2021 NATIONAL INSTITUTE OF NURSING RESEARCH/NATIONAL CANCER INSTITUTE/ ONCOLOGY NURSING SOCIETY

Research Colloquium Abstracts

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Abstract Awards for the Research Colloquium

Symptom Science

First Place (tie)

Diane Von Ah, PhD, RN, FAAN, Indiana University School of Nursing, Indianapolis, IN (Presenter)
Adele Crouch, PhD, RN, Indiana University School of Nursing, Indianapolis, IN
Association of Cardiotoxicity and Cancer and Cancer Treatment-Related Cognitive Impairment in Breast Cancer Survivors

Demarrius Young, National Institutes of Health (Presenter)
Dorela Shuboni-Mulligan, NIH/NCI/CCR/NOB, Bethesda, MD; Mark Gilbert, NIH/NCI/CCR/NOB, Bethesda, MD; DeeDee Smart, Radiation Oncology Branch, Bethesda, MD; Terri Armstrong, NIH/NCI/CCR/NOB, Bethesda, MD; Julianie De La Cruz Minyety, NIH, Bethesda, MD
Regional Dose Response Assessment of Sleep and Circadian Brain Circuitry in Cranial Radiation-Induced Hypersomnolence (C-RIH) Mouse Model

Second Place

Kord Kober, PhD, University of California, San Francisco (Presenter)
Christine Miaskowski, UCSF, San Francisco, CA; Bruce Cooper, UCSF, San Francisco, CA; Steven Paul, UCSF, San Francisco, CA; Jon Levine, UCSF, San Francisco, CA; Thomas Hoffmann, UCSF, San Francisco, CA
Variations in Mitochondrial Dysfunction (MD) Related Genes Are Associated With Sensory Profiles of the Lower Extremities (LE) in Survivors With Chemotherapy (CTX) -Induced Peripheral Neuropathy (CIPN)

Third Place

Carolyn Harris, University of California San Francisco (Presenter)
Christine Miaskowski, UCSF, San Francisco, CA; Bruce Cooper, UCSF, San Francisco, CA; Steven Paul, UCSF, San Francisco, CA; Kord Kober, UCSF, San Francisco, CA
Co-occurrence of Evening Fatigue and Depression Profiles Are Associated With Poorer Quality of Life (QOL) Outcomes in Outpatients With Cancer Receiving Chemotherapy (CTX)

Symptom Management

First Place

Amanda King, PhD, RN, National Cancer Institute, Neuro-Oncology Branch, Bethesda, MD (Presenter)
Dorela Shuboni-Mulligan, NIH/NCI/CCR/NOB, Bethesda, MD; Elizabeth Vera, NIH/NCI/CCR/NOB, Bethesda, MD; Sonja Crandon, NIH/NCI/CCR/NOB, Bethesda, MD; Eric Burton, NIH, Bethesda, MD; Javier Gonzalez Alarcon, NIH/NCI/CCR/NOB, Bethesda, MD; Heather Leeper, NIH/NCI/CCR/NOB; Marta Penas-Prado, NIH/NCI/CCR/NOB, Bethesda, MD; Brett Theeler, Department of Neurology, Walter Reed National Military Medical Center, Bethesda, MD; Jing Wu, NIH/NCI/CCR/NOB, Bethesda, MD; Mark Gilbert, NIH/NCI/CCR/NOB, Bethesda, MD; Terri Armstrong, NIH/NCI/CCR/NOB, Bethesda, MD
Exploring the Prevalence and Burden of Sleep Disturbance in Primary Brain Tumor Patients

Second Place

Victoria Marshall, PhD, RN, University of South Florida, Tampa, FL (Presenter)
Barbara Given, Michigan State University, East Lansing, MI; Rebecca H Lehto, MSU, East Lansing, MI; Charles Given, MSU, East Lansing, FL; Alla Sikorskii, MSU, East Lansing, MI
The Different Impact of Symptoms and Adverse Events on Medication Beliefs in Patients Newly Prescribed Oral Anticancer Agents

Abstract Awards *Continued*

Third Place

Katherine Boyarsky, Spaulding Hospital, Cambridge, MA (Presenter)
Samantha O'Neil
Does the Development of Oncology-Specific Simulations and Hands-On Learning Improve Oncology Nurse Confidence?

Palliative and Psychosocial Care Topics

First Place (tie)

Betty Ferrell, MSN, PhD, City of Hope National Medical Center, Duarte, CA (Presenter)
Marianna Koczywas, City of Hope, Duarte, CA; Vincent Chung, City of Hope, Duarte, CA; Thomas Smith, John Hopkins Sidney Kimmel Comprehensive Cancer Institutes, Baltimore, MD; Nora Ruel, City of Hope Comprehensive Cancer Center, Duarte, CA
A Palliative Care Intervention for Patients on Phase 1 Studies

Marie Flannery, PhD, RN, AOCN®, University of Rochester School of Nursing, Rochester, NY (Presenter)
Sixu Meng, Berkley, Berkley, CA; Zhihong Zhang, University of Rochester School of Nursing, Rochester, NY; Huiwen Xu, University of Rochester Medical Center, Rochester, NY; Supriya Mohile, University of Rochester, Rochester, NY; Eva Culakova, University of Rochester, Rochester, NY
Using Sankey Flow Diagrams to Visualize the Symptom Experience in Older Adults With Cancer

Second Place

Robin Lally, PhD, MS, BA, RN, AOCN®, FAAN, University of Nebraska Medical Center, Omaha, NE (Presenter)
Kevin Kupzyk, UNMC, Omaha, NE; Allison Coates, UNMC, Omaha, NE; Jill Scott, UNMC College of Nursing, Omaha, NE; Mary Onyarin, UNMC College of Nursing, Omaha, NE; Elizabeth Reed, UNMC, Omaha, NE
Choice Matters: Exploring the Impact of Patient Reported Decision Quality and Satisfaction on Symptom Burden in Young Breast Cancer Survivors 2 to 4 Years Post-treatment

