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ORIGINAL ARTICLE

Prescribing Pattern of Vitamins in Dermatologic Disorders at Tertiary Care Teaching Hospital in Western India

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Abstract

Skin ailments are a major burden in society. It is thought that Vitamins may help in improving skin health and appearance, but their deficiency may cause disease. The data regarding vitamin usage patterns in dermatologic practice in India is lacking. Therefore, the present study has been planned to analyze the prescribing pattern of vitamins. A cross-sectional, observational study was carried out at the outpatient department of dermatology at GCSMCH and RC, Ahmedabad, for 12 months from October 2019 to September 2020. Prescriptions of 500 patients were analyzed for common skin conditions and prescribing patterns. All the data were compiled into Microsoft Office Excel, and a descriptive statistical analysis was conducted. Out of 500 patients, males and females were 226(45%) and 274 (55%), respectively. Most of them had skin appendage-related diseases (28%). Out of the total of 1935 prescribed drugs, 619(31.98%) vitamins were prescribed in 500 patients with an average of 1.23 per prescription, in which the majority of drugs were as fixed-dose combination (FDC). Of 1211 prescribed vitamins, vitamin A was the most commonly prescribed vitamin 197 (39.4%). There is no association between prescribed vitamins and the prevalence of diseases. ($p>0.05$). However, the P-value is highly significant, suggesting an association between prescribed vitamins and different age groups. ($p<0.05$). Skin appendage-related diseases are commonest skin ailments. The use of vitamins in skin conditions is very common, particularly in oral formulations, among which the majority were prescribed as FDCs.

Keywords: Vitamins, Dermatology, Prescribing Pattern

Introduction

Skin is the outermost layer and the body's largest organ that performs various important functions like protecting against pathological organisms, various chemical agents (corrosive, irritating), and physical factors (sunlight, radiation, and mechanical).[1] Because of the body's outermost layer exposes it to injury by various extrinsic factors such as infectious agents, environmental, chemical, and some intrinsic factors such as genetic, metabolic, and immunological reactions.[2] The prevalence of skin disorders is approximately 2% of total Out Patient Department (OPD) consultations worldwide.[3] The Common Dermatological Diseases in India are acne vulgaris, dermatitis, eczema, vitiligo, melasma, psoriasis, urticaria, and infectious diseases.[4]

Nutrition is one of many factors required to maintain skin functions and overall skin

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health.[5, 6] Vitamins play a significant role in skin health by acting as antioxidants, sebum, and keratinization regulator, regulators of collagen synthesis, providing extra-cellular matrix homeostasis and acting as photoprotective, slowing skin aging and protection against the cellular events involved in the development of skin cancer.[6] There are various vitamin-related studies, but using vitamins in dermatology is infrequent, as these are more frequently prescribed in various dermatologic conditions. Therefore, this study aimed to analyze the prescription pattern of vitamins and other related aspects in dermatologic practice.

Methods

This was a single-center, observational, cross-sectional study conducted at the outpatient department (OPD) of Dermatology at GCS Medical College, Hospital and Research center, Ahmadabad, a tertiary care teaching hospital. Prescriptions of patients attending dermatology OPD of a tertiary care teaching hospital, Ahmedabad, were collected randomly by the twice-weekly survey for 12 months from October 2019 to September 2020. Data from 500 patients were collected and analyzed. Patients of all ages and gender that were prescribed vitamins and were willing to give written informed consent were included.

The Institutional Ethics Committee's permission was taken before the initiation of the study. The data obtained from the prescription were sorted and analyzed for demographic characteristics, drug use patterns, and percentage of drugs prescribed as vitamins. All the data were compiled into Microsoft Office Excel 2010 version, and a descriptive statistical analysis was carried out using Statistical Package for the Social Sciences (IBM® SPSS) trial Version 25. Mean, and standard deviation (SD) were used to describe numerical variables, and frequency (%) was used for categorical variables. The Chi-square test was used for the measurement of association. P-value <0.05 was considered statistically significant.

Results and Discussion

In this study, we categorized the patients according to age group, the prevalence of disease according to age group, and gender-wise (as per ICD 10). Frequencies of vitamins were evaluated in different disease classes and different age groups. This type of study entitled prescribing pattern of vitamins in dermatologic diseases is one of the rare studies conducted per our literature search.

