

## ARTICLE



# Characteristics of men who use direct-to-consumer men's health telemedicine services

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The characteristics of men who use direct-to-consumer (DTC) men's health services are not well understood. We conducted an online survey of adult men via ResearchMatch, assessing sociodemographic data, health behaviors, and concern for low testosterone and infertility. Logistic regression estimated the association between participant characteristics and familiarity with and reported use of DTC services such as Hims<sup>®</sup> and Roman<sup>®</sup>. Among 1276 men surveyed, 62.2% were concerned about low testosterone. While almost half (48.5%) were familiar with men's DTC health services, only 37 (2.9%) reported using these services. On multivariable analysis, men who used DTC men's health services were more likely to be younger (age 18–39: odds ratio [OR] 2.94, 95% confidence interval [CI] 1.03–8.38,  $p = 0.04$ ; age 40–59: OR 3.26, CI 1.17–9.10,  $p = 0.02$ ; referent age  $\geq 60$ ), have annual income between \$75k and \$100k (OR 5.25, CI 1.39–19.87.45,  $p = 0.02$ ), and be concerned about low testosterone (OR 3.81, CI 1.46–9.96,  $p = 0.01$ ). In conclusion, younger men and those with mid-range incomes were more likely to use online DTC men's health services compared to older or wealthier men. Likewise, men with concerns about low testosterone were more likely to use DTC services, but other health-conscious behaviors and frequency of doctor visits did not predict use.

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## INTRODUCTION

Infertility and sexual dysfunction are associated with significant morbidity among men [1]. However, men are known to have an underlying reluctance to visit healthcare practitioners and are less likely to seek care for their medical concerns compared to women [2]. Moreover, the stigma surrounding men's health conditions such as erectile dysfunction (ED) and male infertility further reduces the likelihood that men will seek evaluation by a physician [3, 4]. Given the high and increasing prevalence of sexual dysfunction among men under age 40, who are less likely to have an established primary care physician, there is a growing demand for alternative care models that can address the needs of these men [5–7]. During the COVID-19 pandemic, telemedicine services have rapidly expanded to fill these needs, and telehealth via both conventional (physician's office) and direct-to-consumer (DTC) approaches now comprises a large proportion of men's health care [8].

DTC men's health services such as Hims<sup>®</sup> and Roman<sup>®</sup> offer convenient access to care and discretion in pursuing treatment for sensitive issues surrounding sexual health [9]. Since their inception in the late 2010s, these companies have expanded their health services to include diagnosis and treatment of ED, hair loss, sexually transmitted infections, mental health, skincare, and primary care. In parallel, lay press and marketing have increasingly focused on issues such as low testosterone and ED—among sectors of medical marketing spending, DTC advertising has seen the most rapid increase spending in the U.S. between 1997 and

2016 [10]. In combination, these changes have resulted in soaring popularity of DTC men's health services, with a 1688% increase in the number of unique visitors to six major DTC websites between 2017 and 2019, and an average of nearly 5 million total visits per month [11].

While the proliferation and popularity of DTC men's health sites have now been well established, little is known regarding the users of these online health services. We sought to examine the demographics, patient characteristics, and health perceptions of men utilizing DTC men's health services. We hypothesized that younger men who engage in health-conscious behaviors and those with low engagement with the traditional healthcare system were more likely to use DTC men's health services.

## MATERIALS AND METHODS

### Participant recruitment and survey design

After obtaining Institutional Review Board approval from Northwestern University, we administered an online 49-item survey between November 2019 and January 2020. This survey has been previously reported by our research group [12]. Men who resided in the United States and aged 18 years and older were eligible to complete the survey. The survey was distributed through ResearchMatch, a non-profit, voluntary, web-based recruitment registry of individuals interested in participating in clinical research [13]. Users are required to register an account and were only allowed to participate once. Consent was obtained prior to participation. Survey data collection was performed using REDCap (Vanderbilt University, Nashville, TN) [14]. Completing the survey in its entirety entered

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participants for a chance to win a \$50 Visa gift card. Of the initial 40,056 men who met the age criteria to participate, 1455 opted to participate in the survey study. Of these men, 1276 (87.7%) completed the entire survey and were included for final analysis (Supplementary Fig. 1).