Third Place

Varna Jammula, National Institutes of Health (Presenter)
Elizabeth Vera, NIH/NCI/CCR/NOB, Bethesda, MD; Lisa Boris, NIH/NCI/CCR/NOB, Bethesda, MD; Nicole Lollo, NIH, Bethesda, MD; Eric Burton, NIH, Bethesda, MD; Javier Gonzalez Alarcon, NIH/NCI/CCR/NOB, Bethesda, MD; Heather Leeper, NIH/NCI/CCR/NOB; Marta Penas-Prado, NIH/NCI/CCR/NOB, Bethesda, MD; Jing Wu, NIH/NCI/CCR/NOB, Bethesda, MD; Mark Gilbert, NIH/NCI/CCR/NOB, Bethesda, MD; Terri Armstrong, NIH/NCI/CCR/NOB, Bethesda, MD
Feasibility and Utility of the Brief Montreal Cognitive Assessment (MoCA) in Primary Brain Tumor Patients

Hot Topics

First Place

Soo Jung Kim, Memorial Sloan Kettering Cancer Center, New York, NY (Presenter)
Armin Shahrokni, MSKCC, New York, NY; Beatriz Korc-Grodzicki, MSKCC, New York, NY; Hayley Litchfield, MSKCC, New York, NY; Charlotte Malling, MSKCC, New York, NY; Kristen Fessele, MSKCC, Basking Ridge, NJ
Surviving the Pandemic: A Retrospective Review of Older Cancer Patients Admitted With COVID-19

Second Place

Lauri Linder PhD, APRN, CPON®, University of Utah, Salt Lake City, UT (Presenter)
Noah Zanville, HCA Healthcare Center, Asheville, NC; Bevin Cohen, The Mount Sinai Hospital, New York, NY; Tamryn Gray, Dana-Farber Cancer Institute, Boston, MA; Janice Phillips, Chicago; Angela Starkweather, University of Connecticut, Storrs, CT; Katherine Yeager, Nell Hodgson Woodruff School of Nursing, Emory University, Atlanta, GA; Mary E. Cooley, Dana-Farber Cancer Institute, Boston, MA
Development of the Oncology Nursing Society's® Research Agenda in Response to COVID-19

Third Place (tie)

Molly Maher, NIH/NCI/CCR/NOB, Bethesda, MD (Presenter)
Kristin Odom, NIH/NCI/CCR/NOB, Bethesda, MD; Brittany Cordeiro, NIH/NCI/CCR/NOB, Bethesda, MD; Mark Gilbert, NIH/NCI/CCR/NOB, Bethesda, MD; Terri Armstrong, NIH/NCI/CCR/NOB, Bethesda, MD
Use of Multidisciplinary Teams and Multi-Media Approaches to Develop and Disseminate Symptom and Disease Educational Materials for Rare Central Nervous System (CNS) Tumor Patients

Victoria Marshall, PhD, RN, University of South Florida, Tampa, FL (Presenter)
Melody Chavez, University of South Florida, Tampa, FL; Tina Mason, Moffitt Cancer Center, Tampa, FL; Dina Martinez-Tyson, University of South Florida, Tampa, FL
Technology-Based Interventions to Address the Psychological Impact of COVID-19 in Patients Undergoing Cancer Treatment

Mid-Career Investigator Award

Dr. Lisa Carter-Harris, Memorial Sloan Kettering Cancer Center

Mentor–Mentee Award

Dr. Deborah Watkins Bruner, Emory University, Mentor
Dr. Jinbing Bai, Emory University, Mentee

Mentor–Mentee Award

Dr. Chris Miaskowski, UCSF, Mentor
Dr. Kord Kober, UCSF, Mentee

PODIUM ABSTRACTS

OUTSTANDING ABSTRACTS

COVID-Related

AFRICAN AMERICAN MALE KNOWLEDGE OF AND RESPONSES TO THE COVID-19 PANDEMIC

Timiya Nolan, The Ohio State University Wexner Medical Center, Columbus, OH; Sarah Addison, The Ohio State University, Columbus, OH; Alicia McKoy, The Ohio State University, Columbus, OH; John Gregory, African American Male Wellness Agency, Columbus, OH; Joshua Joseph, The Ohio State University Medical Center, Columbus, OH; Darrell Gray, The Ohio State Unviversity Wexner Medical Center, Columbus, OH

Significance and Aims The novel coronavirus (COVID-19) pandemic has disrupted daily life and is the nidus of over 15 million COVID-19 infections and 280 thousand deaths in the United States. African Americans, especially men, have been disproportionately burdened by poor COVID-19 outcomes. Yet, little data exists surrounding African American male knowledge of and responses to pandemics. This study explored COVID-19 knowledge, perceived vulnerability, and healthcare system distrust among African American men. Methods Adult African American men participating in a community-based wellness pilot study were recruited to participate in semi-structured focus groups. In NVivo 12 software, verbatim transcripts were thematically analyzed by three coders. Codes were iteratively refined and reduced into themes with consensus. Results African American men (N=21) ages 34 to 72 participated in four focus groups. Themes salient across groups were that COVID-19 is a pandemic that affects "us" more (incidence, mortality, social impact), COVID-19 has led to a world that is "changed" (shifted modes/frequencies of interactions, priorities, and trust), COVID-19 requires concerted efforts to educate and activate African American families to get and stay healthy, and African American culture centers resiliency against systemic threats and uncertainty. Conclusions and Implications Participants were not only knowledgeable about the COVID-19 pandemic, but were actively engaged in information seeking and self-/family- care to reduce risk of transmission, improve health, and remain positive during times of uncertainty. Findings will be used to inform educational interventions to increase uptake of COVID-19 knowledge and recommended behaviors in African Americans.

