



Frequencies and predictors of health psychology referrals after integrative oncology consultation

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Abstract

Objective Health psychology (HP) plays a critical role within a multidisciplinary, integrative oncology team. HP in integrative oncology is not well established and criteria for referral have not been examined. This study examined characteristics of referral to HP.

Methods A chart review of 1827 patients in the Integrative Medicine Center (IMC) between 2019 and 2020 was conducted. Patient assessments included the Edmonton Symptom Assessment Scale, Measure Yourself Concerns and Well-being, and PROMIS10. Chi-square tests were used to compare categorical variables, Mann-Whitney test for non-normally distributed continuous variables, and *t*-tests for normally distributed continuous variables comparing those referred and not referred to HP.

Results Patients referred ($n = 316$) were mostly female (85.4%), White (67.1%), married/partnered (67.7%), obese (42.1%), and with breast cancer (52.2%). When comparing the two groups, patients referred to HP and patients not referred to HP, patients referred had a higher proportion of female and Black patients than expected ($p \leq .01$); patients referred were also younger and had higher BMIs ($p \leq .01$). Referred patients reported worse fatigue, sleep, depression, anxiety, well-being, spiritual pain, financial distress, memory, overall mental health, physical health, and global health ($p \leq .01$). Most common concerns of referrals were diet/nutrition, overall health, and stress/anxiety. Compared to non-referred, HP referrals were more likely to prioritize depression, spirituality, and stress/anxiety ($p \leq .01$).

Conclusions Patient characteristics are well-suited treatment targets for HP, including addressing emotional distress, healthy lifestyle, and quality of life. Our findings can help programs develop strategies to facilitate engagement with psychological counseling.

Keywords Cancer · Integrative oncology · Psychology · Complementary medicine · Alternative medicine

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Background

Health psychology (HP) examines how biological, psychological, and social factors influence health and illness [1]. The health psychologists at The University of Texas MD Anderson Cancer Center are licensed psychologists who provide empirically supported treatments and evidence-based interventions (e.g., cognitive behavioral therapy, motivational interviewing, acceptance, and commitment therapy) to facilitate improved mental and physical health in oncology patients and survivors. Psychotherapy with health psychologists is typically short term (3–12 sessions, delivered weekly or every other week) and goal-focused, aimed at improving patients' quality of life by focusing on several dimensions including reducing symptoms of anxiety and depression and

improving nutrition, exercise habits, and sleep quality and duration, as well as addressing psychosocial stressors.

HP services are offered through the Integrative Medicine Center (IMC), which offers Integrative Oncology services. Integrative oncology focuses on physical, mind-body, and social aspects of health [2] and typically includes a multidisciplinary team consisting of physicians, nurses, dietitians, physical therapists, acupuncturists, yoga therapists, and more. To improve the safety and utilization of appropriate treatment modalities, integrative oncology providers collaborate with patients, working alongside their medical team, to help with symptom management and promote optimal health, regardless of where the patient is on the cancer care continuum [3]. Patients may be referred to group classes such as yoga, music, tai-chi, qigong, cooking, expressive writing, exercise, or meditation. They may also be referred to individual services including oncology massage, acupuncture, physical therapy, yoga therapy, nutrition, meditation, music therapy, and HP. The HP team consists of two doctoral level, licensed psychologists trained in clinical health psychology. Patients referred to HP include, but are not

limited to, those interested in assistance with making lifestyle change (e.g., nutrition, exercise, or sleep) and patients struggling with psychological distress specifically related to their cancer diagnosis or treatment. The referring physicians distinguish between patients that would benefit from HP and those that would be more appropriate for community providers or other mental healthcare providers within the larger hospital system, such as social workers, psychiatrists, or chaplains. If patients already have a trusted mental health provider in the community, patients are typically referred back to that provider for additional support if needed (see Figure 1 for a flow chart representing the referral algorithm). Referrals to HP only come from within the IMC. The IMC's patient population has been described previously: mostly female (69%), with breast cancer being the most common diagnosis (30%), and patients having an early-stage disease (62%) [2]. As needed, the HP team can refer to the IMC dietician, group services (e.g., music therapy, yoga/tai-chi, expressive writing), and other IMC mind-body providers (e.g., music therapist, mind-body practitioner) for one-on-one services.