The survey collected sociodemographic information including age, educational background, income level, and relationship status. Medical history, health insurance status, and personal health behaviors were assessed. Responses to personal health behavior questions were dichotomized: exercise frequency (no regular exercise vs at least once per week), dietary habits (does not follow a special diet vs follows a special diet), fitness tracker use (never used vs prior/current use), supplement use (never/almost never/sometimes vs almost daily/daily). Frequency of doctor visits in the last year was quantified. Prior use of DTC health products and services was queried. Lastly, participants were provided a brief definition of infertility, followed by a series of questions on a 5-point Likert scale assessing their perceptions of infertility and concern about having low testosterone. The administered survey is presented in Appendix A.

### Outcomes

We assessed familiarity with and prior use of DTC men's health services such as Hims® and Roman®. Likert responses for familiarity were dichotomized into "not familiar" (1 = not at all familiar) and "familiar" (2 = slightly familiar to 5 = extremely familiar) for statistical analysis. We also examined overall participant concern for infertility, concern for low testosterone, use of supplements for boosting testosterone, and use of supplements marketed to increase muscle mass and vitality. Likert responses for concern into "not concerned" (1 = not at all concerned) and "concerned" (2 = slightly concerned to 5 = extremely concerned).

### Statistical analysis

Univariable logistic regression was used to estimate the association between participant characteristics and familiarity with and use of DTC men's health services. We examined associations with predetermined covariates that were considered indicative of health-conscious behavior: regular exercise, regimented diet, use of a wearable fitness tracker device, use of DTC DNA testing services, and frequency of visits to the doctor in the last year. Multivariable logistic regression was performed using covariates shown to be significant on univariable analysis. Statistical significance was considered at  $p < 0.05$ . All analyses were performed using Stata 14.2 (StataCorp, College Station, TX).

### RESULTS

Among the 1276 participants who completed the survey, 470 were aged 18–39 (36.8%), and the majority were in a romantic relationship ( $n = 898$ , 70.4%). 245 men (19.2%) followed a diet, 519 (40.7%) used a fitness tracker, and 964 engaged in regular exercise (75.6%). The majority of men ( $N = 794$ , 62.2%) expressed concern about having low testosterone, whereas a minority of men ( $N = 277$ , 21.7%) were concerned about infertility. Only 76 men (6.0%) reported currently prescribed testosterone supplementation, and 77 men (6.0%) frequently used supplements marketed to build muscle mass or improve vitality (Table 1). Nearly half of all men ( $N = 619$ , 48.5%) were familiar with Hims®, Roman® or similar online men's health services, but only 37 (2.9%) reported using these services. Of the men who utilized DTC services, 32 (86.5%) were under age 60 and 32 (86.5%) were concerned with low testosterone.

On univariate analysis, characteristics associated with increased odds of DTC service use included age, income, fitness tracker use, and concern for having low testosterone (Table 1). Insurance status, diet and exercise frequency, prior use of DTC DNA testing services, use of prescribed testosterone supplementation, muscle/vitality supplement use, and number of recent doctor visits were not significantly associated with DTC men's health service use. On multivariable analysis, men who used DTC men's health services were more likely to be younger (age 18–39: odds ratio [OR] 2.94, 95% confidence interval [CI] 1.03–8.38,  $p = 0.04$ ; age 40–59: OR 3.26, CI 1.17–9.10,  $p = 0.02$ ; referent age  $\geq 60$ ), have annual income between \$75 K to \$100 K (OR 5.25, CI 1.39–19.87.45,  $p = 0.02$ ), and be concerned about low testosterone (OR 3.81, CI 1.46–9.96,  $p = 0.01$ ) (Table 2). On multivariable analysis, use of a fitness

tracker was no longer associated with increased odds of DTC men's health service use.

