original report

Patient-Reported Burden of a Neuroendocrine Tumor (NET) Diagnosis: Results From the First Global Survey of Patients With NETs

abstract

Purpose Despite the considerable impact of neuroendocrine tumors (NETs) on patients' daily lives, the journey of the patient with a NET has rarely been documented, with published data to date being limited to small qualitative studies. NETs are heterogeneous malignancies with nonspecific symptomology, leading to extensive health care use and diagnostic delays that affect survival. A large, international patient survey was conducted to increase understanding of the experience of the patient with a NET and identify unmet needs, with the aim of improving disease awareness and care worldwide.

Methods An anonymous, self-reported survey was conducted (online or on paper) from February to May 2014, recruiting patients with NETs from > 12 countries as a collaboration between the International Neuroendocrine Cancer Alliance and Novartis Pharmaceuticals. Survey questions captured information on sociodemographics, clinical characteristics, NET diagnostic experience, disease impact/management, interaction with medical teams, NET knowledge/awareness, and sources of information. This article reports the most relevant findings on patient experience with NETs and the impact of NETs on health care system resources.

Results A total of 1,928 patients with NETs participated. A NET diagnosis had a substantially negative impact on patients' personal and work lives. Patients reported delayed diagnosis and extensive NET-related health care resource use. Patients desired improvement in many aspects of NET care, including availability of a wider range of NET-specific treatment options, better access to NET experts or specialist centers, and a more knowledgeable, better-coordinated/-aligned NET medical team.

Conclusion This global patient-reported survey demonstrates the considerable burden of NETs with regard to symptoms, work and daily life, and health care resource use, and highlights considerable unmet needs. Further intervention is required to improve the patient experience among those with NETs.

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INTRODUCTION

Neuroendocrine tumors (NETs) are a diverse group of malignancies that arise from neuroendocrine cells throughout the body.[1-3] Although NETs are uncommon, incidence rates continue to increase, partly because of greater awareness of the disease and increased accuracy of diagnosis.[3,4] The incidence of NETs in the United States has increased five-fold over the past 30 years, with five out of every 100,000 people being diagnosed with NETs annually.[3] Although NET incidence varies across geographic regions (higher in the Netherlands [4.9 per 100,000][4] and Canada [5.86 per 100,000][5]; lower in Japan [2.10 per 100,000][6] and Taiwan [1.51 per 100,000][7]), an overall trend toward increasing incidence is evident.[4,5,7] This increasing global incidence, together with the considerable number of people living with NETs (estimated prevalence: 35 per 100,000),[8] highlights the importance of improving awareness of this disease, increasing accurate diagnosis, and optimizing disease management.

NETs are generally graded on the basis of mitotic count and proliferative index.[9] NETs can be divided into functional (clinically symptomatic, typically characterized by the hormones they secrete) and nonfunctional (silent/nonsecretory, free of hormone-related symptoms, and generally identified incidentally) tumors,[1,10] although current evidence indicates that diagnosis and treatment

strategies should follow the same principles regardless of functional status.[11] The symptoms associated with NETs may be nonspecific or absent until more advanced stages,[1,2,12] often leading to delays in diagnosis.[2,12] Indeed, NET-related symptoms may persist for long periods (median, 9.2 years) before an accurate diagnosis is made,[2] thus potentially placing a substantial burden on both the patient and the health care system. Because of the nonspecific nature of symptoms, there seems to be no clear pathway of care for patients with NETs; patients may be seen by multiple specialists and undergo extensive and repetitive testing, leading to varying and potentially conflicting treatment recommendations and contributing to delays in an accurate diagnosis.[13] The resulting psychological and emotional burden may at least partially contribute to the reported worse health-related quality of life (HRQoL) outcomes among patients with NETs compared with the general population.[14]

Despite the considerable impact of this disease on patients' daily lives, the journey of the patient with a NET has rarely been documented, with published data being limited to small qualitative studies.[15,16] These studies highlight the lack of a standard care pathway for patients with NETs and identify a number of potential challenges, including difficulty in achieving a NET diagnosis, limited access to information about NETs and to NET-specific treatment centers, and inadequate ongoing support.

Patient experience and patient-reported outcomes are becoming increasingly important end points in oncology. The Institute for Healthcare Improvement has introduced an initiative, called the Triple Aim, to help address insufficiencies in health care and thus optimize health care system performance. These linked goals are to improve the patient experience of care, improve the health of populations, and reduce the per capita cost of health care.[17] It is believed that these goals must be addressed simultaneously to achieve health care reform, and one facet of this effort is to empower individuals and their families in the context of their health care.[17] As oncology care moves toward a more patient-centered care focus, it is important that clinicians understand the experience of NETs from the perspective of the patient.