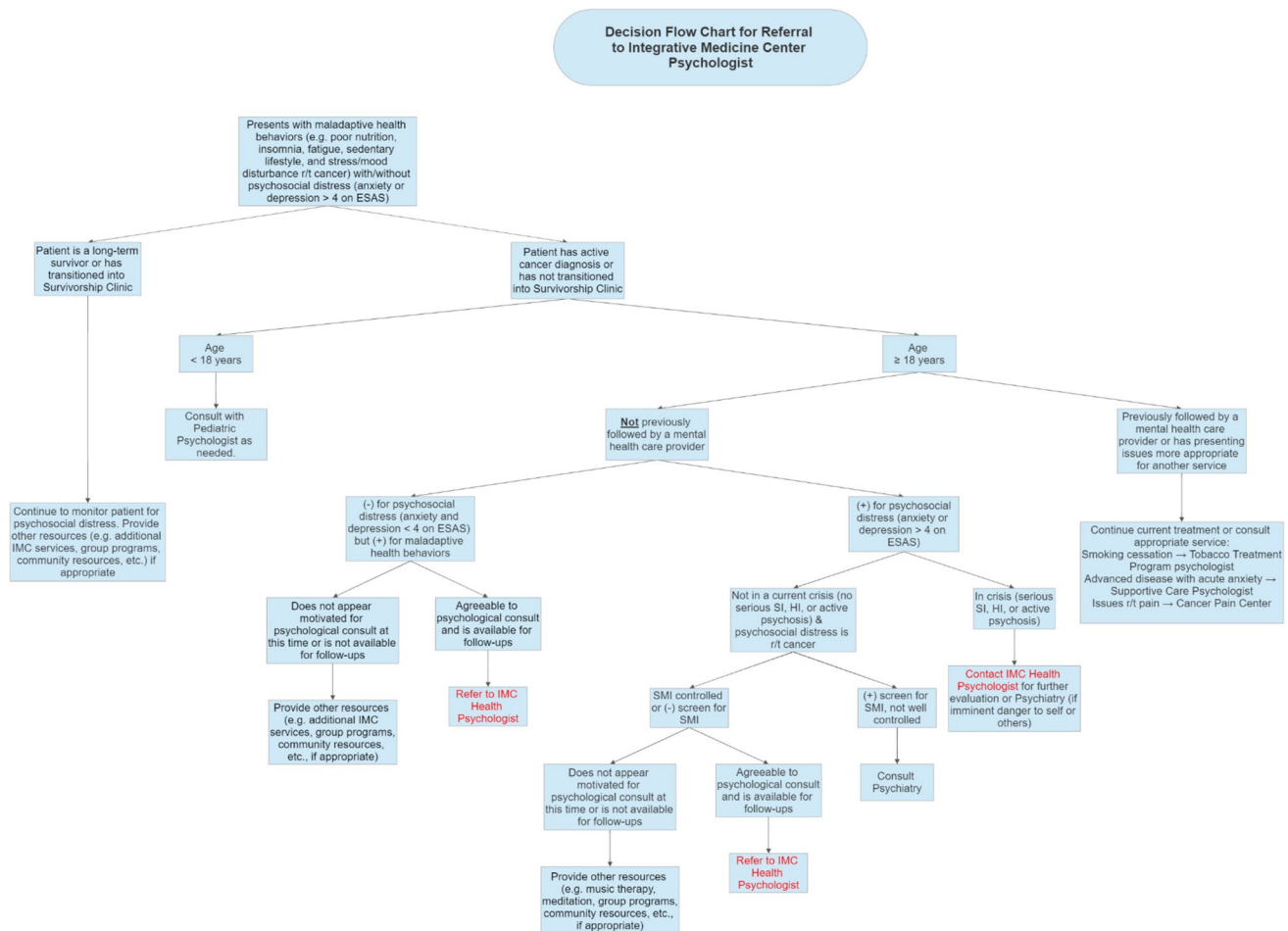


Fig. 1 Decision flow chart for referral to integrative Medicine Center psychologist

Health psychologists differ in important ways from other mental health providers working in a medical setting. Specifically, health psychologists focus on the overall health of the patient, whereas traditional therapists focus on mental illness. Most therapists generally focus on diagnosing and treating mental disorders (e.g., anxiety and depression), whereas health psychologists focus on the bidirectional relationship between physical and mental health. The IMC's mission is to improve patients' physical, emotional, and social well-being. Thus, it is crucial for health psychologists within the center to not only address mental health concerns, but also help patients with their goals of lifestyle change.

