SKIN

ORIGINAL RESEARCH

Tele-Dermatology Recruitment During COVID-19: An Application of Behavioral Economic Principles

Morgan Chambers, BS[1], Jeffrey Miller, MD, MBA[1], Bruce Brod, MD, MHCI, FAAD[2], Jordan Lim, MB BCh, BAO[1]

[1]Penn State College of Medicine, Hershey, PA
[2] University of Pennsylvania Perelman School of Medicine, Department of Dermatology Philadelphia, PA

ABSTRACT

In the ever-changing state of healthcare during the recent COVID-19 pandemic, our system has innovated rapidly using tele-dermatology in acute and chronic patient management. To combat barriers such as low patient enrollment, behavioral economics theories were implemented. Underlying principles in choice architecture, include choice inertia, the way in which humans favor the status quo; and choice overload, where humans fail to make an optimal choice when presented with multiple options. Using these theories, we modified support-staff scripts in our dermatology clinic used when rescheduling appointments. Our baseline script group allowed for patients to choose from a list of options whereas our improvement script applied behavioral economic principles and used tele-dermatology as the default. This quality improvement initiative was employed with the hypothesis that the "improvement" group would lead to an increase in tele-dermatology enrollment over an 8-week period. Our results showed the odds of patients accepting tele-dermatology were statistically significantly higher among those with Script 2, compared with Script 1. This also demonstrated clinical significance for our institution, showing the effect behavioral economics has on patient enrollment in tele-dermatology, which will serve as an asset during the COVID-19 pandemic and beyond. Limitations include small sample size, single institution, and two behavioral economic strategies were assessed in combination.

INTRODUCTION

Amidst the recent COVID-19 epidemic in the United States (US), our healthcare system innovated rapidly to meet challenges. To provide patient care during this time, we transitioned to the use of tele-dermatology for acute and chronic management. One initial problem we faced was decreased patient uptake. Many potential factors influence patient choice to use tele-dermatology including convenience, technological comfortability, confidence in diagnostic accuracy, and lack of physical contact.[1]

To help overcome these barriers, we designed and implemented an intervention using behavioral economics, which is based on the premise that people predictably behave irrationally, leading to decision errors. Choice architecture, coined by behavioral economists Thaler and Sunstein in 2008, refers to the way choices are presented, ultimately impacting decisions.[2] It involves using techniques to influence consumer choice, such as the use of defaults, similar to the process of organ donation. America and certain countries in Europe require people to "sign-up" for organ donation leading to low participation. In the Netherlands, minimal participation is noted as people must actively

choose to donate. Belgium, by contrast, has a participation rate of 98% as patients must actively opt out.[4]

Other principles of behavioral economics include status quo bias and choice overload. Status quo bias theorizes that humans tend to favor the status quo rather than making a change.[3] In parallel, when a person is faced with multiple options, the complexity of evaluating these options leads to "choice paralysis," a state where no choice or suboptimal choice is made. This can be likened to the many psoriasis medications on the market; in that due to the overload of options, the dermatologist chooses to use a familiar, but less safe and effective medication. Providing fewer choices to the dermatologist is an intervention that might encourage the use of biologics.

We hypothesized that the use of behavioral economic principles in scripted messages by our schedulers over an 8-week period would simplify scheduling options while increasing tele-dermatology uptake by patients when designated as the default option.