Palliative and Psychosocial Care

SELF-ADVOCACY BEHAVIORS AND NEEDS IN WOMEN WITH ADVANCED CANCER: ASSESSMENT AND DIFFERENCES BY SOCIAL DETERMINANTS OF HEALTH

Teresa Thomas, University of Pittsburgh School of Nursing, Pittsburgh, PA; Cathy Bender, School of Nursing, University of Pittsburgh, Pittsburgh, PA; Peg Rosenzweig, School of Nursing, University of Pittsburgh, Pittsburgh, PA; Heidi Donovan, University of Pittsburgh School of Nursing, Pittsburgh, PA; Kai-Lin You, University of Pittsburgh School of Nursing, Pittsburgh, PA; Yael Schenker, University of Pittsburgh School of Medicine, Pittsburgh, PA

Significance and aims: Patients with cancer self-advocate to get their needs met. Self-advocating is hypothesized to improve patient outcomes, which is particularly important for patients who are vulnerable due to social determinants of health (SDH). The study aims are to: (1) describe how self-advocacy behaviors and needs associate with patient-reported outcomes and (2) determine if these relationships vary based on SDH. Methods: We analyzed baseline data from a prospective randomized clinical trial evaluating a self-advocacy intervention among adult women (N=78) newly diagnosed with advanced breast or gynecologic cancer (NCT03339765). We collected the following patient-reported measures: self-advocacy behaviors (FSACS Scale), self-advocacy needs (investigator-developed), quality of life (FACT-G), symptom burden (MDASI), mood (HADS), and socio-demographic characteristics including SDH. For Aim 1, we conducted descriptive and correlational analyses. For Aim 2, we conducted analyses of variance. Results: Participants reported moderate to high self-advocacy behaviors: informed decision-making ($\bar{X}$=4.9±0.9), effective communication with healthcare providers ($\bar{X}$=4.9±0.8), and connected strength ($\bar{X}$=4.4±0.9). The highest ranked self-advocacy needs included finding information (56%;n=44), talking with healthcare providers (47%;n=37), and managing symptoms (31%;n=24). Self-advocacy behaviors were associated with higher quality of life and lower symptom burden. Self-advocacy behaviors and needs did not differ by SDH. Conclusions and implications: Women newly diagnosed with advanced cancer report moderate-to-high levels of self-advocacy behaviors and a variety of self-advocacy needs which are related to several patient-reported outcomes but do not differ by SDH. Future research should assess how self-advocacy evolves over a woman's cancer experience including among women at-risk for disparities in outcomes.

Symptom Science

LIVING WITH A CENTRAL NERVOUS SYSTEM (CNS) TUMOR: FINDINGS ON LONG-TERM SURVIVORSHIP FROM THE NIH NATURAL HISTORY STUDY

James Rogers, NIH/NCI/CCR/NOB; Elizabeth Vera, NIH/NCI/CCR/NOB, Bethesda, MD; Alvina Acquaye, NIH; Amanda King, National Cancer Institute; Heather Leeper, NIH/NCI/CCR/NOB; Javier Gonzalez Alarcon, NIH/NCI/CCR/NOB, Bethesda, MD; Eric Burton, NIH/NCI/CCR/NOB, Bethesda, MD; Marta Penas-Prado, NIH/NCI/CCR/NOB, Bethesda, MD; Brett Theeler, Department of Neurology, Walter Reed National Military Medical Center, Bethesda, MD; Jing Wu, NIH/NCI/CCR/NOB, Bethesda, MD; Mark Gilbert, NIH/NCI/CCR/NOB, Bethesda, MD; Terri Armstrong, NIH/NCI/CCR/NOB, Bethesda, MD

Significance and aims: Central nervous system (CNS) tumors are associated with high symptom burden at diagnosis, with limited published reports on long-term survivorship (surviving >5 years). We describe cross-sectional patient-reported outcomes (PRO) data from long-term survivors (LTS) with CNS tumors. Methods: Clinical/treatment characteristics and PROs, including symptom burden and interference (MDASI-BT/SP), perceived cognition (Neuro-QOL), anxiety and depression (PROMIS), and general health status (EQ-5D), were systematically collected on 248 adult LTS between 9/2016–8/2019. Descriptive statistics and regression analysis were used to report results. Results: Participants were primarily White (83%) males (51%) with high-grade tumors (59%) and a median age of 47 years (19–82). Severe anxiety, depression, and cognitive symptoms were reported in up to 25% of the entire sample. Forty-two percent of brain tumor patients (N=222) reported no moderate-to-severe symptoms while 45% reported ≥3; top symptoms included fatigue (40%), difficulty remembering (29%), and drowsiness (28%). Among spine tumor patients (N=42), nearly half reported moderate-to-severe weakness, pain, fatigue, and numbness/tingling, with 72% experiencing activity-related interference. Brain tumor LTS at higher risk for severe symptoms were more likely to be younger ($p=0.038$), unemployed ($p<0.001$), and have poor KPS ($p<0.001$) while high-risk spinal cord tumor LTS had poor KPS and received any tumor treatment (all $p\leq0.006$). Conclusions and implications: Our findings indicate that LTS fall into distinct cohorts that have either no significant symptoms or very high symptom burden. These results underscore the need to incorporate longitudinal analyses to better understand risk for adverse outcomes and develop programs to address survivorship care needs.

SYMPTOM CLUSTERS IN CANCER AND EXTRACELLULAR VESICLES AS SYSTEMIC MARKERS OF INFLAMMATION

Delia Sass, NINR, Bethesda, MD; Wendy Fitzgerald, NICHD/NIH, Bethesda, MD; Ann Berger, University of Nebraska Medical Center, Omaha, NE; Isaias Torres, NINR, Rockville, MD; Kevin Kupzyk, University of Nebraska Medical Center, Omaha, NE; Leonid Margolis, NICHD/NIH, Bethesda, MD; Leorey Saligan, NINR/NIH, Bethesda, MD