The International Neuroendocrine Cancer Alliance (INCA) consists of a network of 18 independent charitable organizations and patient groups for individuals with NETs from 15 countries around the world. INCA, which aims to be the global voice in support of people living with NETs, collaborated with Novartis Pharmaceuticals to conduct the first global survey to gather data about the experience of patients with NETs from multiple countries. To our knowledge, this has been the first endeavor to collect information on the patient experience with NETs. The aim of this patient-reported survey was to increase understanding of the views and experiences of patients with NETs, including their needs and challenges with regard to diagnosis, management of NETs, interactions with medical teams, knowledge and awareness levels of the disease, and information sources.

The findings of this survey expand the knowledge base regarding NETs from a patient perspective, with the goal of improving disease awareness and patient care. Collecting and reporting such patient-centered data, in addition to directing improvements in patient experience and care practice, can have overarching beneficial effects on the health care system as a whole.[18]

In this publication, we present findings most relevant to the impact of NETs on patients' daily lives and on the health care system, and highlight unmet needs from the patient perspective.

METHODS

Study Design and Participants

Patients were primarily recruited online via the use of flyers, Web site postings, e-mails, and social media channels of the INCA member organizations/patient advocacy groups. For transparency, the Novartis logo was clearly displayed on all survey materials to indicate that Novartis was involved in the survey, and all materials stated that the sponsoring company or the INCA patient group partners may use the data for disease awareness purposes.

Survey Details

Survey domains and key questions were initially generated at a roundtable meeting of the INCA leadership held during the 10th annual European Neuroendocrine Tumor Society conference in Barcelona, Spain, in March 2013. Hall & Partners, a research organization, was used to construct a detailed survey to assess patients' experiences with NETs on the basis of the meeting discussions and a review of the NET literature. Fourteen NET patient health consumer groups within INCA had direct input into question development, and the final questionnaire was reviewed and edited by all members of INCA and by Novartis between May and October 2013. This anonymous survey was developed to be primarily conducted online, with an approximate time for completion of

Table 1 – Summary of Patient-Reported Sociodemographics and Clinical Characteristics

Patient Sociodemographics and Clinical Characteristics	Patients (N = 1,928)
Patient-reported sociodemographics	
Region, %	
Americas	48
Europe	40
Asia	5
Oceania	7
Age (mean), years	56.8
Age distribution (years), %	
<40	8
40-49	17
50-59	32
60-69	31
70+	12
Female, %	64
Educational level, %	
Not university educated	55
Bachelor degree or higher	45
Caregiver, %	
Yes	65
No	35
Work status, %	
Employed	
Full-time	25
Part-time	8
Self-employed	6
Retired	31
Medical disability	18
Not employed/homemaker/student	11
Patient-reported clinical characteristics	
NET type, %	
Gastrointestinal	54
Pancreas	22
Lung	12
Thymus	1
Other	8
Unknown	5
Tumor grade, %*	
1	37
2	21
3	6
Unknown/do not remember	35

(Continued on following page)

25 minutes on the basis of length. Paper surveys were also generated and distributed via patient advocacy groups and health care professionals (HCPs) to reach patients without Internet access. Both the online and paper surveys were available in eight languages: Bulgarian, Dutch, English, French, German, Japanese, Norwegian, and simplified Chinese. Hall & Partners fielded the survey from February to May 2014 and analyzed the results.

Patient-reported data on sociodemographic information (eg, age, sex, educational background), clinical characteristics (eg, NET type, years since diagnosis, functional status, tumor grade), burden of NETs on daily life and work, desired improvements, and information sources were collected. In this survey, data were purposefully self-reported to maximally reflect the patient's voice. The questionnaire covered patients' overall awareness of NETs, the diagnostic experience throughout their disease course, burden of disease, ongoing management, interactions with health care providers, experience with and access to NET treatments, and resources used for education about NETs. Questions were categorized as follows: initial screening, patient's current status, diagnosis, quality of life, NET management, NET treatment, NET education, and demographics (the full survey appears in the Data Supplement). With the exception of certain questions designed to gather numerical information, survey questions were closed ended; participants were provided options from which to choose. When patients were asked to rate a particular parameter, responses included the graded descriptors not at all, somewhat, very, and extremely, and when asked the degree to which they (dis)agreed with a particular statement, the descriptors strongly and somewhat were added to response choices.

Data Analyses

Global data were analyzed using the MERLIN (Merlinco, London, UK) survey software package. Survey responses were summarized using descriptive statistics, including means, medians, and percentages. Statistical significance is shown at a 95% CI level ($P < .05$). In some instances, responses are presented as the top two responses (eg, somewhat agree/strongly agree; a moderate amount/a lot).

RESULTS

Patient Characteristics

A total of 1,928 patients with NETs participated in the survey, with the majority being recruited through patient advocacy groups (37%) and

Table 1 – Summary of Patient-Reported Sociodemographics and Clinical Characteristics (Continued)

Patient Sociodemographics and Clinical Characteristics	Patients (N = 1,928)
Functional status, %†	
Functional	44
Nonfunctional	15
Asymptomatic	21
Unknown/do not remember	19
Time since diagnosis (mean), years	5.2
Time since diagnosis (years), %	
<5	59
5-9	27
10-14	8
15+	6
Metastatic disease at the time of diagnosis, %	58
Surgical removal of primary tumor since diagnosis, %	70

Abbreviations: Ki-67, protein encoded by the *MKI67* gene; NET, neuroendocrine tumor.