The health psychologists at MD Anderson often work alongside other integrative oncology practitioners. For example, patients may receive a detailed plant-based diet plan from the integrative oncology dietician and an exercise plan from the physical therapist. HP can work with patients to help them execute the recommended changes. Alternatively, a patient with anxiety may be referred to both HP and oncology massage therapy. Therapies or treatment plans from the integrative oncology team members are complementary.

It is often said that a cancer diagnosis is a “wake-up call.” It is a unique experience that often motivates a patient to pause and re-evaluate their life and current health behaviors [4–6]. The initial shock of a cancer diagnosis is a teachable moment and may motivate patients to engage in lifestyle changes that they were hesitant to initiate or struggled to maintain prior to diagnosis. HPs are clinicians who expertly guide patients towards lifestyle changes, with the goal of improving both emotional and physical well-being. There is a significant overlap between psycho-oncology care and HP. However, psycho-oncology may have a larger emphasis on pain management, sexual functioning, and facing end-of-life [7], whereas HP in integrative oncology has a larger focus on co-occurring emotional problems and improvement in lifestyle behaviors and general health.

The IMC at MD Anderson views HP as a vital component of integrative oncology care and one that is often absent from other integrative oncology programs. Addressing psychosocial distress is an increasing priority in cancer care [8] and health psychologists are uniquely qualified to address both cancer-related emotional distress and also facilitate lifestyle change such as losing weight, increasing exercise, and improving sleep by utilizing interventions such as cognitive behavioral therapy, acceptance and commitment therapy, and motivational interviewing. After an extensive literature review, no prior articles were found that discussed characteristics of patients referred to HP in an oncology setting. The current study is a retrospective analysis examining demographic, medical characteristics, and psychosocial factors associated with referral to HP within the IMC at the MD

Anderson. Understanding this information would further guide and inform oncology teams on a model of referral.

Methods

Participants

We conducted a retrospective chart review of patients who completed a medical consultation appointment with one of the physicians at the IMC between January 1, 2019 and January 13, 2020, which included 1827 patients. The consult appointments with the integrative oncology physician occurred prior to the COVID-19 pandemic and orders were placed for HP on the day of the consult. Thus, HP consults during the study time period were not affected by subsequent changes to telehealth or hospital structure. Referrals to the IMC come from centers within MD Anderson. At the initial medical consultation appointment, patients complete questionnaires and then meet with an integrative oncology physician and/or advanced practice provider to assess biopsychosocial concerns regarding cancer diagnosis and treatment. Various services are considered for referral including individual psychotherapy with HP. Integrative physicians suggest referral options to patients based on patient questionnaire data and clinical interview feedback during the 60-min appointment. Insurance approval for HP does not affect the referral recommendation; approval is determined at a later time by the hospital financial services. All patients seen by an integrative physician were included in this study sample. All questionnaire data collection was part of an IRB-approved protocol and this retrospective data analysis was approved in a separate IRB protocol (2021-0213). Collected data were stored in a secured, HIPAA compliant, FileMaker Pro database and a waiver of informed consent was granted for this retrospective analysis.

Measures

Demographics (e.g., sex, age, race, ethnicity, marital status, employment status) and additional clinical data (cancer diagnosis, cancer staging, body mass index) were extracted from the electronic medical record. Cancer stages were collapsed into three groups: local disease (stage 0 ($n = 40$), stage I ($n = 321$), stage II ($n = 210$)), advanced disease (stage III ($n = 208$), stage IV ($n = 292$)), and unknown (unknown stage ($n = 736$) and other ($n = 20$)). Questionnaires were completed using an institutionally provided iPad. Patients at MD Anderson who were not fluent in English were able to have a translator translate the questionnaires when necessary. The data was later entered into an electronic database for analysis.

Measure yourself concerns and well-being (MYCaW)

At their integrative medicine consult, patients completed a modified version of the MYCaW questionnaire [9]. Patients were asked to identify the top two concerns for their visit. Areas of potential concern included the following (listed alphabetically): appetite, depression, diet/nutrition, dry mouth, exercise, fatigue, herbs/supplements, hot flashes, integrative approach, memory, nausea, neuropathy, overall health, pain, relaxation, sleep, spiritual, stress/anxiety, and other.