Significance and aims: Cancer survivors often experience psychoneurological symptom clusters that include cancer-related fatigue (CRF), pain, depression, sleep disturbances, and cognitive impairments, affecting their quality of life. These symptoms share a common systemic inflammatory mechanism; yet, little is known about these systemic inflammatory markers. This study explored the relationships between extracellular vesicle (EV)- associated inflammatory markers and psychoneurological symptom clusters in men with prostate cancer. Methods: This observational study followed 40 men with prostate cancer at the start (T1) of external beam radiation therapy (EBRT) and three months (T2) post-treatment, and 20 men with prostate cancer on active surveillance (AS). Participants completed questionnaires to assess fatigue, sleep disturbances, depressive symptoms, and cognitive fatigue. EVs were isolated using ExoquickTM; 45 soluble, and EV-associated immune markers were measured on a Luminex 200 System. All statistical analysis was completed in IBM SPSS Grad pack 24.0. Results: Psychoneurological symptom clusters were identified using principal component analysis. EBRT T1 symptom clusters did not include depression; whereas, EBRT T2 and AS symptom clusters included CRF, sleep disturbance, sleep impairment, cognitive fatigue, and depression. EV-associated and soluble IL-21 and RANTES significantly correlated with the EBRT T1 psychoneurological symptom cluster; soluble IFNα2, IL-9, and IL17 significantly correlated with the ERBT T2 cluster; and soluble survivin correlated with AS cluster. Conclusions and implications: EV–associated and soluble immune markers may elucidate the systemic inflammatory underpinnings of symptom clusters, opening new avenues for future research and understanding of the symptom clusters.

FATIGUE, DEPRESSIVE SYMPTOMS, PHYSICAL ACTIVITY, AND CARDIORESPIRATORY FITNESS

IN POSTMENOPAUSAL WOMEN WITH BREAST CANCER

Jennie Duquette, University of Pittsburgh, Pittsburgh, PA; Cheryl Cuglewski, University of Pittsburgh, Pittsburgh, PA; Susan Sereika, The University of Pittsburgh, Pittsburgh, PA; Kirk Erickson, The University of Pittsburgh, Pittsburgh, PA; Amanda Gentry, University of Pittsburgh School of Nursing, Pittsburgh, PA; Cathy Bender, School of Nursing, University of Pittsburgh, Pittsburgh, PA

Significance and Aims: Fatigue and depressive symptoms often co-occur in women with breast cancer with significant implications for quality of life. Physical activity may reduce these symptoms. We explored relationships among fatigue, depressive symptoms, physical activity (PA), and cardiorespiratory fitness (CF) in postmenopausal women with early-stage breast cancer. Methods: Using a cross-sectional design, we measured fatigue, depressive symptoms, PA, and CF within two years of completing primary treatment. Depressive symptoms were assessed using the Beck Depression Inventory-II, fatigue with the PROMIS 8-item Fatigue measure, PA with the SenseWear Armband, and CF with submaximal graded exercise tests. Data were analyzed using partial correlations, controlling for age and SenseWear Armband wear-time. Study findings: On average, participants (n=94) were 63.29±7.61 years old with a BMI of 31.29±6.53, and a relative peak VO2 of 17.27±3.88 ml/kg/min. Participants reported mild depressive symptoms (5.66±4.93) and an average fatigue score of 18.40±7.07. Higher average moderate PA & daily minutes of moderate-to-vigorous PA were associated with less depressive symptoms (r=–.21, p=.046; r=–.209, p=.048, respectively). Higher average steps per day (r=–.248, p=.018), higher moderate average PA (r=–.302, p=.004), average daily minutes of moderate-to-vigorous PA (r=–.299, p=.004) and average daily active energy expenditure (r=–.27, p=.01) were associated with less fatigue. Conclusions and Implications: Results suggest that higher levels of PA and CF are associated with less depressive symptoms and fatigue for women with breast cancer. Future research is needed to further investigate how to manage depressive and fatigue symptoms in the breast cancer survivorship journey.

POSTER ABSTRACTS

HOT TOPICS: HEALTH DISPARITIES

Health Disparities

STORY+ SMARTPHONE APPLICATION FOR ENDOCRINE THERAPY TREATMENT ADHERENCE FOR AFRICAN AMERICAN WOMEN WITH BREAST CANCER—DESIGN AND USABILITY TESTING

Sue Heiney, University of South Carolina; Sara Donevant, University of South Carolina, Columbia, SC; Akanksha Singh, University of South Carolina, Department of Integrated Information Technology College of Engineering and Computing, Columbia, SC; Jingxi Sheng, University of South Carolina; Benjamin Schooley, University of South Carolina, Department of Integrated Information Technology College of Engineering and Computing, Columbia, SC

African American (AA) women with breast cancer (BrCa) have 40% greater mortality and worse adherence to endocrine therapy (ET) than White women. ET has significant survival benefits. A smartphone application (app) to improve ET adherence could decrease mortality. Our purpose was to create, refine and test the app, STORY + (Sisters Tell Others & Revive Yourself) for AA BrCa survivors through iterative cycles. We collected and analyzed qualitative and quantitative interview data from 20 AA BrCa survivors to inform the first version of STORY+. We found that AA BrCa survivors used reminders and calendars for adherence but wanted more organizational options. Using this data, we created STORY+ with a dashboard, personalized reminders and individualized ET medication and side effect information. In three serial focus groups, we presented subsequent versions of STORY+ to AA BrCa survivors using a "talk aloud" protocol to determine benefits, challenges, and usability. Participants wanted an in-app community for story sharing, a side effect tracker, and a personal cancer history. The side effect tracker was intended to improve communication with oncology healthcare providers (HCP) about the intensity of side effects. The cancer history provided a succinct summary of diagnosis and treatment for non-oncology HCPs. Participants endorsed all components of the completed app and the inclusion of cultural norms. Recommendations from HCPs and health literacy experts included additions to the patient history, medication and side effects, and improved health literacy. Our findings demonstrate that STORY+ has good usability and is now ready for proof-of-concept and feasibility testing.

