Dermatology 2.0- How the Internet is Changing us, our Patients and our Practice

Abstract

The internet, in a short span of time relative to the history of modern medicine, has changed us doctors, our patients and our practice. This article reviews these changes and how they have occurred. The write- up was conceptualized after the authors started noticing subtle and overt differences in the consultation and treatment paths of patients who were internet savvy vs. those who were internet naïve. A survey was conducted in the clinic to understand the behavioral changes brought about by the internet among patients of clinical as well as aesthetic dermatology. It must be remembered that these changes are completely new to the practice of dermatology; even small numbers of positive replies are noteworthy. The Covid 19 pandemic has made teledermatology a requisite of the time, rather than an option. Our dependence on technology has never before been so profound. As modern-day dermatologists, we need to be updated about the interactions of dermatology and technology. We must constantly try to optimize the benefits of the internet and minimize its pitfalls. Needless to say, most of the facts mentioned here have been gleaned from the internet itself, from a wide range of sources including but not limited to medical journals, books, news reports, commercial websites and magazines.

Keywords: *Behavior modification, dermatology, internet*

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"Any symptoms of skin rash or mild pain or anything happens to the body, I quickly google it out…I keep searching about it… it is flooded with unnecessary information which leads to anxiety and depression… there is a strong urge now and then to go to the doctor"

Words of a 37-year-old male patient who is a self-confessed cyberchondriac.

Introduction

The internet is now ubiquitous. Its incorporation in daily life is the new normal. At nearly 700 million, India is next only to China in terms of the number of users.[1] In the pre-internet era, the only sources of health care information were doctors, print media, radio, or television. Rapid spread of internet has placed an unprecedented amount of health information within reach of the general population. The internet is broadly used for information, communication, social media, and e-commerce, all of which can influence the practice of dermatology.

The visual nature of dermatology makes it unique among medical fields. It lends itself easily not only to telemedicine but also to self-diagnosis. It is not rare to have a patient who has googled her symptoms, self-diagnosed her ailment, and tried a few remedies herself before seeking a dermatologist's appointment. After a consultation, she may use the internet to verify the doctor's advice. In order to understand the behavioral changes brought about by internet use by our patients, we conducted a questionnaire-based survey in our private establishment located in a tier 2 city in India.

Survey

The questionnaire [Table 1] was designed by the authors after noting subtle and overt differences in the consultation and treatment path of internet savvy vs. internet naïve patients. Similar articles for use of the internet for health care were referred to. Clinical and aesthetic dermatology patients visiting our clinic in February 2020 were asked if they browsed the internet for skin

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Table 1: Questionnaire for behavioral changes after internet use among dermatology patients with responses and results of binomial test

Question	Response*		Two-tail
	Yes	No	P
1. Have you tried any self-treatment, remedies or products suggested online for your skin?	41	59	0.08
2. Have you been worried about your symptoms after looking them up online?	47	53	0.61
3. Have you deferred/avoided going to your doctor because of an online search? (does not include online consultation)	12	88	<0.0001
4. Have you ever rushed to your doctor because your online search frightened you?	25	75	<0.0001
5. Have you asked questions to your doctor about your condition or its treatment based on your online search?	44	56	0.27
6. Have you changed/avoided certain treatments after looking up their side effects online?	41	59	0.08
7. Have you asked about or demanded for a certain treatment from your dermatologist because your online search gave a favorable review to it?	16	84	<0.0001
8. Do you check for authenticity of medical information when you read it? E.g., If it comes from a reliable website or a qualified medical practitioner	68	32	0.0004
9. Do you buy online skin products based on online reviews or suggestions?	35	65	0.0035
10. Have you suffered any side effects from any online advice/products or remedies which may include home remedies or general advice?	15	85	<0.0001

*Sample size is 100 so each value is also in %

or hair-related health care information and if they were willing to fill a questionnaire about their usage while in our waiting room. To safeguard privacy, according to the declaration of Helsinki, the patients were not required to disclose their identity on the form and were to put it in an enclosed folder. A total of 100 such forms were filled by convenience sampling. All questions were in a Yes/No format. Our respondents cannot be considered as representative of the population in general but that of urban Indian patients visiting a dermatologist who use the internet for health care information.