Modified edmonton symptom assessment scale (mod ESAS-FS, 16-item)

Recent experience of patient symptom burden was assessed using the ESAS-FS [10–13] which asks patients to rate 12 core symptoms (pain, fatigue, nausea, depression, anxiety, drowsiness, loss of appetite, decreased sense of well-being, shortness of breath, sleep, financial distress, spiritual pain) with an additional 4 items (hot flashes, dry mouth, numbness/tingling) over the past 24 h on a scale on a scale 0 (no problem) to 10 (most severe problem). The ESAS Global Distress Score is the sum of 9 core items including pain, fatigue, nausea, depression, anxiety, drowsiness, appetite, sense of well-being, and shortness of breath (total score 0–90). The Physical Symptom Score is the sum of pain, fatigue, nausea, drowsiness, appetite, and shortness of breath scores (total 0–60). The Psychological Distress Score is the sum of depression and anxiety scores (total 0–20). For all individual symptoms, a clinically significant difference is ≥ 1 point. For predetermined subscales, clinical significance is defined as differences ≥ 3 for Global Distress Score and Physical Symptom Score and ≥ 2 for Psychological Distress Score.

Patient-reported outcomes measurement information system (PROMIS10)

The PROMIS10 [14] is a general assessment of the global healthcare-related quality of life, including 10 self-report items. A sample item is, “In general, would you say your quality of life is...” Responses are on a 5-point scale (i.e., poor, fair, good, very good, excellent) and one item is on an 11-point scale. Items can be summed for a measure of global health, as well as divided into mental health and physical health subscales. Lower scores represent worse global, mental, or physical health.

Statistical analysis

Summary statistics were used to describe the demographic characteristics in the two groups: patients referred to HP versus patients not referred to HP. Summary statistics were

also used to calculate the results of mod-ESAS, PROMIS10, and MYCaW questionnaires. Demographic and clinical outcomes were compared between the two groups using a chi-squared test for categorical variables (i.e., sex, race, ethnicity, marital status, employment status, cancer type, cancer staging), the Mann-Whitney test for non-normally distributed continuous variables (BMI, which was positively skewed), and the independent samples *t*-test for normally distributed variables (age).

Chi-square tests were used to examine whether patients referred to HP had significantly different concerns than expected as listed on the MYCaW compared to patients not referred to HP. Mod-ESAS symptom scores were not normally distributed; thus, group differences on mod-ESAS individual symptoms and summary subscales were analyzed using Mann-Whitney tests. PROMIS10 scores tended to be normally distributed; thus, *t*-tests were used to evaluate whether physical health, mental health, and global total subscales differed by group membership. As this was an exploratory study including multiple analyses, the alpha level was reduced to a more conservative value (.01) to lower the type I error rate.

Results

Of the 1827 patients who presented to the IMC for a consult between January 2019 and January 2020, 316 (17.3%) were referred to HP. Participants with missing data were excluded for the specific analysis related to the missing data. Greater than 97.5% of the data was available for demographic variables, except for employment (11.3% of patients had “unknown” employment status). Greater than 96.5% of data was available for clinical outcomes: MYCaW (96.7%), PROMIS10 (99.7%), and mod-ESAS (97.5%) questionnaires. Cancer staging, when pulled from medical records, listed “unknown” for 40.3% of patients. Cancer diagnoses with high rates ($> 40\%$) of “unknown” staging included gastrointestinal, genitourinary, leukemia, lymphoma/myeloma, other, sarcoma, and thoracic head and neck. Table 1 shows demographic characteristics. When describing just those patients referred to HP, they were mostly female (85.4%), White (67.1%), married or partnered (67.7%), and obese, which is defined as a BMI ≥ 30.0 (42.1%). Most common cancer diagnosis was breast cancer (52.2%), and the majority of patients had the local disease (42.7%).

When comparing the two groups, patients referred to HP and patients not referred to HP, referred patients were more likely to be female (85.4% versus 70.0%), younger (mean age 53.2 years versus 56.9 years), Black (14.9% versus 8.9%), and have higher body mass index (medians 28.7 versus 26.6). We ran exploratory analyses (independent *t*-tests) of the full sample to examine whether patients

Table 1 Demographic characteristics of integrative oncology consults (*N* = 1827)