*Grade 1: NETs are relatively slow growing, Ki-67 index ⩽ 2%; grade 2: NETs have a less predictable, moderately aggressive course, Ki-67 index 3%–20%; grade 3: NETs can be highly aggressive, Ki-67 index > 20%.

†Functional NETs: produce symptoms caused by the secretions of hormones (eg, flushing, diarrhea, wheezing, cramping); nonfunctional NETs: do not secrete hormones, but they may cause symptoms caused by the tumors' growth (eg, pain, intestinal blockage, bleeding).

online sources (51%). These patients were recruited from > 12 countries in the Americas (United States [n = 758], Canada [n = 164], and other countries in North, Central, and South America [n = 6]), Asia (Japan [n = 81], Singapore, and other countries in Asia [n = 18]), Europe (Germany [n = 311], United Kingdom [n = 156], France [n = 117], Norway [n = 54], Belgium [n = 29], Bulgaria [n = 18], and other countries in Europe [n = 78]), and Oceania (n = 138). The exact number of countries could not be determined because some respondents identified the general region in which they lived rather than a specific country. Overall, the majority of respondents were from North America (n = 922; 48%) and Europe (n = 763; 40%).

Patient-reported sociodemographic parameters and clinical characteristics are summarized in Table 1. The mean age was 56.8 years, and 64% were women. Close to half of the patients (45%) had a bachelor's degree or higher, and two-thirds had a caregiver (ie, a close family member or friend to help them manage day-to-day NET-associated activities). Only 39% of patients were currently working (full-/part-time employment or self-employed) and 18% had a self-identified medical disability (not further specified). GI NETs were the most common NET type (54%), followed by pancreatic NETs (22%) and lung NETs (12%). Of the patients who knew their functional status (n = 1,551), 55% reported having functional disease. Of those who knew their tumor grade (n = 1,242), 91% reported having grade 1 or 2 tumors; 35% of all patients either did not know or had not been told their tumor grade.

Diagnostic Delays and Use of Health Care Resources

Mean patient-reported time from first symptom onset to diagnosis was 52 months; 29% of patients required ⩾ 5 years for a NET diagnosis, and 58% of patients had metastases at the time of diagnosis. Patients saw a mean of 6.2 HCPs across a mean of 11.8 doctor visits in the period of first onset of symptoms before receiving their NET diagnosis (Figs 1A and 1B).

On average, approximately three HCPs were involved in the ongoing management of patients with NETs, with oncologists/hematologists (70%) and general practitioners (58%) seen most often after diagnosis. Annually, patients reported having a mean of 5.5 NET-related tests, with 28% receiving tests six or more times per year after diagnosis.

Impact of NETs on Patients' Personal and Work Lives

Living with NETs seemed to have a considerable impact on patients' personal and work lives. Although on a scale of 1 to 6 (1 = very poor health, 6 = excellent health), patients reported a mean health score of 4, a relatively large proportion (37%) reported very poor to fair health. Patients reported experiencing numerous ongoing NET-related symptoms, such as general fatigue/muscle fatigue/weakness (56%), diarrhea (48%), and abdominal pain or cramping (41%; Fig 2). Many of these symptoms occurred on a daily basis. Most survey participants (71%) reported a moderate to substantial negative impact of NETs on their daily life, including overall energy levels (70%), finances (50%), and the ability to perform everyday household chores (45%) or care for family (39%; Fig 3A). A large proportion of patients believed that living with NETs substantially affected (a moderate amount/a lot) their emotional health (60%), the emotional health of family/friends (48%), and their relationships with family/friends (34%/34%).

Most patients (92%) reported making one or more lifestyle changes as a result of NETs, including dietary changes (58%), increased time/money spent on traveling to or from their medical appointments (52%/51%), and seeing a therapist for emotional aspects of the disease (20%; Fig 3B).