SCOPING REVIEW EVIDENCE CAN INFORM SYMPTOM SCIENCE FOR IMMIGRANT CANCER SURVIVORS IN THE UNITED STATES

Joan Such Lockhart, Duquesne University School of Nursing, Pittsburgh, PA; Melinda Granger Oberleitner,

University of Louisiana at Lafayette, College of Nursing and Allied Health Professions, Lafayette, LA; David A. Nolfi, Duquesne University, Pittsburgh, PA

Significance and Aims: Immigrants who are cancer survivors experience multiple challenges in the United States (US). Evidence gleaned from scoping reviews of published research targeting the experiences of this vulnerable population can inform symptom science, practice, and policy aimed at reducing health disparities. Two scoping reviews explored the experiences of Hispanic/Latinx and Asian immigrant adult cancer survivors (Lockhart, Oberleitner, & Nolfi, 2019, 2020). Methods: The scoping reviews followed the rigorous 5-step method by Arksey and O'Malley (2005) that enables a general understanding of published evidence on a topic. Hispanic/Latinx and Asian immigrants were targeted due to their growing numbers in the US. Searches were conducted using three major databases for research published in English over the past decade about each immigrant group. Final results produced 18 and 32 studies, respectively. Results: Analysis provided a unique perspective about each immigrant group and evidence to potentially address existing gaps. While reviews revealed common themes (survival patterns, barriers, and quality of life), details contained in subthemes illustrated very diverse experiences grounded in each respective culture. Also, the Hispanic/Latinx review described issues related to decision-making in cancer care, while the Asian review addressed culturally-informed care. Conclusions and Implications: Scoping review methodology provided a systematic approach to collect and analyze existing evidence about the experiences of cancer survivors who are US immigrants. Results illustrate unique cultural factors to consider when developing symptom-related interventions to address health disparities for each immigrant group. Experts should consider applying scoping methodology to inform future strategies related to cancer care.

TARGETING SMARCB1 IN PEDIATRIC CHORDOMA DEVELOPMENT

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Significance: Pediatric chordoma is a rare aggressive primary malignancy of the axial skeleton, originating from notochordal tissue with a propensity for metastasis. The clinically aggressive poorly-differentiated chordomas arise from inactivation of SMARCB1 (SNF5). SMARCB1 is a key subunit in the SWI/SNF chromatin-remodeling complex. Poorly-differentiated chordomas disproportionately affect children. Currently, there are no approved therapies, especially the highly aggressive SMARCB1neg poorly-differentiated chordomas. Unfortunately, chordomas do not respond to cytotoxic therapy and the identification of therapeutic targets has been challenging due to the infrequent occurrence of clinically actionable somatic mutations. The combination of these factors contributes to a dismal survival rate. This dire prognosis highlights an urgent need for identifying new treatments and improving pediatric patient outcomes. Methods: To identify mechanisms by which SMARCB1 loss drives poorly-differentiated developments, we examined the effects of SMARCB1 re-expression in the SMARCB1neg chordoma cell lines, Ch22 and UM-Chor5. Using an inducible SMARCB1 vector (pIND20-SNF5), we developed stable Ch22 and UM-Chor5 cells with inducible SMARCB1 expression. 24h and 48h after induction of SMARCB1, we observed an increased protein level of SMARCB1. SMARCB1neg chordoma cell lines lacked expression and CDKN2A p16INKa expression wasn't detected. Results: Our data establish SMARCB1 re-expression in SMARCB1neg chordomas alters the repertoire of SWI/SNF complexes, perhaps restoring those associated with cellular differentiation. Our finding supports a model where SMARCB1 inactivation blocks the conversion of growth-promoting SWI/SNF complexes to differentiation-inducing ones. Conclusion: Therefore, restoration of SMARCB1 in SMARCB1neg chordomas cells creates a unique opportunity to identify therapeutic vulnerabilities.

USE OF MULTIDISCIPLINARY TEAMS AND MULTI-MEDIA APPROACHES TO DEVELOP AND DISSEMINATE SYMPTOM AND DISEASE EDUCATIONAL MATERIALS FOR RARE CENTRAL NERVOUS SYSTEM (CNS) TUMOR PATIENTS

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Significance and aims: Primary CNS tumors are <2% of all cancers. Furthermore, patients are highly symptomatic while trying to navigate care for their rare disease while evidence-based tumor and symptom education is limited. Our primary objective was to create and disseminate patient-centered content utilizing multidisciplinary teams and communication science to improve access to content. Methods: The multidisciplinary team, including NCI neuro-oncology scientists and providers, developed content from evidence-based sources, partnered with communication specialists to ensure health literacy, and established outreach principles for use on social media, newsletters, and web-and app-based programs. Web-based analytics assessed outreach and efficacy. Results: Educational content for 12 rare tumors and 6 self-care topics was created and shared on the NCI-CONNECT website, newsletters, and social media (private Facebook group and Twitter). Since launching the website in September 2018, visits have increased 1,492%. The content was also shared directly to 5,247 newsletter subscribers, 4,198 Twitter followers with >1 million impressions per year, 313 Facebook members, 9 non-profit organization partners, and thousands of attendees at >10 patient-focused neuro-oncology events. This outreach approach is now being replicated for a symptom tracking and self-care communication mobile app launching in 2021. Conclusions and implications: By marrying patient-centered communication science, education, and outreach, a team successfully created highly sought content that reflects the unique needs and abilities of CNS tumor patients and families. This material can educate neuro-oncology patients on their specific tumor, promote self-care, facilitate symptom management, and empower families to advocate for their unique needs, reaching outside traditional healthcare systems.