Demographic	Patients referred to health psychology (<i>n</i> = 316)		Patients not referred to health psychology (<i>n</i> = 1511)		<i>p</i> value
	<i>n</i>	%	<i>n</i>	%	
Sex					< .001
Female	270	85	1057	70	
Male	46	15	454	30	
Age					< .001
15–39	45	14	184	12	
40–59	173	55	623	41	
≥ 60	98	31	704	47	
Race					.01
Black	47	15	135	9	
White	212	67	1118	74	
Asian	27	9	112	7	
Other ^a	29	9	131	9	
Unknown or declined	1	0.3	15	1	
Ethnicity					.03
Hispanic or Latino	54	17	179	12	
Non-Hispanic or Latino	257	81	1298	86	
Unknown or declined	5	2	34	2	
Marital status					.09
Single	48	15	182	12	
Married or significant other	214	68	1108	73	
Divorced or separated	40	13	134	9	
Widowed	12	4	70	5	
Other or unknown	2	0.6	17	1	
Employment status					< .01
Full-time	125	40	553	37	
Self-employed	19	6	114	8	
Retired	46	15	347	23	
Not employed	63	20	232	15	
Other ^b	29	9	92	6	
Unknown	34	11	173	11	
Body mass index					< .001
< 25	91	29	558	37	
25.0 ≥ 29.9	92	29	505	33	
30.0 ≥ 34.9	68	22	256	17	
≥ 35.0	65	21	189	13	
Cancer type					< .001
Breast	165	52	549	36	
Thoracic head and neck	34	11	256	17	
Gastrointestinal	25	8	187	12	
Gynecologic	29	9	120	8	
Genitourinary	19	6	111	7	
Lymphoma/myeloma	12	4	83	6	
Sarcoma	6	2	55	4	
Central nervous system/neurologic	5	2	47	3	
Skin/melanoma	14	4	38	3	
Leukemia	7	2	34	2	
Other	0	0	31	2	
Cancer staging					< .001
Local	135	43	436	29	
Advanced	86	27	414	27	
Unknown	95	30	661	44	

^aAmerican Indian or Alaskan Native, Native Hawaiian or Other Pacific Islander, Other

^bStudent, Part-time employment, Active-Duty, Disabled

Denominator in the % calculation excluded patients with missing data in each group; percentages rounded to nearest whole number

who were Black varied from all other races combined as measured by the self-report PROMIS10 subscales. Blacks tended to have worse global mental health ($M = 12.37$ versus 12.99 , $p = .02$), and significantly worse global physical health ($M = 12.23$ versus 13.29 , $p < .001$), and global total health ($M = 30.27$ versus 32.40 , $p < .001$), when compared to all other races. However, Blacks did not present with more advanced disease, but rather tended to have fewer patients in the “unknown” category compared to all other races, as measured by chi-square test ($p = .05$). HP referrals were less likely to be retired (14.6% versus 23.0%). Significant chi-square test results showed that HP referrals consisted of more breast cancer (52.2% versus 36.3%) and fewer thoracic neck and head cancer diagnoses (10.8% versus 16.9%) compared to the non-referred group. HP referrals were more likely to have the local disease (42.7% versus 28.9%) and less likely to have “unknown or other” staging (30.1% versus 43.7%), compared to the non-referred group. Based on $\alpha = .01$, there were no significant differences in marital status or ethnicity.

Regarding the most frequent MYCaW top concerns presented during the initial IMC integrative oncology medical consultation, HP referred patients were most interested in discussing the areas of diet/nutrition (33.8%), stress/anxiety (32.1%), and overall health (24.0%). HP referrals, compared to those patients who were not referred, were more likely to prioritize depression (9.7% versus 3.4%), spiritual (1.0% versus 0.1%), and stress/anxiety (32.1% versus 11.9%). Patients referred to HP were also less likely to prioritize herbs/supplements (6.8% versus 14.6%), neuropathy (6.5% versus 14.8%), and pain (13.0% versus 26.0%) (see Table 2 for breakdown of MYCaW results).

ESAS symptom scores during the initial integrative oncology medical consultation of patients who were referred to HP were significantly worse for all symptoms ($p \leq .01$), with the exception of pain, dry mouth, and numbness/tingling (see Table 3). Symptoms with clinically significant differences (≥ 1 point difference) included fatigue, sleep, depression, anxiety, well-being, spiritual pain, financial distress, and memory. Patients referred to HP showed higher statistically and clinically significant symptom burden: Physical Symptom Score ($M = 18.58$ versus 15.17 , $p < .001$), Psychological Distress Score ($M = 8.00$ versus 4.28 , $p < .001$), and Global Distress Score ($M = 31.37$ versus 23.03 , $p < .001$). Mean scores showed that fatigue, sleep, and well-being had the highest mean scores of all the symptoms for both patients referred and not referred to HP.

Regarding the PROMIS10 scores during the initial integrative oncology consultation, patients referred to HP had significantly lower scores, compared to patients not referred, on the PROMIS10 Global Mental Health subscale Physical Health subscale, and the Global Total

($p < .001$) (see Table 4 for results). Lower scores reflect worse mental, physical, and overall health.