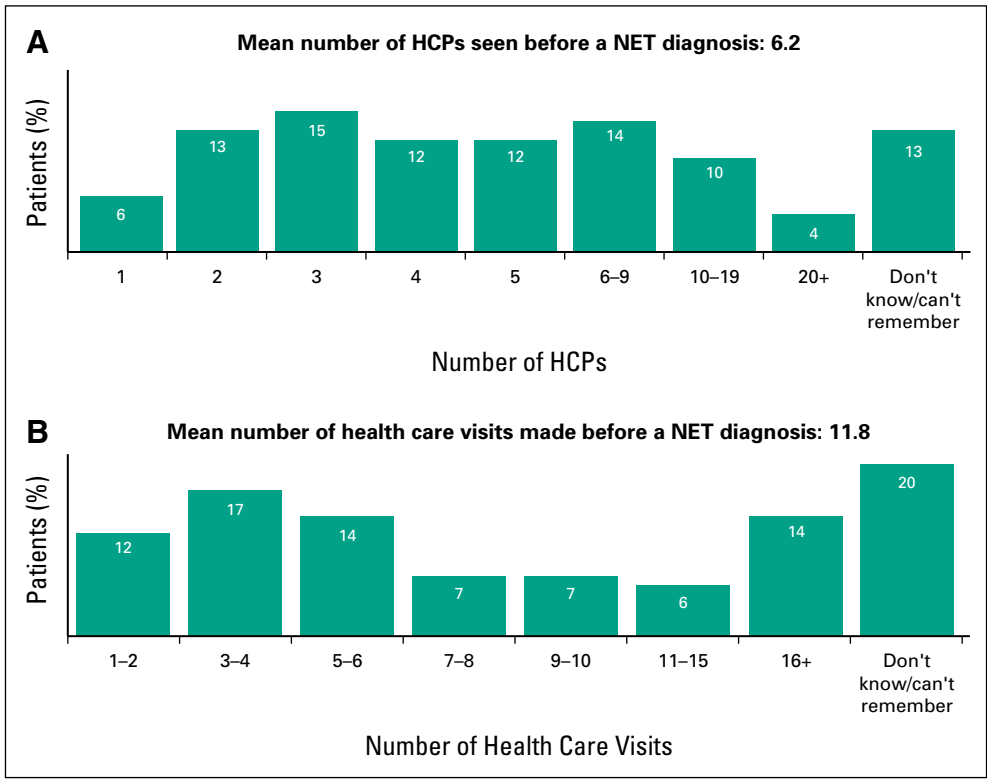


Fig 1 –
(A) The number of health care professionals (HCPs) seen before receiving a neuroendocrine tumor (NET) diagnosis. Base population: all respondents (N = 1,928). Question: Approximately how many HCPs (including all doctors, specialists, and nurses) were involved in your diagnosis of a NET? Please consider all those you saw from the time you first experienced symptoms to the time you received the diagnosis of a NET. (B) The number of health care visits made before receiving a neuroendocrine tumor (NET) diagnosis. Base population: all respondents (N = 1,928). Question: Approximately how many different visits to HCPs (including all doctors, specialists, and nurses) did you have to make? Please consider all those you saw from the time you first experienced symptoms to the time you received the diagnosis of a NET.

NETs had a significant impact on work life. Almost half of patients (49%) reported taking days off from work, 27% asked their employer to make accommodations, and 24% reduced their work hours because of NETs (Fig 3C). Of the 440 patients not currently employed or unable to work because of medical disability, 82% reported having to stop working as a direct result of their NETs.

Access Issues

Despite the high frequency of physician visits and medical tests, survey findings revealed numerous unmet needs with regard to NET management. The majority of patients desired better availability of a wider range of NET-specific treatment options (60%) and access to NET experts or a NET specialist center (56%). Close to half believed that more knowledgeable NET medical providers (47%) and a better coordinated/aligned NET medical team (45%) would improve NET care (Fig 4). In addition, many patients lacked access to treatments they know exist (Table 2). In all cases, the percentage of patients with knowledge of particular treatment options was greater than the percentage of patients with access to those options. Patients also reported having to travel an extended distance to see their NET medical providers (mean distance, 126 miles [median, 25; range, 1 to 9,942; standard deviation, 439.35] or 182 km [median, 40; range, 1 to 9,656; standard deviation, 503.38]).

DISCUSSION

To our knowledge, this is the first large, global study that attempts to characterize the impact of NETs from the patient perspective. To date, there is a scarcity of published data on the experiences and perspectives of patients with NETs, which may be in part due to the rarity of this cancer as well as difficulties in collecting patient-reported data from an international perspective. For this survey, the extensive use of online social media sources through local/regional advocacy groups enabled recruitment of a large number of patients with NETs in a relatively short period of time.

Findings from this survey brought to light the substantial impact of NETs on patients' daily lives, including their physical and emotional well-being, financial stressors, and impaired interactions with family and friends. The NET-related burden resulted in lifestyle changes and substantial financial strain and had a negative impact on patients' ability to work. Although validated HRQoL assessment tools were not used in this survey, the findings are consistent with previously conducted surveys in Norway and the United States, which reported worse HRQoL