### DISCUSSION

In the wake of the COVID-19 pandemic, the increasing number of men opting for telehealth in lieu of the traditional office visit creates both potential opportunities and obstacles for the optimization of care. It is critical that clinicians understand the evolving needs of this patient population as well as the role that telehealth and DTC companies play in the provision of comprehensive men's health care. To better understand the demographics, concerns, and perspectives of men who may seek these services, we administered an online survey to gauge familiarity with and use of DTC men's health products and level of concern regarding men's health issues.

Our study found that middle-aged men in the middle-income bracket had higher odds of using DTC men's health services. Whereas we hypothesized that younger men would be the most likely users of these services for myriad reasons including decreased likelihood of having an established primary care physician, these data suggest that middle-aged men may be the highest users of DTC men's health care. The convenience of such services may be of greater value to men in this age group due to increased concerns regarding fertility or age-related sexual dysfunction, prompting seeking additional care outside the traditional healthcare system [15, 16]. Furthermore, most DTC service users in our study (73%) had private health insurance, suggesting that for this group, insurance status and income were not significant barriers to care. However, it is important to consider that high-deductible insurance plans have become increasingly popular among younger patients, which might incentivize spending on DTC products with predetermined prices over less certain out-of-pocket costs for office visits and lab testing [17]. DTC service users were also equally likely to have seen a physician in the prior year, indicating the presence of an established patient-physician relationship that could have been leveraged for men's health care. Instead, these men opted for care through a DTC platform despite the potentially higher cost of medications compared to traditional prescribing routes or coupon sites [18]. This may be explained by the perceived savings of DTC services, as many companies advertise comparable medication costs, but often charge additional consultation, membership, and shipping fees. Regardless, for these men, the benefits of convenience and discretion afforded by telehealth and DTC medicine seem to have outweighed the increased costs.

The majority of DTC service users (86.5%) were concerned about low testosterone. Considering the men in our study were relatively health-conscious (19.2% of men following a diet, 40.7% using a fitness tracker, and 75.6% engaging in regular exercise), elevated concern about low testosterone may reflect a broader increase in consumer marketing toward "low T" testing and treatment [19, 20]. A systematic review from Bandari et al. found a significant increase in testosterone prescriptions in the US driven by off-label prescribing and DTC marketing [21]. Only 6% of men in our study indicated that they had used prescribed testosterone supplementation, and 6% indicated using a "muscle-mass" or "vitality-increased" supplement, which are often marketed to improve testosterone. While certain DTC men's platforms such as Hims® and Roman® do not offer testosterone replacement therapy, the rapid emergence of platforms specifically offering DTC testosterone replacement therapy will likely cater to the same group of existing DTC users who are already concerned about low testosterone.

While some men who use DTC men's health services might have straightforward health concerns amenable to this type of evaluation, others may prioritize convenience over more comprehensive care [22]. Intake questionnaires on DTC websites are typically simplistic and rely entirely on self-reported symptoms and vital signs. Such questionnaires fail to adhere to the American

**Table 1.** Demographic and socioeconomic characteristics of survey responders ( $n = 1276$ ) and association with use of direct-to-consumer (DTC) men's health services using univariable logistic regression.

