Research
- Journal Of Pharmacology Pharmaceutics & Pharmacovigilance | ISSN: 2639-5649
- Journal Of Physical Medicine Rehabilitation & Disabilities | ISSN: 2381-8670
- Journal Of Plant Science Current Research | ISSN: 2639-3743
- Journal Of Practical & Professional Nursing | ISSN: 2639-5681
- Journal Of Protein Research & Bioinformatics
- Journal Of Psychiatry Depression & Anxiety | ISSN: 2573-0150
- Journal Of Pulmonary Medicine & Respiratory Research | ISSN: 2573-0177
- Journal Of Reproductive Medicine Gynaecology & Obstetrics | ISSN: 2574-2574
- Journal Of Stem Cells Research Development & Therapy | ISSN: 2381-2060
- Journal Of Surgery Current Trends & Innovations | ISSN: 2578-7284
- Journal Of Toxicology Current Research | ISSN: 2639-3735
- Journal Of Translational Science And Research
- Journal Of Vaccines Research & Vaccination | ISSN: 2573-0193
- Journal Of Virology & Antivirals
- Sports Medicine And Injury Care Journal | ISSN: 2689-8829
- Trends In Anatomy & Physiology | ISSN: 2640-7752

Submit Your Manuscript: <https://www.heraldopenaccess.us/submit-manuscript>