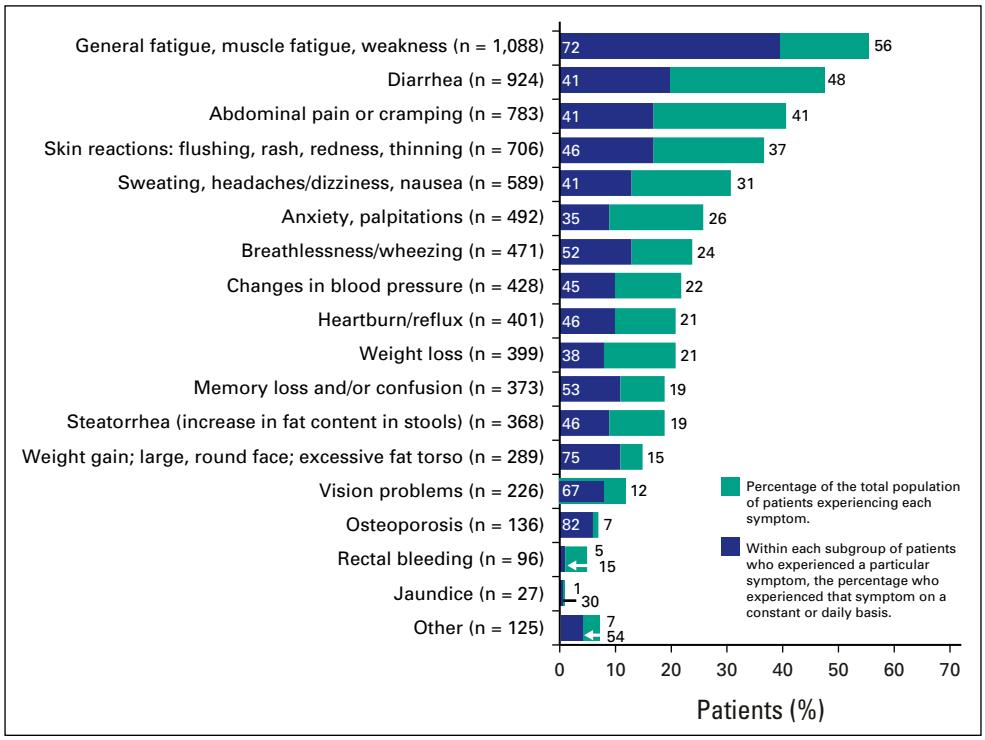


Fig 2 –
Neuroendocrine tumor (NET) symptoms experienced, often on a daily basis. Base population: all respondents (n values as indicated in figure). Questions: Which of the following symptoms, if any, do you suffer from as a result of your NET? Select all that apply. How frequently do you suffer from each of the following symptoms as a result of your NET?

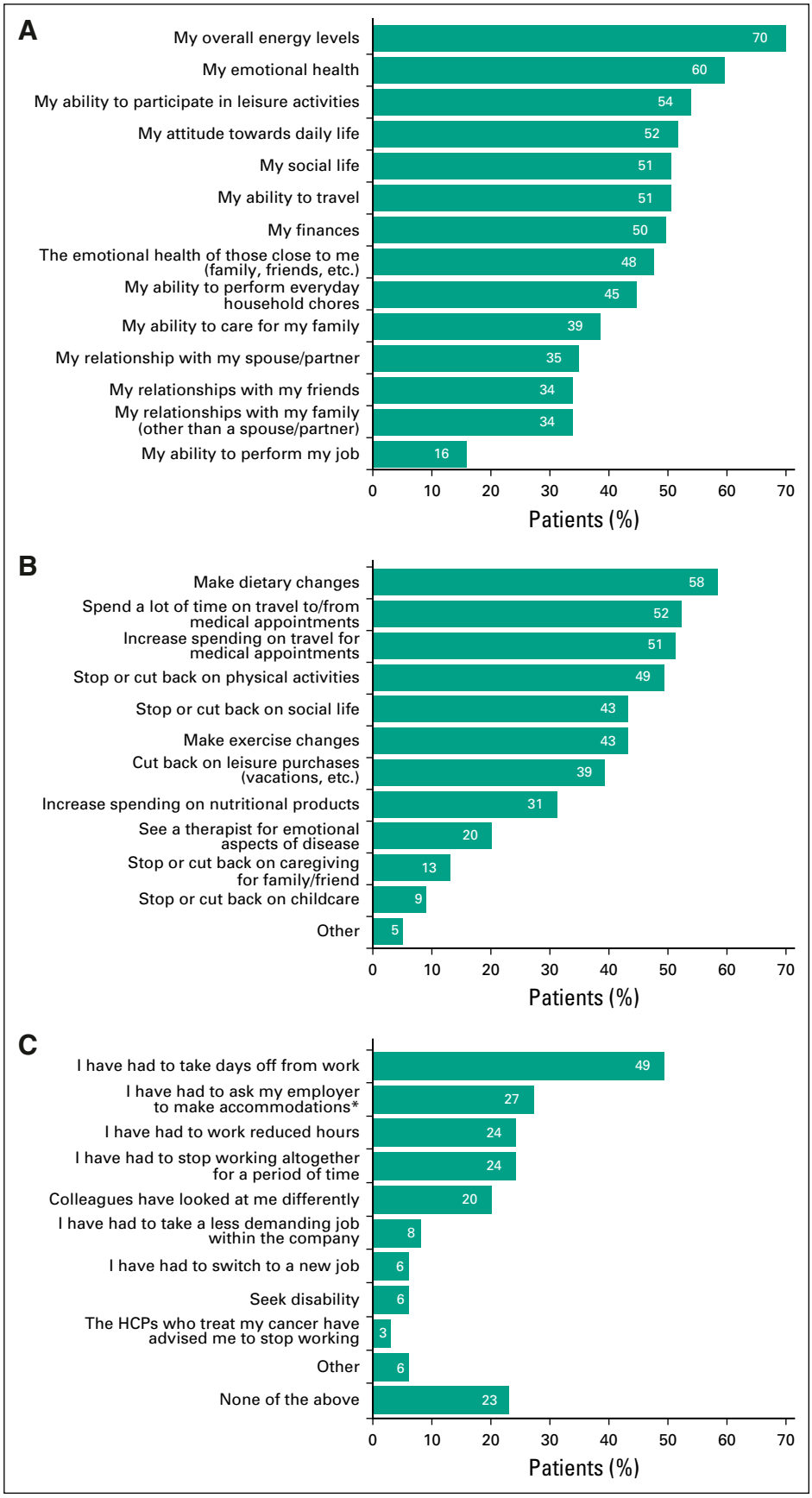
scores in patients with NETs versus the general population, as expected.[19,20] A previous US survey of cancer survivors also reported poorer HRQoL in this group compared with adults without cancer.[21]