	<b>n (%)</b>	<b>Univariate OR [95% CI]</b>	<b>p value</b>
<b>Age</b>			
18–39	470 (36.8)	2.90 [1.05 to 7.98]	0.04
40–59	390 (30.6)	3.52 [1.28 to 9.69]	0.02
60+	416 (32.6)	Reference	
<b>Education</b>			
No college	129 (10.1)	Reference	
Some college	287 (22.5)	0.33 [0.07 to 1.50]	0.15
Bachelor's Degree	418 (32.8)	1.08 [0.35 to 3.35]	0.89
Post-Graduate Degree	442 (34.6)	1.17 [0.39 to 3.57]	0.78
<b>Income</b>			
<\$25k	270 (21.2)	Reference	
\$25k–\$50k	296 (23.2)	2.47 [0.65 to 9.42]	0.19
\$50k–\$75k	257 (20.1)	3.60 [0.98 to 13.24]	0.05
\$75k–\$100k	185 (14.5)	5.09 [1.38 to 18.74]	0.02
>\$100k	268 (21.0)	2.04 [0.50 to 8.24]	0.32
<b>Insurance</b>			
No insurance	63 (4.9)	Reference	
Public Insurance	329 (25.8)	1.15 [0.14 to 9.73]	0.897
Private Insurance	752 (58.9)	2.31 [0.31 to 17.28]	0.415
Combination of Public/Private	132 (10.3)	1.44 [0.15 to 14.14]	0.753
<b>Relationship status</b>			
Single	378 (29.6)	1.65 [0.84 to 3.21]	0.14
Not single	898 (70.4)	Reference	
<b>Exercise</b>			
No regular exercise	312 (24.5)	Reference	
At least once a week	964 (75.6)	1.01 [0.47 to 2.16]	0.99
<b>Diet</b>			
No special diet	1029 (80.8)	Reference	
Follows a special diet	245 (19.2)	1.16 [0.53 to 2.58]	0.71
<b>Fitness Tracker Use</b>			
Never used	757 (59.3)	Reference	
Former/current user	519 (40.7)	2.46 [1.25 to 4.83]	0.01
<b>Familiarity with Hims, Roman, or Similar Service</b>			
Unfamiliar	657 (51.5)		
Familiar	619 (48.5)		
<b>Use of Hims, Roman, or Similar Service</b>			
Have not used	1239 (97.1)	-	

**Table 1.** continued

	<b>n (%)</b>	<b>Univariate OR [95% CI]</b>	<b>p value</b>
Have used	37 (2.9)	-	
<b>Use of Home DNA Testing Service</b>			
Have not used	934 (73.2)	Reference	
Have used	342 (26.8)	1.50 [0.75 to 2.98]	0.25
<b># of Doctor Visits in Last Year</b>			
0	110 (8.6)	Reference	
1–2	518 (40.6)	2.36 [0.30 to 18.51]	0.41
3–4	344 (27.0)	4.28 [0.55 to 33.10]	0.16
>5	304 (23.8)	4.48 [0.58 to 34.86]	0.15
<b>Low Testosterone Concern</b>			
Not concerned	482 (37.8)	Reference	
Concerned	794 (62.2)	4.01 [1.55 to 10.35]	<0.01
<b>Infertility Concern</b>			
Not concerned	999 (78.3)	Reference	
Concerned	277 (21.7)	1.76 [0.87 to 3.56]	0.11
<b>Prescribed Testosterone Supplementation</b>			
No	1174 (93.9)	Reference	
Yes	76 (6.1)	2.19 [0.75 to 6.41]	0.15
<b>Muscle Mass/Vitality Supplement Use</b>			
Infrequent	1199 (94.0)		
Frequent	77 (6.0)	1.94 [0.67 to 5.61]	0.22

**Table 2.** Association with use of direct-to-consumer (DTC) men's health services using multivariable logistic regression.