Methods

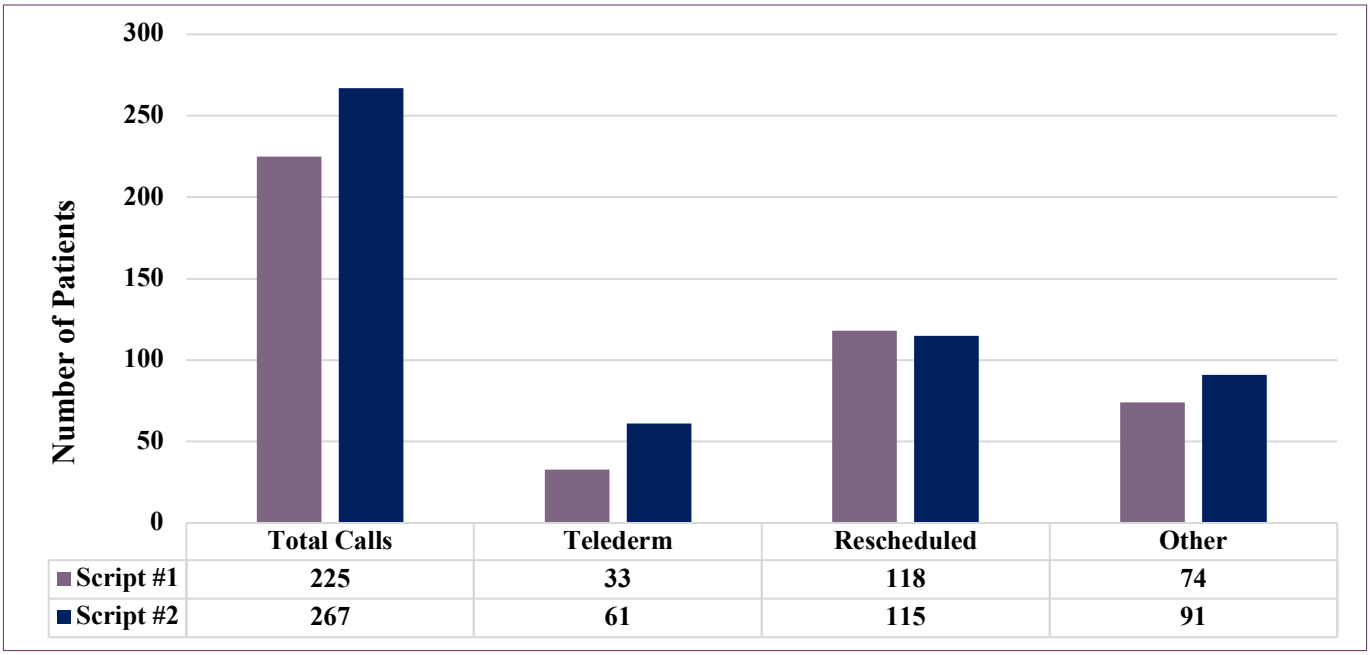
This quality improvement initiative involved a single improvement cycle, which included two groups of patients. Our "baseline" group listed rescheduling options for patients and allowed them to choose, a clear example of choice overload. Our "improvement" group applied behavioral economics principles previously discussed. We made signing up for tele-dermatology appointments the default option, limiting choice overload and transitioning tele-dermatology to an opt-out model.

RESULTS

Between March 6th and May 7th, 2020, a total of 225 calls were made with script #1 (control/opt-in) and a total of 267 calls were made with script #2 (Behavioral Economics/opt-out) by the office staff. For script #1, 33 patients chose tele-dermatology appointments (14.6%), 118 chose to reschedule (52.4%), and 74 fell in the "other" category (32.9%). For script #2, 61 patients accepted tele-dermatology appointments (22.8%), 115 patients opted-out and chose to reschedule (43.1%), and 91 fell into the "other" category (34%) (Figure 1). The "other" category consisted of calls to out of service numbers, voicemails reached, and unavailable voicemails. An F-test was performed between scripts for each category to determine variance which was equal for tele-dermatology and rescheduled patients, but unequal for "other". This was then used for subsequent t-tests that revealed no statistical differences in tele-dermatology, rescheduled, or other patients for Script 1 vs. 2 (p-values of 0.30, 0.78, and 0.62, respectively). Odds ratio was then calculated which showed that the odds of patients accepting tele-dermatology were higher among those with Script 2, compared to those with Script 1 (OR = 1.90, 95% CI = 1.16, 3.11).

DISCUSSION

Behavioral economics diverges from traditional economic principles to incorporate insights of human nature and psychology to model how people truly behave when making a choice. In this small, randomized controlled trial, our implementation of behavioral economic principles almost doubled our patient uptake of tele-dermatology



	Total Calls	Telederm	Rescheduled	Other
Script #1	225	33	118	74
Script #2	267	61	115	91

Figure 1: *Overall Tele-dermatology Data.* Total number of calls made for baseline script and intervention script are shown along with the number of patients who either chose tele-dermatology, to reschedule, or fell into the "other" category.