This survey also highlighted numerous unmet needs for patients with NETs, including the desire for better access to NET-specific medical teams (ie, NET experts and specialist centers), as well as NET-specific treatments and information. A need for increased awareness of NETs among the medical community was also demonstrated, reflected by a desire for patients to have better access to more knowledgeable NET medical providers as well as a better coordinated NET medical team. Indeed, the finding that 35% of patients did not know or had not been told their tumor grade may reflect a lack of communication between patients and physicians regarding NETs. These findings are aligned with results of previous survey-based oncology studies, particularly with regard to access to information about NETs from physicians, NET-specific treatment centers, and disease-specific support.[15,16] Clearly, there is a need for better coordination and accessibility of care for patients with NETs.

It has been established that not only are patients more likely to be compliant with treatment if they are actively involved in their own health care, but also they are more likely to have a better outcome if they are well informed and assertive regarding their treatment.[18,22] Since 2001, when a report by the Institute of Medicine proposed that patient-centeredness should be one of the aims of the US health care system,[23] increasing efforts have been made to provide more patient-centered care, in part by customizing that care according to the individual patient's needs and values and placing patients in control of their own care.[24] The findings from this survey emphasize the need for more standardized pathways of NET patient care that address ongoing issues and challenges identified by patients. Patients often reported a substantial delay in diagnosis and extensive use of health care resources (involving large numbers of HCP visits and numerous tests) and also voiced the desire for better coordinated care from medical providers. Lack of these elements potentially contributes to excessive use of health care resources, affecting both patients and the health care system. This scenario is the inverse of the triple aim promoted by the Institute for Healthcare Improvement report on patient-centered care.[17,23] Success with patient-centered approaches to NET care (improved outcomes and quality of care) are increasingly being demonstrated in multidisciplinary specialist centers.[25]

Our survey has several potential limitations that should be taken into consideration, including

Fig 3 –
(A) Negative impact of neuroendocrine tumors (NETs) on daily life. Base: all respondents (N = 1,928). Question: How much has each of the following areas of your life been negatively affected, if at all, by your NET? Top two box scores are shown (a moderate amount/a lot). (B) Lifestyle changes caused by having a NET. Base: all respondents (N = 1,928). Question: Since you were diagnosed with your NET, have you had to make any of the following changes? Please select all that apply. (C) Impact of NETs on work life. *For example, flexible work schedule, work from home, adaptive devices, opportunities for rest. Base population: respondents who are working full time/part time or are self-employed (n = 741). Question: Has your NET impacted you at work in any of the following ways? Please select all that apply. HCP, health care professional.



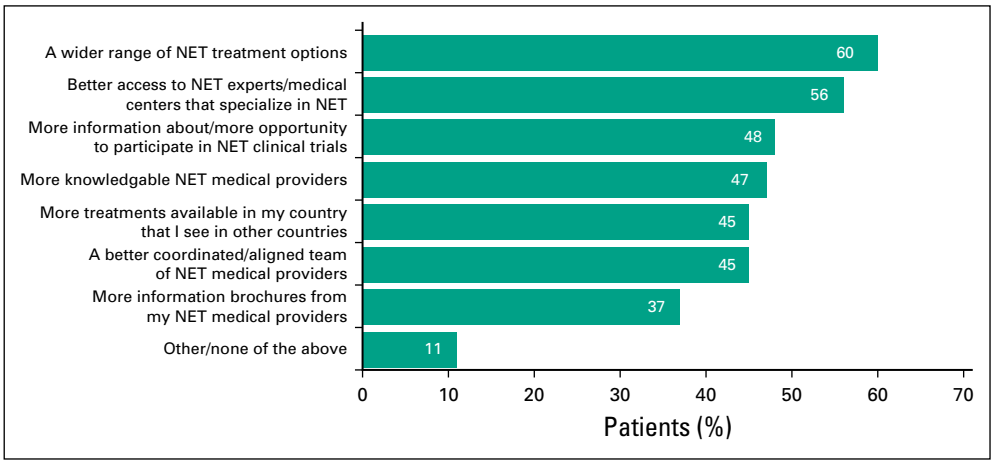


Fig 4 –
Patients' beliefs regarding improvements that would help with ongoing neuroendocrine tumor (NET) management. Base population: all respondents (N = 1,928). Question: Which of the following would help with the ongoing management of your NET?