CHARACTERIZATION OF SYMPTOM BURDEN IN DIVERSE ETHNORACIAL GROUPS WITH CNS TUMORS: A REPORT FROM THE NEURO-ONCOLOGY BRANCH (NOB) NATURAL HISTORY STUDY (NHS)

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Patients with central nervous system (CNS) tumors are highly symptomatic, reporting 10 co-occuring and 3 moderate-severe symptoms on average. However, studies underrepresent different ethnoracial populations and disparities in healthcare leading to minority patients presenting with advanced disease and resultant increased symptom burden. Our purpose was to evaluate differences in symptom burden/function in diverse ethnoracial groups with CNS tumors. Symptom burden (MDASI-BT) was collected from patients enrolled in the NHS from 09/2016–02/2020. Descriptive statistics, and standardized classification of symptom severity were used to describe sample characteristics. Significance level was $p < 0.05$. One hundred eighteen patients self-identified as ethnically diverse with 30% Black/African American, 23% Asian, and 47% Hispanic/Latinos. Most patients were male (53%) with a median age of 50 (range 21–79). There were differences in KPS status among the ethnoracial groups, with 48% Asians, 64% Black/African American and 36% Hispanic/Latino having low KPS (≤ 80). Among patients with a low KPS, most Asians (≥50%) reported 10 moderate-to-severe symptoms, the majority of Black/African Americans reported 4 moderate-to-severe symptoms while Hispanic/Latinos only reported one. The overall top five symptoms varied by ethnoracial group. Fatigue was a common top symptom among all groups. Hispanic/Latino reported distress (27%) and irritability (25%), Asians reported feeling sad (37%) and Black/African Americans reported pain (31%). Symptom reports vary by ethnoracial group and are dissimilar in frequency and severity compared to whites. Future studies exploring these findings in a larger cohort are warranted to inform assessment and management in these vulnerable populations.

THE RELATIONSHIP BETWEEN BASELINE FACTORS AND DOSE ALTERATIONS AMONG WOMEN RECEIVING EARLY STAGE BREAST CANCER CHEMOTHERAPY ACCORDING TO RACE

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Black women may be unable to receive the full dose of prescribed breast cancer (BC) therapy on time due to multiple risk factors. The influence of income on these outcomes was not known. The aim of this study was to explore the relationships among baseline demographic, behavioral and distress scores with subsequent chemotherapy dose alterations among Black and White women receiving BC chemotherapy The study cohort was 68 black and 108 white women from 10 sites in Western Pennsylvania and Eastern Ohio. Variables included demographic/neighborhood, behavioral factors, and symptoms measured against the outcome of chemotherapy dose alteration (reduction, delay or early termination). Women of lower income were more likely to come from deprived neighborhoods (t(168) =3.78,p<0.01), have less education (t(136)=–3.76,p<0.01), higher symptom distress (t(132)=4.20, p<0.01), and more difficulty meeting financial needs (t(xx),p<0.031) than women of higher income. Lower income women experienced more dose alterations than higher income women (x2(2) =10.65, p<0.01). Black patients were more likely to come from areas of higher neighborhood deprivation (t(168) =5.00,p<0.01), had less education (t(159) =-4.964,p<0.01), lower income(x2(1)=24.49,p<0.01), higher symptom distress (t(161)=3.03,p<0.01), more difficulty in meeting basic financial needs (t(xx),p<0.01) and experienced more dose alterations (x2(2) =8.89, p<0.05) than White women. Controlling for income, there were no significant racial differences among any variables except that black women were more likely to live in high deprived areas than White women (x2(1)=16.781,p<0.001). Further exploration of the etiology and intersectionality of race and income as baseline barriers to receiving prescribed dose intensity in BC chemotherapy is needed.

Palliative and Psychosocial Care: Knowledge & Beliefs

EVALUATING MULTIDISCIPLINARY ONCOLOGY PROVIDERS' EXPERIENCE AND KNOWLEDGE OF OPIOID USE DISORDERS IN PATIENTS WITH CANCER

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Significance and aims: Increased concern exists patients with cancer developing an opioid use disorder (OUD). Stigma associated with OUDs contributes to disparities and barriers to care, negatively impacting health outcomes. A hospital-wide survey was conducted to further evaluate OUD experiences and knowledge among multidisciplinary oncology health care providers. Methods: The 29 questions were distributed via electronic mailing list to physicians, Advanced Practice Providers (APPs) (advance practice nurses, physician assistants, pharmacists) and registered nurses (RNs). Results: The final sample (n= 773) included 42 physicians, 213 APPs and 518 RNs. Physicians were less likely to have personal experience (self, family member, friend or coworker) with OUDs (n=12, 29.3%), compared to 57.1% of APPs (n = 117) and 55.8% of RNs (n = 276) (p = 0.003). The majority of respondents (n = 629, 87%) agreed they treat all persons the same, regardless of OUD. Physicians disagreed with this more often (n = 13, 32.5%, p<0.001). Providers with personal experience were more likely to disagree with the statement stereotypes or bias do not impact the quality of care patients receive" (APPs p= 0.0103; RNs p = 0.0291). This was not significant among physicians (p=0.4977). Conclusions and implications: The majority of non-physician providers agreed they treated all patients the same regardless of OUD, however, those with personal experience with OUDs recognized bias more often as leading to barriers engaging in care and resulting in health disparities. A feasible solution is implicit bias training to enhance compassion and understanding while increasing self-awareness of existing bias.

Palliative and Psychosocial Care

EXPLORATION OF THE ROLE OF SPIRITUALITY IN PAIN EXPERIENCES AMONG WOMEN WITH ADVANCED BREAST CANCER

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Significance/Aims: Women with advanced breast cancer often experience pain. Previous studies indicate that spirituality may serve as a resource to alter pain perceptions; yet the role of spirituality in pain management had not been examined as a lived experience among this population. The current study qualitatively explored how women with advanced breast cancer perceive their spirituality as influencing their pain. Methods: Guided by Self-Transcendence Theory, a phenomenological approach was taken. Women with advanced breast cancer and average pain >2 were recruited via tumor registry mailings. Face-to-face semi-structured interviews (N=9) were conducted. An inductive data analysis approach was employed by multiple investigators, using open-coding thematic analysis. Steps were taken to enhance trustworthiness. Results: Participants had stage III/IV breast cancer, were Caucasian and self-identified as Christian (mean age=61 years). Themes included: 1) Spirituality provides positive cognitive framing to help face pain; 2) Spirituality elicits supportive emotions such as peace and tranquility despite pain; 3) Spiritual practices serve as pain self-management tools; and 4) Connection with others and service activities (aspects of spirituality) helped women cope with pain. Conclusions/Implications: While various facets of spirituality were mentioned, most women found spirituality to alter pain experiences in supportive ways. Greater attention to spirituality may open new avenues of research for development of nurse-led pain management interventions. Research exploring pain and spirituality among diverse samples of people with cancer is a vital next step. Providers are encouraged to address spirituality with their patients, understanding that it is a unique phenomenon that may impact symptom experiences.