Discussion

The present study is the first study to our knowledge to examine the characteristics of oncology patients referred to a health psychologist in an integrative medicine setting. Although the prevalence of mental health issues in oncology patients has been well studied [15], there is minimal literature regarding factors associated with psychology referral, especially with health psychologists. Results showed that patients referred to HP within an integrative oncology program during a calendar year did indeed present with and endorse worse mental and physical health at the time of referral than those not referred during that same time period. The findings demonstrate fidelity to the model put forth by our program, which is that HP services are to address moderate or greater emotional distress and to facilitate improvements in diet, exercise, and sleep. Patients referred to HP did in fact prioritize and report greater stress, anxiety, spiritual concerns, and depression compared to non-referrals. Furthermore, HP’s focus on healthy lifestyle changes and behavioral modification is reinforced in that referrals had higher body mass index and prioritized diet/nutrition and overall health relative to those not referred. Interestingly, it is possible that emotional and physical health concerns interact to exacerbate each other. Specifically, when someone is feeling physically ill (e.g., in pain, nauseous), they might be more likely to feel emotionally unwell. This relationship can also be reversed in that people who are more sad or anxious might be more aware of their physical ailments [16]. HP is a particularly helpful referral for these types of patients, in that HP focuses on the interplay between biopsychosocial aspects of well-being.

Also, consistent with our integrative oncology model is that HP referrals were less likely to prioritize concerns related to herbs/supplements and neuropathy and were less likely to report dry mouth and numbness/tingling. This could be due to initial evaluation and screening by the integrative physician to appropriately choose the patients who will benefit from an HP consult. Patients who were referred to HP were also less likely to have prioritized pain as a main concern for the integrative oncology consult. Unfortunately, we do not have data on why this might be occurring. In some patients, neuropathy is a concern prior to starting treatment with a neurotoxic therapy and request education on how to prevent or help manage if neuropathic symptoms develop. If patients are referred after they have completed treatment with neurotoxic agents and have no long-term residual effects, neuropathy may not be prioritized. For those prioritizing pain, it might be that these

patients are more likely referred to other integrative therapies within the clinic such as massage, acupuncture, yoga therapy, or physical therapy, all effective adjunctive treatments for pain relief. Alternatively, it is possible that patients with the primary complaint of pain were already involved in or ultimately referred to our cancer hospital's supportive care or pain clinics, which have psychologists and counselors providing psychosocial support. It is worth noting that pain management is a relevant treatment concern within HP for which CBT and other behavioral modalities are effective [17].

Although previous studies examine which patients seek integrative medicine [2] and which patients are referred to psychological services in oncology palliative care [18], we did not find any previous literature on which oncology patients are referred to HP in an integrative oncology setting. Our study appears to have both similarities and differences to patients referred to psychology in a palliative oncology setting [18]. Like Ann-Yi's study, we also found patients referred to HP were mostly White (68% and 67.1%, respectively). Interestingly, the HP referral group had higher proportions of Black patients than expected. Perhaps IMC physicians and advanced practice providers are accurately perceiving the emotional and physical distress shared by patients who are Black and thus recommending more support in the form of HP. The proportion of Black patients (14.9%) within the HP referrals is slightly higher than the proportion of Blacks in the full IMC sample (10.0%). This proportion of Black patients is slightly higher than what was reported (6.97%) for a cohort of 155,155 MD Anderson patients [19]. Of the 182 Black patients, 47 were referred to HP, which is 25.8% of the Black population seen in the Integrative Medicine Clinic (IMC). Considering that 25.8% of Black IMC patients were referred to HP, that is a higher referral rate compared to other racial groups. For comparison, 15.9% (212/1330) of White IMC patients were referred to HP, and 19.4% (27/139) of Asian IMC patients were referred. The 14.9% number refers to the percentage of patients that were referred to HP out of the total number referred (47/316). Oncology providers and integrative medicine providers should have vigilance in screening underserved communities for mental health issues and healthy lifestyle changes in order to improve access to HP for people of color.

Similar to a study of referrals in a palliative oncology setting, females were more likely to be referred to psychology [18]. Approximately 69% of IMC patients are female [2], which makes it more likely for referrals from the clinic to be female due to this sex difference. Our results are also in line with previous literature that shows women seek psychological help more often than men and men

tend to wait until they are experiencing a high symptom burden [20].