recall bias, given the fact that findings are solely based on patient responses to closed-ended questions and not confirmed by medical records. In addition, the survey was qualitative in nature; standardized, validated HRQoL assessments were not used. Finally, most patients were recruited online (Web sites, 31%; social media, 20%) and through patient advocacy groups (37%). Respondents may have been more likely to be highly engaged, motivated care seekers. There was also a preponderance of female respondents, and nearly half of the participants (45%; Table 1) had higher education levels. As such, the survey population may not be fully representative of a heterogeneous NET population. However, comparison of the disease characteristics (site of origin, functional status, and grade/differentiation) of the patient population that participated in this survey to those included in pivotal phase 3 clinical trials on NETs revealed similarities (Data Supplement).[26-32]

These limitations notwithstanding, a key strength of this global patient-reported survey is that findings directly reflect patients' perspectives on NETs. Having an understanding of how patients experience their disease is unique and of significant value, because it directly aligns with the new movement in health care toward patient-centered care.[17,23] A concerted effort from clinicians and HCPs at various levels is needed to effectively interpret the data and successfully implement appropriate care processes to bring these improvements in the quality of patient-centered care to fruition.[33] Regional and country-specific analyses of these survey data have also been conducted; INCA is currently working with their local organizations to use this information to help better inform NET patient care according to geographic region.

In conclusion, this large, global patient survey demonstrates the considerable burden of NETs with respect to symptoms, impact on work and

Table 2 – Availability of Neuroendocrine Tumor Treatments

	Treatments I Have Heard Of*	Treatments I Have Access To†	Treatments I Have Received/Am Currently Receiving‡
Surgery	90†‡	76‡	67
Chemotherapy	75†‡	38‡	22
Drug therapy other than chemotherapy	79†‡	56‡	47
PRRT	74†‡	28‡	17
Interventional radiology	65†‡	30‡	16
Observation	74†‡	53‡	44
Other/none of the above	13†‡	7	7

NOTE. Data presented as %. Base: all respondents (N = 1,928). Question: This is a list of available NET treatments. Please select those you have heard of, those you have access to (meaning they are available to you), and those you have received/are currently receiving for the treatment of your NET.

Abbreviation: NET, neuroendocrine tumor; PRRT, peptide receptor radionuclide therapy.

*†‡Symbols appearing next to a given value indicate significant differences, $P < .05$, between the patient group specified in that column compared with those specified in the other columns.

daily life, and health care resource use and highlights unmet needs and ongoing challenges. Taken together, this survey provides valuable findings that may be used in future research to gain a better understanding of this rare disease and insights regarding best practices for disease management.

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Final approval of manuscript: All authors

AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

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REFERENCES

1. Öberg KE: Gastrointestinal neuroendocrine tumors. Ann Oncol 21:vii72-vii80, 2010 (suppl 7)
2. Vinik AI, Woltering EA, Warner RR, et al: NANETS consensus guidelines for the diagnosis of neuroendocrine tumor. Pancreas 39:713-734, 2010