The mean age of the patients was 34.07±16.39 years. Nearly half of the patients were aged 21 to 40 years (46.40%). The maximum age of the patients was 95 years, while the minimum was three years for the study population. Out of 500 patients, males and females were 226 (45%) and 274 (55%), respectively. (Table 1)

Diseases were categorized as per ICD–10 criteria. The highest percentage was patients with skin appendage disease (group G, 28%), where 47.85% of them suffered from acne. Moreover, about 26.6% were classified in Group H, where 67.66% of them suffered from pigmentation disorder. The result of our study is in contrast with Sarkar et al.[10] The most common dermatological disorder was Infectious disease (40%), followed by eczema and dermatitis (31%). In classes B, E, and F, approximately 2% of patients were found. (Table 1)

In the present study, acne hair and fall disorders were found in 14% and 12.4 % of the total study population, respectively, as compared to other studies conducted by Pathak et.al 2016[11] where it was 17.95% and 4.12%.

Table 1. Demographic Details of the Study Population

Demographic characteristic	Result N (%)
Gender	
Male	226(45.20)
Female	274(54.80)
Age (Years)	
0-20	113(22.60)
21-40	232(46.40)
41-60	120(24.00)
>60	35(7.00)
Disease distribution	
A-Infectious disease (Pyoderma, candidiasis, scabies, herpes zoster)	58(11.60)
B-Bullous disorder (pemphigus)	22(4.40)
C-Dermatitis and eczema (prurigo, pityriasis alba)	54(10.80)
D-Papulosquamous disease (Psoriasis and lichen planus)	71(14.20)
E-Urticaria and erythema	11(2.20)
F-Radiation related disorder (PMLE)	11(2.20)
G-Skin appendages disease (Acne, hair loss, alopecia areata, keloid)	140(28.00)
H-Other (pigmentation disorder, SLE, insect bite, nutritional deficiency)	133(26.60)

Vitamins use was increased due to the growing cases of dermatological illnesses and rise in research and development activities, shifting consumer preferences, rising health awareness, growing geriatric population, and cosmetic purpose.[9] Out of the total prescribed 1935 drugs, 31.98% was vitamin (619) (Table 2), which was much more as compared with the study of Mate VH et al.2019[13] and Gambre R et al[2] where it was 9% and 6.73%, respectively.

This increased frequency of prescribing vitamins is because we only enrolled patients with at least one vitamin. The majority of vitamins were prescribed as FDCs. (77.1%)

Out of 1935 drugs, only 13.02% were prescribed from the WHO essential medicine list, while 27.18% from the national list of essential medicine and the vitamins were 2.42%, and 8.11%, respectively. (Table 2) The mean value for all drugs per prescription was 3.87±1.46, which was almost similar to the findings of a study by Gambre R et al.[2] This result contrasts with the study of Narwane SPet al.2011[12] where the mean number of drugs prescribed was less (2.70±0.93).

Table 2. Prescription Pattern according to WHO Prescribing Core Indicators

Sr no	Drug use Indicators	Result
1.	The total number of prescriptions analyzed	500
2.	% of drugs prescribed as per WHO EML (2021)	13.02%
3.	% of drugs prescribed as per NLEM (2015)	27.18%
4.	% of drugs prescribed as FDCs	40.41%
5.	% of drugs prescribed with the generic name	9.76%
6.	% of drugs prescribed in injectable form	0.25%
7.	% of anti–microbial prescribed	9.81%
8.	% of vitamins prescribed	31.98%
9	% of vitamins prescribed as per WHO EML	2.42%
10.	% of vitamins prescribed as per NLEM	8.11%

Vitamin A was the most commonly prescribed (n= 197; 39.4%) followed by folic acid (n=176; 35.2%). Our findings compared to another study conducted by H.R. Lieberman et al. 2015 in which vitamin C was prescribed in 18%, followed by vitamin D (7%) and vitamin E (6%), respectively, in the study population. Vitamin B5 and K were the least prescribed.

Overall, oral route was the most commonly prescribed route. Among them, tablets were the most common dosage form, followed by the topical route in which the most common dosage form was creams. Moreover, the parenteral route prescribed certain vitamins like B3, B12, and D. Most vitamins were prescribed as FDCs. Still, specific vitamins were also prescribed as a single drug, like vitamins A, C, and folic acid, higher in number than others. Vitamin B1, B2, B5, B7 K, and E were only prescribed as FDCs. (Table 3)

Drugs other than vitamins were divided into thirteen groups according to their functions. Of all 1935 drugs prescribed, about 10.3% was the moisturizer, followed by the steroid. (10.2%). (Table 4) In our study total of nine different corticosteroids were prescribed in 169 (33.80%) patients, as compared with other studies conducted by Gupta R et al. 2019 and Gambre R et al.[2,21] where it was 41.7%,11.91% respectively.