HP referrals were more likely to be younger compared to non-referred patients and less likely to be retired compared to non-referred patients, which makes sense considering that age and employment status are likely correlated. The difference between age means was not large; however, perhaps younger patients are more interested and willing to be referred to HP, whereas there may be more hesitation to meet with psychology for older individuals. A report published by the American Psychological Association showed that younger individuals are also reporting higher mental health distress [21]. This also might account for some of the differences in the ages of those referred to HP and those not referred.

Results from the present study showed that 52% of HP referrals were diagnosed with breast cancer. Breast cancer patients account for a significant portion (39%) of the IMC patient population [21], thus contributing to the high referral rate. Additionally, the breast cancer clinic and IMC partnered to create a healthy lifestyle program, where newly diagnosed breast cancer patients are screened regarding

Table 2 Comparison of top 2 patient concerns (MYCaW) for integrative oncology consultation among those referred versus not referred to health psychology ($N = 1827$)

MYCaW	Patients referred to health psychology ($n = 316$)		Patients not referred to health psychology ($n = 1511$)		<i>p</i> value
	<i>n</i>	%*	<i>n</i>	%*	
Appetite	5	2	44	3	= .18
Depression	30	10	49	3	< .001
Diet/nutrition	104	34	406	28	= .04
Dry mouth	7	2	61	4	= .11
Exercise	31	10	115	8	= .21
Fatigue	47	15	217	15	= .86
Herbs/supplements	21	7	213	15	< .001
Hot flashes	13	4	66	5	= .82
Integrative approach	51	17	264	18	= .52
Memory	7	2	38	3	= .74
Nausea	8	3	51	4	= .43
Neuropathy	20	7	216	15	< .001
Overall health	74	24	266	18	= .02
Pain	40	13	380	26	< .001
Relaxation	13	4	74	5	= .53
Sleep	31	10	138	10	= .75
Spiritual	3	1	1	0.1	< .01
Stress/anxiety	99	32	173	12	< .001
Other	5	2	53	4	= .07

Denominator in the % calculation excluded patients with missing data in each group; percentages rounded to nearest whole number

MYCaW, Measure Yourself Concerns and Well-being

Table 3 Comparison of symptom burden (ESAS) at integrative oncology consultation among those referred versus not referred to health psychology ($N = 1827$)

ESAS symptom	Patients referred to health psychology ($n = 316$) Mean (SD)	Patients not referred to health psychology ($n = 1511$) Mean (SD)	p value
Pain	3.31 (2.86)	3.41 (2.9)	.62
Fatigue	5.27 (2.65)	4.19 (2.71)	< .001
Nausea	1.37 (2.25)	1.08 (2.09)	.01
Sleep	5.57 (2.55)	4.42 (2.72)	< .001
Shortness of breath	1.83 (2.53)	1.27 (2.05)	< .001
Appetite	3.59 (2.71)	2.86 (2.73)	< .001
Drowsiness	3.18 (2.87)	2.34 (2.55)	< .001
Depression	3.26 (2.90)	1.58 (2.29)	< .001
Anxiety	4.74 (2.89)	2.70 (2.67)	< .001
Well-being	4.82 (2.35)	3.56 (2.50)	< .001
Spiritual pain	1.87 (2.50)	0.83 (1.66)	< .001
Dry mouth	2.41 (2.87)	2.17 (2.86)	.08
Hot flashes	2.72 (3.29)	1.78 (2.78)	< .001
Financial distress	3.88 (3.29)	2.24 (2.75)	< .001
Memory	4.40 (2.62)	3.38 (2.50)	< .001
Numbness/tingling	2.69 (3.07)	2.71 (3.11)	.87
Physical Symptom Score	18.58 (10.64)	15.17 (10.47)	< .001
Psychological Distress Score	8.00 (5.21)	4.28 (4.57)	< .001
Global Distress Score	31.37 (15.47)	23.02 (15.02)	< .001

ESAS, Edmonton Symptom Assessment Scale

Physical Symptom Score = sum of pain, fatigue, nausea, drowsiness, appetite, and shortness of breath (range 0–60)

Psychological Distress Score = sum of depression and anxiety (range 0–20)

Global Distress Score = sum of pain, fatigue, nausea, depression, anxiety, drowsiness, appetite, well-being, and shortness of breath (range 0–90)

health behaviors and may receive support in areas of stress management, exercise, and nutrition. As part of this initiative, early-stage breast cancer patients are often referred to HP for behavior modification. These factors likely explain the high proportion of breast cancer patients referred to HP. HP referrals were also more likely to have early stages of the disease, which is consistent with the higher proportion of overall referrals to the IMC being patients with local/curable disease [2]. Patients with advanced-stage disease and higher symptom burden are less likely to be referred to HP

since they are more likely already following with palliative care teams for symptom management and psychosocial support. Of note, HP referred patients had higher emotional and physical distress based on self-report data; however, higher distress is not necessarily a marker of worse disease status. Perhaps those with recently diagnosed early-stage cancer are experiencing distress as they adjust to their new diagnosis, perceiving the diagnosis as a “wake-up call” and an opportunity to prioritize stress management and controlling physical health problems, such as diet, exercise, and sleep.