	<b>Multivariate OR [95% CI]</b>	<b>p value</b>
<b>Age</b>		
40–59	3.26 [1.17–9.10]	0.02
18–39	2.94 [1.03–8.38]	0.04
60+	Reference	
<b>Income</b>		
<\$25,000	Reference	
\$25,000 to \$50,000	2.74 [0.72–10.53]	0.14
\$50,000 to \$75,000	3.59 [0.95–13.46]	0.06
\$75,000 to \$100,000	5.25 [1.39–19.87]	0.02
More than \$100,000	2.04 [0.49–8.57]	0.33
<b>Fitness Tracker Use</b>		
Never used	Reference	
Former/current user	1.80 [0.88–3.68]	0.11
<b>Low Testosterone Concern</b>		
Not concerned	Reference	
Concerned	3.81 [1.46–9.96]	0.01

Urological Association guidelines on ED and testosterone replacement, which recommends thorough medical, sexual, and psychosocial history, physical examination, and laboratory evaluation as well as counseling on underlying cardiovascular disease risk [23].

As Shahinyan et al. note, a shift to DTC care for men's health issues may overlook crucial pathology discovered in a traditional office evaluation, such as dyslipidemia, diabetes, or low testosterone [24]. In reality, 15–20% of young men with ED have an organic etiology, and sexual dysfunction may only be the sentinel sign of underlying cardiovascular, endocrine or neurological disease [25, 26]. Thus, circumvention of a formal and thorough evaluation, whether in person or via telemedicine, may lead to underdiagnosis of significant comorbid conditions and reduced overall quality of care. The use of DTC men's health services by a minority of our cohort indicates a potentially large number of men may be at risk for substandard and guidelines-discordant care if the adoption of these platforms increases.

Our study is subject to certain limitations that reduce the generalizability of our results. First, in the absence of prior validated surveys on online men's health services, we designed a novel survey using Likert items to assess familiarity with and use of such telemedicine products. Second, there is selection bias among men participating in ResearchMatch, who are necessarily technologically savvy and facile with online interfaces; as such, they may have a greater awareness of telemedicine and DTC platforms than other men in the United States. As a result, our survey may overestimate familiarity with such services. Third, our sample size is relatively small. While many men completed the survey, only a small number reported actual use of DTC men's health services. It is therefore difficult to extrapolate our findings without assessing a broader study population. Fourth, the survey did not assess erectile function nor prior use of therapies for ED. As such, it is not possible to determine whether concerns regarding ED were a major driver of DTC service use. Lastly, the survey was conducted before the COVID-19 pandemic, during which the use of telemedicine rapidly expanded across all patient ages and demographics. During the pandemic, urologists' usage of telemedicine had nearly tripled, with some groups reporting that male sexual medicine visits made up a significantly larger share of telemedicine encounters [8, 27]. As a result, we speculate that DTC men's health service utilization rates have continued to rise in parallel and may have accelerated beyond their pre-pandemic trajectories [11]. Thus, the 3% usage rate that we observed is likely an underestimation of current utilization. Further research is required to fully assess how demographics have potentially shifted through the pandemic period.

## CONCLUSIONS

Younger men and those with mid-range income were more likely to use online DTC men's health services compared to older or wealthier men. Men with concerns about low testosterone were more likely to use DTC services, but other health-conscious behaviors and frequency of doctor visits did not predict use. Due to the rapid expansion of telemedicine during the COVID-19 pandemic, it is important for physicians to understand the needs and characteristics of patients who access DTC services, as well as the strengths and limitations of these services, in order to appropriately counsel patients on health concerns that can and cannot be adequately addressed through this approach.

## DATA AVAILABILITY

The datasets generated during and analyzed during the current study are available from the corresponding author upon reasonable request.

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## AUTHOR CONTRIBUTIONS

Conceptualization: MTH and JAH. Methodology: MTH and JAH. Data curation: MTH and MKK. Formal analysis: MTH and JAH. Supervision: JW, NEB, REB, JAH. Writing—original draft preparation: SSA and MTH. Writing—review and editing: SSA, MTH, JDL, MNP, RJF, JAH.

### COMPETING INTERESTS

The authors declare no competing interests.

### ADDITIONAL INFORMATION

**Supplementary information** The online version contains supplementary material available at <https://doi.org/10.1038/s41443-022-00635-8>.

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