On the other hand, we did in cost analysis and considered direct per-day cost only. The average cost of prescribed vitamins was INR 15.61±14.35, and for other concomitant drugs was INR 34.88 ± 27.30. (Table 5).

In disease class H (378), higher numbers of vitamins were prescribed, followed by class G (n= 246), while in F, the least numbers were prescribed. (Figure 1) Vitamin A was the most commonly prescribed vitamin in disease class G (commonly for acne) and H (commonly for pigmentary disease). It may be due to vitamin A having the function of reducing acne form eruption and has an antioxidant action so it has a role in pigmentary disease.[14,15] Vitamin D was most commonly prescribed in class D (psoriasis) because it has a function of an immunomodulator.[18,19]

Table 3. Analysis of Different Vitamins Prescribed (1)

Name of Vitamins	Present in No. (%) of prescription [n=500]	Prescribed as a Single drug No. (%)	Prescribed as FDCs No. (%)	Route with a Dosage form	No. (%)
Vitamin A	197 (39.4)	68(34.51)	129(65.48)	**Oral**	152 (77)
				Capsule	92 (60)
				Tablets	51(34)
				Syrup	9(6)
				Topical	45(23)
				Cream	40(89)
				Gel	5(11)
Vitamin B1	58(11.6)	0	58(100)	**Oral**	58 (100)
				Capsule	6 (10.3)
				Tablets	43(74.1)
				Syrup	9 (15.5)
Vitamin B2	58(11.6)	0	58(100)	**Oral**	58 (100)
				Capsule	6 (10.3)
				Tablets	43(74.1)
				Syrup	9 (15.5)
Vitamin B3	79 (15.8)	4(5.06)	75(94.93)	**Oral**	62 (78.4)
				Capsule	6 (9.6)
				Tablets	47(75.8)
				Syrup	9(14.5)
				Topical	13(16.4)
				Cream	11(84.6)
				Gel	2(15.8)
				Parenteral	4(5)
				IM injection	4(100)

Table 3. Analysis of Different Vitamins Prescribed (2)

Name of Vitamins	Present in No. (%) of prescription [n=500]	Prescribed as a Single drug No. (%)	Prescribed as FDCs No. (%)	Route with a Dosage form	No. (%)
Vitamin B5	44(8.8)	0	44(100)	**Oral**	33 (75)
				Tablets	24(74.1)
				Syrup	9 (15.5)
				Topical	11(25)
				Face wash	11(100)
Vitamin B6	59(11.8)	1(1.69)	58(98.3)	**Oral**	59 (100)
				Capsule	6 (10.1)
				Tablets	44(74.5)
				Syrup	9 (15.2)
Vitamin B7	111(22.20)	0	111(100)	**Oral**	111 (100)
				Capsule	6 (5.4)
				Tablets	105(94.5)
Vitamin B12	86 (17.2)	7(8.13)	79(91.8)	**Oral**	82 (95.3)
				Capsule	6 (7.3)
				Tablets	67(81.7)
				Syrup	9(10.9)
				Parenteral	4(4.6)
				IM injection	4(100)
Folic acid	176 (35.2)	48(27.27)	128(72.3)	**Oral**	172 (97.7)
				Capsule	6 (3.4)
				Tablets	166(96.5)
				Parenteral	4(2.2)
				IM injection	4(100)

Table 3. Analysis of Different Vitamins Prescribed (3)

Name of Vitamins	Present in No. (%) of prescription [n=500]	Prescribed as a Single drug No. (%)	Prescribed as FDCs No. (%)	Route with a Dosage form	No. (%)
Vitamin C	83 (16.6)	23(27.71)	56(72.2)	**Oral**	82 (99)
				Capsule	6 (7.3)
				Tablets	76(92.6)
				Parenteral	1(1)
				IM injection	1(100)
Vitamin D	103(20.6)	2(1.94)	101(98.09)	**Oral**	94 (91.2)
				Capsule	2 (2.12)
				Tablets	83(88.29)
				Syrup	9(9.5)
				Topical	8(7.7)
				Ointment	6(75)
				Gel	2(25)
				Parenteral	1(0.9)
				Intralesional	1(100)
Vitamin K	9 (1.80)	0	9(100)	**Topical**	9 (100)
				Cream	1 (11)
				Tincture	8(88.8)
Vitamin E	137 (27.4)	0	137(100)	**Oral**	62 (45.2)
				Tablets	53(85.4)
				Syrup	9(14.5)
				Topical	75(54.7)
				Cream	44(58.6)
				Gel	20(26.6)
				Face wash	11(14.6)