appointments, which was reflected by the statistically significant odds ratio of 1.90. We speculate that these results demonstrate modifications in the intervention group's script had a clinically significant effect on our patients' enrollment in tele-dermatology during the COVID-19 pandemic. The application of behavioral economics, being relatively new to healthcare, has been rarely reported in dermatology. Various published examples in dermatology include the use of framing effects and status quo when discussing actinic keratosis treatment[5], tanning practices in adolescents[6], and sun protection practices[7]. Even further, the use of social norming has been demonstrated by Albertini et al. who compared average layers amongst Mohs Surgeons across the US, and heuristics centered-on reference dependence have been used to promote willingness to use injectable biologics in psoriasis patients.[8,9] While it is becoming increasingly recognized to facilitate high value care, most health systems have not developed the capacity for widescale implementation. At the core of behavioral economics is light paternalism, a more ethical approach for influencing decision-making than mandating a choice. Rather, it points people in a direction while offering the option of opting out should they have strong preferences.

Limitations of this study include completion at a single academic institution, limiting the ability to comment on generalizability, particularly in private practice settings. Duration was limited, subsequently limiting sample size, due to clear advantages being recognized by our intervention. Support staff delivering the scripts were unblinded and could have influenced the patients in other ways which we cannot appreciate in the collection of data. Finally, two behavioral economic principles were combined in one arm of the study rather than having two distinct arms making it difficult to determine if one principle was more effective.

CONCLUSION

Our clinic has implemented these interventions to nudge our patients towards adoption of tele-dermatology to provide care access and continuity. Having appropriate patients seen via tele-dermatology limits the anxiety of COVID-19 exposure as well as anxiety associated with an unaddressed dermatologic concern, prevents patients from seeking care in the ED, and limits use of personal protective equipment. Not only does this process increase access to health care during COVID-19, but its benefits can be expected to extend far beyond the pandemic. Increasing tele-dermatology opportunities could potentially decrease clinic wait time, allow for more efficient triaging, and lead to less in-person traffic upon reopening. These factors will all serve as assets to providers and patients as we navigate through this evolving health care landscape.

Conflict of Interest Disclosures: None

Funding: None

Corresponding Author:
Jordan Lim, MB BCh BAO
Department of Dermatology
Penn State Hershey Medical Center
500 University Dr
Hershey, PA 17033
Phone: 717-531-6820
Fax: 717-531-4702
Email: jlim1@pennstatehealth.psu.edu

References:

1. Demiris G, Speedie SM, Hicks LL. Assessment of patients' acceptance of and satisfaction with teledermatology. Journal of medical systems. 2004 Dec 1;28(6):575-9.
2. Thaler RH, Sunstein CR. Nudge: Improving decisions about health, wealth, and happiness. Penguin; 2009.
3. Samuelson W, Zeckhauser R. Status quo bias in decision making. Journal of risk and uncertainty. 1988 Mar 1;1(1):7-59.
4. Emanuel EJ, Ubel PA, Kessler JB, Meyer G, Muller RW, Navathe AS, Patel P, Pearl R, Rosenthal MB, Sacks L, Sen AP. Using behavioral economics to design physician incentives that deliver high-value care. Annals of internal medicine. 2016 Jan 19;164(2):114-9.
5. Berry K, Butt M, Kirby JS. Influence of information framing on patient decisions to treat actinic keratosis. JAMA dermatology. 2017 May 1;153(5):421-6.
6. Garc√≠a-Romero MT, Geller AC, Kawachi I. Using behavioral economics to promote healthy behavior toward sun exposure in adolescents and young adults. Preventive medicine. 2015 Dec 1;81:184-8.
7. O'Keefe DJ, Wu D. Gain-framed messages do not motivate sun protection: A meta-analytic review of randomized trials comparing gain-framed and loss-framed appeals for promoting skin cancer prevention. International journal of environmental research and public health. 2012 Jun;9(6):2121-33.
8. Albertini JG, Wang P, Fahim C, Hutfless S, Stasko T, Vidimos AT, Leshin B, Billingsley EM, Coldiron BM, Bennett RG, Marks VJ. Evaluation of a peer-to-peer data transparency intervention for Mohs micrographic surgery overuse. JAMA dermatology. 2019 Aug 1;155(8):906-13.
9. Oussedik E, Cardwell LA, Patel NU, Onikoyi O, Feldman SR. An anchoring-based intervention to increase patient willingness to use injectable medication in psoriasis. JAMA dermatology. 2017 Sep 1;153(9):9