Table 4 Comparison of overall health (PROMIS10) at integrative oncology consultation among those referred and not referred to health psychology ($N = 1822$)

PROMIS10 Subscales	Patients referred to health psychology ($n = 315$) Mean (SD)	Patients not referred to health psychology ($n = 1507$) Mean (SD)	p value
Global Mental Health	11.14 (3.12)	13.30 (3.32)	< .001
Global Physical Health	12.63 (3.03)	13.30 (3.07)	< .001
Global Total	29.32 (6.88)	32.79 (7.26)	< .001

PROMIS10, Patient-Reported Outcomes Measurement Information System; lower scores equal worse health; missing data ($n = 5$)

Study limitations

Limitations of the present study include that the selection of patients referred to HP is determined in part by the patients who are referred to the IMC. For example, some patient characteristics (e.g., breast cancer diagnosis, female, earlier disease stage) reflect the overall population referred to the IMC. Another limitation is that only a small portion of IMC patients can feasibly be referred to HP due to limited resources (two licensed psychologists) and the nature of psychotherapy, which includes repeat visits and flexible treatment plans to build a strong therapeutic relationship. Since this study was conducted at a single integrative oncology clinic, it may not be representative of the types of patients referred to HP in other cancer hospitals. Results may have been different had the referrals come from other providers within the cancer center, from outside providers, or from other institutions. It would be interesting to compare how the referral population to the HP differs from the referrals to other mental health providers, in particular with physical health and lifestyle change goals. Due to the nature of the difference in practices, no other studies were found that looked at other mental health providers' referrals regarding BMI or other similar physical health variables nor lifestyle change goals. Since our study is cross-sectional, it does not help us understand the benefits of HP consultation among our patients. Future studies should look at whether and how patients benefit from HP services.

Clinical implications

This study is clinically significant because it provides information on which patients physicians believe would benefit most from HP. By comparing those who were referred to HP to those who were not referred, the data shows physicians are more likely to refer patients who are reporting higher levels of physical and psychological distress to HP. It might be expected that referrals would endorse higher psychological distress. It is particularly noteworthy that referred patients also reported a higher physical symptom burden. These referrals are appropriate given that HP focus on the integration of physical, emotional, and social well-being.

Conclusions

The present study shows that patients referred to HP, within an integrative oncology clinic at a large comprehensive cancer center, have more severe psychological and physical symptom burden and higher BMI. This is the first study to extensively describe the patient population referred to HP in an oncology setting. Strengths of the present study include a large dataset allowing detailed

analysis to examine demographic, clinical, and patient self-reported outcomes as predictors of referral to HP over an extended period. The results may guide other oncology providers who are considering referring patients to a psychologist, especially in an integrative oncology program. The development of a workflow for decision-making regarding referrals to HP may help with optimizing referrals. We see HP as providing an essential and valuable resource for oncology patients, particularly within integrative oncology programs, due to HP's focus on well-being and healthy lifestyle. Our program can model how HP providers can be utilized to maximize healthcare services for cancer patients.

Author contribution Conceptualization: Lorenzo Cohen, Catherine Powers-James, Gabriel Lopez; provision of study materials or patients: Catherine Powers-James, Aimee J. Christie; collection and assembly of data: Telma Gomez, Catherine Powers-James, Aimee J. Christie, Gabriel Lopez; formal analysis and investigation: Aimee J. Christie, Catherine Powers-James; writing—original draft preparation: Aimee J. Christie, Catherine Powers-James; writing—review and editing: all authors.

Data availability The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Code availability Not applicable.

Declarations

Ethics approval Data was collected as part of a center-based database as part of an IRB-approved protocol.

Consent to participate Due to the low-risk nature of the data and with IRB-oversight of the protocol, the study was conducted under a consent waiver.

Consent for publication Not applicable.

Conflict of interest Lorenzo Cohen is the co-author of the book *Anti-cancer Living: Transform Your Life and Health with the Mix of Six* for which he receives royalties.

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