The demographics of the survey are presented in Figure 1, and the survey results are presented in Table 1. A binomial test was performed on the survey questions. Chi-square test was performed to examine the relationship between gender and other demographics, and to examine the influence of demographic parameters on each question. A significance level of $P < 0.05$ was used. [Appendix].

Sixty-nine percent of our patients were females, and 81% were under 40 years of age. Forty one percent of patients, significantly more females than males, were using remedies or products suggested online, χ^2 (1, N = 100) = 6.30, $P = 0.01$. Females were also more likely to buy products based on reviews, χ^2 (1, N = 100) = 9.64, $P = 0.001$. Time spent online did not differ by gender, χ^2 (1, N = 100) = 0.38, $P = 0.53$. Patients who spent longer than an hour on the internet daily apart from work were more likely to worry about their symptoms χ^2 (1, N = 100) = 4.83, $P = 0.02$. The internet influenced our patients' decision to visit the dermatologist, the products they used, and the treatments they opted for. Time spent online also affected the patients' decision to rush to or defer going to their doctor.

The demographics of this survey not only reflect the patient demographics of our clinic but also the findings of
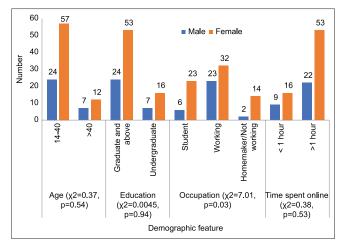

Figure 1: Demographic parameters and correlation with gender

other studies. In both developed and developing countries, people who search for health care information online are more likely to be younger, females, better educated, and have higher incomes.[2,3]

Discussion

Sources of information on the internet may be educational, social, or commercial. Often, it is the internet rather than the dermatologist that is the first source of skin disease related knowledge to patients.[4]

Impact on dermatology patients [Text Box 1]

Doctor, clinic, and hospital ratings may lead a patient to or away from them. Physician-ratings and reviews have an impact on the patient's attitude toward the rated doctor.[5]

Patients can buy medicines and cosmetics online. Online pharmacies offer better pricing, convenience, anonymity, information about drugs and alternatives, medicine reminders, and other services.[6] Compulsive buying and

Text Box 1: Advantages and disadvantages of the internet for the dermatology patient

Advantages	Disadvantages
Easy access to information irrespective of location or time	Difficulty in differentiating reliable from unreliable information
Quick answers to queries	Unfiltered, superfluous or unnecessary information
Free availability	Misinterpretation of symptoms, misinformation about diseases and misguidance about adverse effects
Anonymity	
Enhanced conversation with dermatologist	Undue anxiety, cyberchondria, depression
Detailed knowledge about disease and medication	Self-diagnosis and treatment leading to side effects
Informed choice	Bias
Education, awareness and empowerment	Compulsive shopping or buying of skincare products
Emotional support with blogs and patient support groups	Buying counterfeit or unregulated products
Interaction with other patients	Peer or trend influence, paid influencers
Help in finding dermatologist in locality	Effect on patient- physician relationship
Teledermatology for underserved population and in times of lockdowns	Nocebo like effects,
	Risk of diagnostic errors with teledermatology vs. face to face consults
Online pharmacy	Privacy, surveillance, and security of data

experimentation with skincare and beauty products is becoming commonplace. Chemical peels, energy-based devices, and lasers are available for sale online in our country. There is no limit to what one can purchase on the internet and no screening for who sells or purchases it. Poor quality, counterfeit, or exorbitantly priced products may be supplied.

Mobile applications have been designed for diseases such as eczema to help patients track possible exposures to allergens and seasonal variations. Smart dispensing devices for topicals use mobile app-based analysis of photographs of the patient's face, product preferences, and local environmental conditions to create personalized skin care formulae.

Online information can be dangerous as patients may not be able to discern reliable sources from unreliable ones. E.g., a teenager suffering from acne may search for quick home remedies for pimples online and apply apple cider vinegar or toothpaste on her pimple ending up with a burn.