COPING STRATEGIES AND SUPPORTIVE CARE NEEDS OF INFORMAL CAREGIVERS OF PATIENTS WITH HEMATOLOGIC MALIGNANCIES

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Significance: Informal caregivers (IC) of adults with various diseases including hematologic malignancies (HM) experience low quality of life and psychological well-being (Bevans et al., 2016; Ferrell & Kravitz, 2017; Reblin et al., 2018; Shaffer et al., 2017). Although HM's are life-threatening cancers associated with high mortality, numerous symptoms, and lengthy hospitalizations (Noone, 2018) - and are therefore likely to be challenging for ICs to cope with - there is scant research exploring IC experiences. Aim: Describe the complex experiences of ICs of patients with HM, particularly with regard to coping and adaptation in the midst of diagnosis and treatment. Methods: This study used a qualitative descriptive design (Sandelowski, 2010) to analyze semi-structured interview responses from ICs (N=27) within six weeks of the patients' HM diagnosis. A content analysis was conducted to generate common themes (Vaismoradi et al., 2013). Results: ICs endorsed adaptive and maladaptive coping. Adaptive strategies included positivity, taking one day at a time, spirituality, engaging in pastimes, and utilizing emotional and instrumental family and community support. Maladaptive coping included harmful habits, avoidance, and lacking or being unable to accept family and community support. Conclusions and implications: Findings highlight the complexities of caregiver burden as they support their loved ones with HM. Palliative care can be leveraged to support ICs. For example, informing palliative care personnel of caregivers' experiences can inform interventions aimed at caregiver role preparation, burden prevention, promoting well-being, and bolstering the capability to cope.

EXPLORING THE EFFECTS OF GENOMIC TESTING ON FEAR OF CANCER RECURRENCE AMONG BREAST CANCER SURVIVORS

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Significance: Fear of cancer recurrence (FCR) is the greatest unmet psychosocial need among breast cancer survivors (BCS). The Oncotype Dx® test predicts the 10-year risk of distant recurrence and benefit of adjuvant chemotherapy among women with early stage hormone receptor-positive breast cancer. Despite the test's clinical utility, psychosocial responses are poorly understood. Methods: A descriptive cross-sectional study was conducted to explore associations between Oncotype Dx® test results (Recurrence Score) and FCR, health-related quality of life (HRQOL), distress, anxiety, depression, illness representation and perceived risk. Bivariate analyses were used to examine the associations between variables followed by multiple linear regression to examine predictors of FCR. Results: Greater FCR was associated with higher distress, anxiety, depression, illness representation and poorer HRQOL. BCS's with a high Oncotype Dx® Recurrence Score reported higher overall fear ($p=.013$) and greater perceived consequences of their cancer ($p=.034$) compared to BCS's with a low Recurrence Score. Using multiple linear regression, anxiety ($\beta=.21$, $p=.016$), greater emotional response ($\beta=.45$, $p<.001$) and perceived consequences (β =.18, p=.039) of illness explained 58% of the variance ($p < .001$) in FCR. Conclusion: BCS's with higher risk of recurrence may experience higher FCR. However, for FCR, modifiable factors such as anxiety and illness representation (greater emotional response and perceived consequences of illness) may be more important than non-modifiable factors such as Oncotype Dx® test results and age. Further research is needed to develop personalized interventions to improve BCS's outcomes.

Symptom Science

CHOICE MATTERS: EXPLORING THE IMPACT OF PATIENT REPORTED DECISION QUALITY AND SATISFACTION ON SYMPTOM BURDEN IN YOUNG BREAST CANCER SURVIVORS 2 TO 4 YEARS POST-TREATMENT

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Significance/Aims: Over 30% of breast cancers are diagnosed among women < age 50. Young women face multiple challenges because of myriad treatment decisions with lifechanging consequences for sexuality, fertility, and mental and physical functioning. As part of a project to develop clinical pathways for guideline-informed breast cancer treatment decision making, we assessed pre-implementation patient-reported outcomes (PRO) of global health, treatment decision quality, patient-provider interaction, and sexual function/satisfaction among women < age 50 diagnosed 2 to 4 years prior. Methods: Electronic health records of two Midwestern cancer centers were queried to identify women diagnosed between 2016 and 2018. PROMIS Global Health and Sexual Function/Satisfaction measures, and The Brief Subjective Decision Quality Measure with five additional patient-provider interaction questions were mailed in 2020 to 130 women ages 23 – 49 years (90% White) and returned anonymously. Results: Forty-two completed surveys yielded no differences in PRO between cancer centers. Mean decision quality was high, but lowest for surgical, chemotherapy and genetic testing decisions (6.16 to 6.32; range 1.4 – 7). Distress management was reportedly discussed with 65% ($n = 26$). Decision quality and patient-provider interaction satisfaction were associated with global physical and mental health ($r = .38$ to .60; $p < .001$ – .02). Sexual satisfaction was impeded by fatigue (62%), tiredness (55%), and feeling unattractive (48%). Conclusions/Implications: Treatment consultation and decision quality matter to young women's PRO years after cancer diagnosis. Implementation of evidence -based interventions to support patient-provider interactions and decision quality to reduce long-term symptom burden continue to be warranted.