3. Yao JC, Hassan M, Phan A, et al: One hundred years after "carcinoid": Epidemiology of and prognostic factors for neuroendocrine tumors in 35,825 cases in the United States. J Clin Oncol 26:3063-3072, 2008
4. Korse CM, Taal BG, van Velthuysen MLF, et al: Incidence and survival of neuroendocrine tumours in the Netherlands according to histological grade: Experience of two decades of cancer registry. Eur J Cancer 49:1975-1983, 2013
5. Hallet J, Law CH, Cukier M, et al: Exploring the rising incidence of neuroendocrine tumors: A population-based analysis of epidemiology, metastatic presentation, and outcomes. Cancer 121:589-597, 2015
6. Ito T, Sasano H, Tanaka M, et al: Epidemiological study of gastroenteropancreatic neuroendocrine tumors in Japan. J Gastroenterol 45:234-243, 2010
7. Tsai HJ, Wu CC, Tsai CR, et al: The epidemiology of neuroendocrine tumors in Taiwan: A nation-wide cancer registry-based study. PLoS One 8:e62487, 2013
8. Oberg K, Castellano D: Current knowledge on diagnosis and staging of neuroendocrine tumors. Cancer Metastasis Rev 30:3-7, 2011 (suppl 1)
9. Rindi G, Klöppel G, Couvelard A, et al: TNM staging of midgut and hindgut (neuro) endocrine tumors: A consensus proposal including a grading system. Virchows Arch 451:757-762, 2007
10. Gastrointestinal Carcinoid Tumours Treatment (PDQ®). http://www.cancer.gov/types/gi-carcinoid-tumors/patient/gi-carcinoid-treatment-pdq
11. Modlin IM, Moss SF, Gustafsson BI, et al: The archaic distinction between functioning and nonfunctioning neuroendocrine neoplasms is no longer clinically relevant. Langenbecks Arch Surg 396:1145-1156, 2011
12. Boudreaux JP, Klimstra DS, Hassan MM, et al: The NANETS consensus guideline for the diagnosis and management of neuroendocrine tumors: Well-differentiated neuroendocrine tumors of the jejunum, ileum, appendix, and cecum. Pancreas 39:753-766, 2010
13. Metz DC, Choi J, Strosberg J, et al: A rationale for multidisciplinary care in treating neuroendocrine tumours. Curr Opin Endocrinol Diabetes Obes 19:306-313, 2012
14. Beaumont JL, Zhimei L, Choi S, et al: Health-related quality of life of patients with neuroendocrine tumor compared to the United States general population. Pancreas 39:271, 2010 (abstr)
15. Feinberg Y, Law C, Singh S, et al: Patient experiences of having a neuroendocrine tumour: A qualitative study. Eur J Oncol Nurs 17:541-545, 2013
16. Griffiths J, Willard C, Burgess A, et al: Meeting the ongoing needs of survivors of rarer cancer. Eur J Oncol Nurs 11:434-441, 2007
17. Institute for Healthcare Improvement: IHI Triple Aim Initiative. http://www.ihi.org/Engage/Initiatives/TripleAim/Pages/default.aspx
18. Browne K, Roseman D, Shaller D, et al: Analysis & commentary. Measuring patient experience as a strategy for improving primary care. Health Aff (Millwood) 29:921-925, 2010
19. Haugland T, Vatn MH, Veenstra M, et al: Health related quality of life in patients with neuroendocrine tumors compared with the general Norwegian population. Qual Life Res 18:719-726, 2009
20. Beaumont JL, Cella D, Phan AT, et al: Comparison of health-related quality of life in patients with neuroendocrine tumors with quality of life in the general US population. Pancreas 41:461-466, 2012
21. Weaver KE, Forsythe LP, Reeve BB, et al: Mental and physical health-related quality of life among U.S. cancer survivors: Population estimates from the 2010 National Health Interview Survey. Cancer Epidemiol Biomarkers Prev 21:2108-2117, 2012
22. Clancy CM: How patient-centered healthcare can improve quality. http://www.psqh.com/marapr08/ahrq.html
23. Committee on Quality Healthcare in America, Institute of America: Crossing the Quality Chasm: A New Health System for the 21st Century. 1-360, 2015. https://www.nationalacademies.org/hmd/~/media/Files/Report%20Files/2001/Crossing-the-Quality-Chasm/Quality%20Chasm%202001%20%20report%20brief.pdf
24. Berwick DM: A user's manual for the IOM's 'Quality Chasm' report. Health Aff (Millwood) 21:80-90, 2002
25. Singh S, Law C: Multidisciplinary reference centers: The care of neuroendocrine tumors. J Oncol Pract 6:e11-e16, 2010
26. Rinke A, Müller HH, Schade-Brittinger C, et al: Placebo-controlled, double-blind, prospective, randomized study on the effect of octreotide LAR in the control of tumor growth in patients with metastatic neuroendocrine midgut tumors: A report from the PROMID Study Group. J Clin Oncol 27:4656-4663, 2009
27. Caplin ME, Pavel M, Ćwikła JB, et al: Lanreotide in metastatic enteropancreatic neuroendocrine tumors. N Engl J Med 371:224-233, 2014
28. Yao JC, Fazio N, Singh S, et al: Everolimus for the treatment of advanced, non-functional neuroendocrine tumours of the lung or gastrointestinal tract (RADIANT-4): A randomised, placebo-controlled, phase 3 study. Lancet 387:968-977, 2016

29. Yao JC, Shah MH, Ito T, et al: Everolimus for advanced pancreatic neuroendocrine tumors. N Engl J Med 364:514-523, 2011

30. Pavel ME, Hainsworth JD, Baudin E, et al: Everolimus plus octreotide long-acting repeatable for the treatment of advanced neuroendocrine tumours associated with carcinoid syndrome (RADIANT-2): A randomised, placebo-controlled, phase 3 study. Lancet 378:2005-2012, 2011

31. Raymond E, Dahan L, Raoul JL, et al: Sunitinib malate for the treatment of pancreatic neuroendocrine tumors. N Engl J Med 364:501-513, 2011

32. Strosberg J, Wolin E, Chasen B, et al: 177-Lu-Dotatate significantly improves progression-free survival in patients with midgut neuroendocrine tumours: Results of the phase III NETTER-1 trial. Presented at: European Cancer Congress 2015, Vienna, Austria, September 25-29, 2015 (abstr 6LBA)

33. Davies E, Cleary PD: Hearing the patient's voice? Factors affecting the use of patient survey data in quality improvement. Qual Saf Health Care 14:428-432, 2005

APPENDIX

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