Vitamins C and E were commonly prescribed in disease class H because of their antioxidant action.[16,17]Among all prescribed vitamin B complex, B7 was most commonly prescribed in disease class G (hair related disorder) because it causes hair growth and reduces hair fall.[15] (Figure 1). Statistically, there is no association between prescribed vitamins and the prevalence of diseases. ($p>0.05$)

In the present study, a higher number of vitamins was prescribed in the age group of 0-20 and 21-40 years compared to others. (Figure 2). Vitamin D was most commonly prescribed in the age group 41-60 years because psoriasis is the most prevalent skin disorder in this group.[20] Among vitamin B complex, B7 was most commonly prescribed in age groups 0-20 and 21-40 years because in this group hair related disorders are much more and B7 has a role in hair growth and reducing hair fall. The p-value is highly significant, suggesting an association between prescribed vitamins (other than B-complex) and different age groups. ($p<0.05$)

This study is important in various aspects It is important to frame our results in terms of limitations. First, although the number of patients enrolled was relatively sufficient, a larger study population is needed for a better idea of disease epidemiology and prescription pattern. Second, it is a single-center study in a tertiary care teaching hospital which may not reflect the scenario at other healthcare facilities. Third, as this was a cross-sectional study, we did not follow up with patients, so long-term adverse effects and toxicity due to the overdose of supplements might have been missed. Fourth, as very few children and adolescents attended dermatologic OPD during our study period, fewer data were available in this age group we could not be generalized our findings. In the future, the study should be conducted at various dermatologic centers, including many children and adolescents.

Conclusion

We conclude from the present study that, acne, hair related, infectious, and pigmentary disorders were the commonest dermatologic ailment in which vitamins are used. Vitamins were most frequently prescribed drugs by various routes, majorities by fixed-dose combinations, while moisturizers and steroids were the most commonly used concomitant drugs. Prescriptions encountered with injections, by their generic name and present in the essential list of medicines, were fewer, which may not be an encouraging sign. In our study, though polypharmacy was found in the majority of prescriptions, in most of the cases, it was unavoidable and justifiable, as per our knowledge, but the risk of adverse reactions and drug-drug interactions couldn't be ignored.

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None

Conflict of Interest

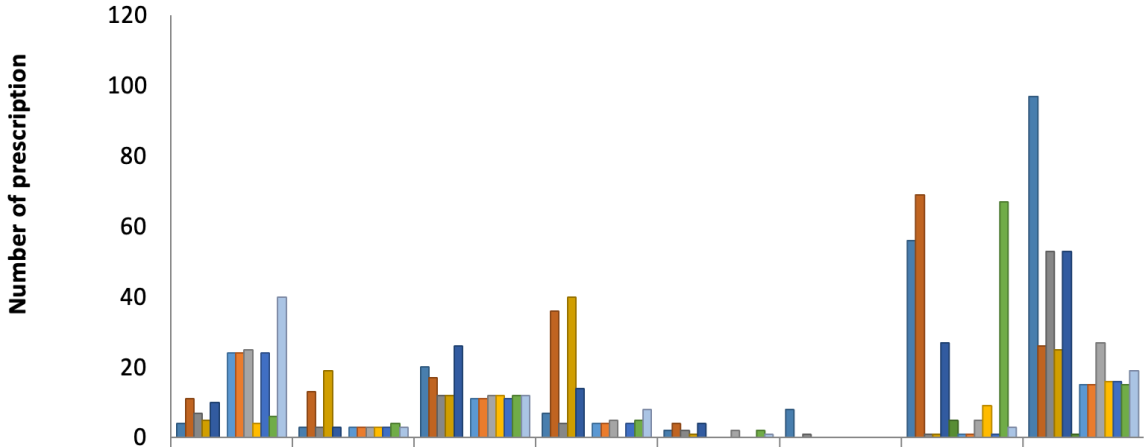
None

Table 4. Frequency of Drugs Prescribed other than Vitamins

Class of drug	Number of prescriptions have this class (500)	% of prescriptions contain this class	Total number of drugs prescribed in the class	% of total prescribed drugs)
Moisturizer	188	37.60	201	10.38
Corticosteroids	169	33.80	198	10.23
Antihistamines	186	37.20	196	10.12
Immunomodulators	106	21.20	120	6.20
Antibiotics	83	16.60	110	5.68
Miscellaneous	112	22.4	112	5.78
Anti-acne	89	17.8	89	4.59
Anti-fungal	50	10	67	3.46
Antacid	63	12.6	63	3.25
Anti-hypertensive	56	11.2	56	2.89
Analgesic	44	8.8	44	2.27
Depigmentation	26	5.20	26	1.30
Anti-viral	13	2.60	13	0.67