Web-based information is heavily affected by bias. Search engine optimization, marketing, and advertisements influence the information that reaches the user making it market-driven rather than backed by scientific research. Misleading advertisements use pseudoscientific language to disguise intangible or ineffective benefits, like miracle cures for hair graying or skin lightening. Websites for skincare advice carry links to various products with the aim of selling them. Celebrity influencers and individual narratives can lead to treatment selection bias.[7] People can seek out those whose ideas confirm their own and filter out any ideas that challenge their own.[8] Hence, a patient searching for natural or organic skincare may reinforce her ideas that all synthetic chemicals are harmful simply by selecting to read only those websites that extol natural vs. synthetic products.

In the internet era, becoming a hypochondriac is easy. "Cyberchondria" refers to a clinical phenomenon in which repeated internet searches regarding medical information result in excessive concerns about physical health.[9] A dermatology clinic reported a 46% incidence of health anxiety, which is higher than has been reported for other specialty clinics.[10] Using the internet for health purposes is associated with increased depression probably due to over-attention to health problems.[11] E.g. a patient with an innocuous aphthous ulcer may be unnecessarily anguished to learn that mouth ulcers may be cancerous. Online search by hypochondriacs may lead to dysfunctional health behaviors such as doctor hopping or ordering nonprescribed medicine online.[12]

Preconceived notions developed by internet search can have nocebo-like effects. Having received a prescription for finasteride, a patient who searches for "side effects of finasteride" online reads decreased sex drive and trouble getting or keeping an erection at the top of the list, further increasing the possibility of sexual dysfunction. On the other hand, online reviews may overestimate the benefits of treatments and enable ineffective treatments to maintain a good reputation e.g., microdermabrasion has the least significant results among all modalities for acne scars but maintains high ratings on review websites. Having to explain inaccurate online information can negatively affect patient-physician relationships.[13]

The information available online is unregulated and not subject to the rigorous editing and multiple checks that print or television media has. A lot of fake information goes around simply by sharing on social media. E.g., an article suggesting that readers can turn back the clock on silver strands by applying a once-weekly hair mask made of coconut oil, which "reverses gray hair," and lemon juice, which "prevents premature graying" was shared 5,60,000 times.[14] Websites that promote miracle cures, or sell products through advertisements that are poorly demarcated from content, cannot be considered reliable.

Unlike financial institutions, health care may not have a strong data protection system. Thus, there is always a risk of breach of privacy, confidentiality, and misuse of such data.

Impact on doctors and dermatology practice

For dermatologists, the internet provides a minefield of education in the form of e-learning. Internet is a clinical aid to the dermatologist and can provide diagnostic and management support in real-time for obscure and difficult-to-treat cases.[15] Social media groups and messaging apps allow dermatologists to discuss queries and exchange information. Artificial intelligence tools can be employed for lesion analysis. Internet-enabled lasers or energy-based devices have software that can regularly be updated online.

Web-based health platforms help patients locate and set up appointments with dermatologists in their locality. Clinic management programs manage appointments as well as patient data, inventory, billing, staff salary, etc.

Teledermatology is used as an alternative to face-to-face communication, and its benefits have never before been more evident than in the recent coronavirus pandemic. It is an excellent tool to help underserved areas and cuts the risk of contagion in the time of pandemics. It helps prioritize face-to-face consultation for urgent vs. nonurgent conditions.

Teledermatology is dependent on the patient's ability to share information and good quality photographs. Image quality is dependent on the hardware, software, and speed of the internet connection. Many latest smartphones have "beauty filters" that may make changes to photographs, especially selfies. This is undesirable from a diagnostic point of view, and patients must be instructed to send "unfiltered", unmodified photographs. Examination by palpation and examination of the patient as a whole is not possible and poor-quality images can lead to misdiagnosis.

Conclusion

Online resources offer opportunities and challenges for dermatologists. Educating patients about reliable online resources can ensure that the right information reaches them. They may be referred to educational, government, or health organization websites.

Our survey can be considered a pilot to gain insight into patient behavior modification by the internet. Patients who browse the internet are being influenced in the products they use, their decision to visit their dermatologist, their interaction with the doctor, and their acceptance of treatments recommended. These influences are new to the practice of dermatology and are playing a big role in shaping the future of our specialty.

The fact that the internet has revolutionized the way we practice cannot be denied. It should be a constant endeavor by dermatologists, patients, and service providers to optimize the benefits provided by the internet while minimizing its pitfalls.

Conflicts of interest

There are no conflicts of interest.

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