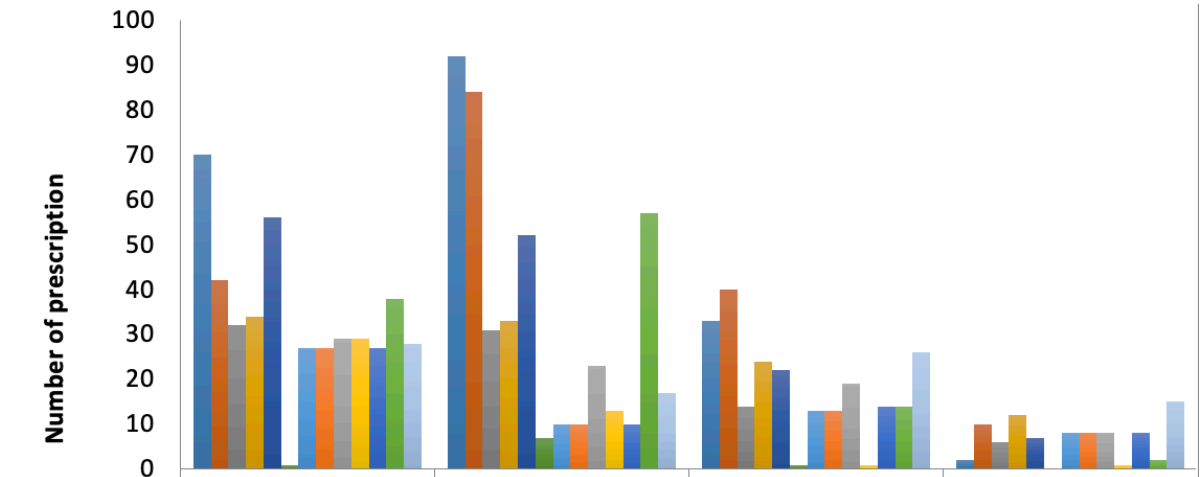
Table 5. Cost Analysis of the Prescription among the Study Participants

Cost of Variable	Result (INR)
1. Total cost/prescription (Mean ± SD)	50.66±29.66
2. Vitamins/prescription (Mean ± SD)	15.61±14.35
3. Concomitant medicine cost/prescription (Mean ± SD)	34.88 ± 27.30



	A	B	C	D	E	F	G	H
Vitamin A	4	3	20	7	2	8	56	97
Folic acid	11	13	17	36	4	0	69	26
Vitamin C	7	3	12	4	2	1	1	53
Vitamin D	5	19	12	40	1	0	1	25
Vitamin E	10	3	26	14	4	0	27	53
Vitamin K	0	0	0	0	0	0	5	1
Vitamin B1	24	3	11	4	0	0	1	15
Vitamin B2	24	3	11	4	0	0	1	15
Vitamin B3	25	3	12	5	2	0	5	27
Vitamin B5	4	3	12	0	0	0	9	16
Vitamin B6	24	3	11	4	0	0	1	16
Vitamin B7	6	4	12	5	2	0	67	15
Vitamin B12	40	3	12	8	1	0	3	19

Figure 1. Frequency of Vitamins Prescribed in Different Disease Classes



	0-20	21-40	41-60	>60
Vitamin A	70	92	33	2
Folic acid	42	84	40	10
Vitamin C	32	31	14	6
Vitamin D	34	33	24	12
Vitamin E	56	52	22	7
Vitamin K	1	7	1	0
Vitamin B1	27	10	13	8
Vitamin B2	27	10	13	8
Vitamin B3	29	23	19	8
Vitamin B5	29	13	1	1
Vitamin B6	27	10	14	8
Vitamin B7	38	57	14	2
Vitamin B12	28	17	26	15

Figure 2. Age-wise Distribution of Prescribed Different Vitamins

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