SYMPTOM MANAGEMENT: INTERVENTIONS

Symptom Management

USE OF PRE-EFFICACY NIH ORBIT MODEL TO DEVELOP A BEHAVIORAL INTERVENTION THAT PROMOTE SELF-MANAGING FATIGUE AND PAIN

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Significance and Aims: Patients with advanced-stage cancer experience detrimental effects on their functional status and quality of life. Pain and fatigue are the most commonly reported symptoms in this patient population. Current clinical guidelines suggest that physical activity can significantly improve musculoskeletal pain and fatigue; however, few patients demonstrate adherence to physical activity recommendations. This presentation aims to demonstrate the use of the NIH's Obesity-Related Behavioral Intervention Trial (ORBIT) model to develop a behavioral intervention known as the personalized Physical Activity intervention with fitness graded Motion Exergames (PAfitME™). Methods: Two phases of testing were conducted using the ORBIT model. In Phase I, a standardized exergame prescription was evaluated by an advisory board. Additionally, a single case study was used to evaluate the personalized exergame prescription based on fitness level. Phase IIa utilized a within-group pre-and post-test design to evaluate the personalized exergame prescriptions based on fitness level, self-efficacy, and variation in fatigue/pain (N=10). Phase IIb consists of PAfitME testing in a randomized clinical trial with a control group (N=150). Results: The PAfitME™ Logic Model was developed in Phase I. In Phase IIa, participants reported that the worst fatigue and pain scores (0–10 scales) decreased over 6-week PAfitME™ with moderate to large effect sizes (fatigue: d = 0.7; pain: d = 0.6). PAfitME™ is currently under Phase IIb testing (R01CA244947). Conclusions and Implications: Positive results from an efficacy trial will support PAfitME™ to self-manage moderate to severe fatigue and pain among advanced-stage cancer patients.

EXPLORING SELF-MANAGEMENT ACTIVITIES IN LONG-TERM POST-TREATMENT CANCER SURVIVORS

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Significance and aims: Beating cancer does not guarantee being free from remaining and late symptoms for long-term post-treatment cancer survivors. To date, the majority of relevant studies on self-management have focused on identifying needs of short-term survivors (< 5 years). Less is known about how long-term survivors (>5 years) practice self-management. The purpose of this study was to characterize the self-management in long-term cancer survivors. Methods: This qualitative descriptive study involved purposefully selecting 24 participants through a combination of maximum variation and stratification sampling strategy. Individuals ≥18 years old who received curative intent treatments for head and neck or colorectal cancer between 2–10 years ago were recruited. Participants completed demographic and self-management activity questionnaires, self-management diaries followed by semi-structured interviews. Data was analyzed using content analysis. Results: Participants' demographics include; age (M=59.5, SD=11.3), male (54.2%), white (100.0%), married (69.6%), survivors of head and neck (50%) and colorectal cancer (50%). Self-management activities included managing fear of cancer recurrence, reducing cancer risk, physical activity, and symptom management. Majority of survivors focused on cancer risk reduction and were proactive about management of their fear of recurrence and self-examination for recurrence. Only four participants reported engaging in managing symptoms or changing exercise routines and diet. Conclusions and implications: Long-term survivors focus more on reducing their cancer recurrence risk rather than symptom management. Oncology researchers should further evaluate the influence of survivors' beliefs on engagement in self-management behaviors. Clinicians may need to focus self-management education on symptom management efforts among long-term cancer survivors.

A PHYSICAL ACTIVITY INTERVENTION TO RELIEVE SYMPTOMS IN YOUNG ADULTS DURING CHEMOTHERAPY

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Significance/Aims: Physical activity (PA) is recommended to manage cancer-related fatigue and may relieve other co-occurring symptoms. Minimal research has examined PA interventions in young adults (YAs) during treatment. This pilot study compared a PA intervention against attention control to improve PA and symptoms in YAs (20–39 years) during chemotherapy. Methods: The PA intervention was integrated into 5 clinic visits over 3 months and included education, goal-setting, PA self-monitoring, and collaboration with a coach. PA was measured with waist-worn accelerometers, and YAs self-reported symptoms with the PROMIS-29 profile at baseline and end of study. Descriptive statistics and Wilcoxon rank sum test were used to compare outcomes between the two groups. Results: 47 YAs (mean =32.3 years) with a variety of cancers enrolled, and 25 were randomized to the intervention. At baseline, YAs had a median of 3922 steps/day [IQR: 2418 – 4949] and 7.39 [IQR: 5.0 – 12.43] minutes/day of moderate-intensity PA. PROMIS-29 T-scores for physical function, anxiety, depression, fatigue, sleep disturbance, pain interference, and ability to participate in social roles ranged from 46.6 – 55.7. At end of study, changes were found between groups in physical function (p=.040) and ability to participate in social roles (p=.008); attention control participants exhibited declines while intervention participants reported increases. There were no pre-post differences between groups in PA or symptoms. Discussion: Without intervention, YAs receiving chemotherapy may decline in physical function and participation in usual activities. Effective age-appropriate strategies are needed to promote PA and relieve symptoms in YAs with cancer.

DESCRIBING CANCER SURVIVORS' ENGAGEMENT IN A SERIOUS GAME INTERVENTION: WHO ENGAGES AND WHY IT MATTERS

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Serious games are effective interventions to promote illness self-management. However, the impact of individuals' engagement remains understudied, limiting the ability to distribute intervention benefits uniformly. The aims of this study are to examine game engagement of patients with cancer, if engagement differs by sociodemographic factors, and the impact on learning outcomes. This was a prospective randomized clinical trial of a 12-week serious game or a paper pamphlet. We recruited adult women within a 3-month diagnosis of advanced breast or gynecologic cancer from a cancer center. Participants' game usage was collected from tablets and weekly self-reports. The learning outcome, self-advocacy, was measured by Female Self-Advocacy in Cancer Survivorship Scale. The t-test, chi-square test, and linear regression were applied for the study purposes. Fifty-two participants were recruited. Participants with available tablet data (n=35) spent a mean of 42 minutes on the game (range:6 minutes–4.2 hours), and 83% engaged in at least 3 of the 4 game sessions. Based on self-report data (n=48), 75% completed the entire intervention and 69% repeated game sessions. Neither time, completion, nor repetition differed by participants' income, education, or race. Time spent on the serious game was associated with higher self-advocacy ($R2=.63$, $F(1,35)=42.64$, $p<.01$). Serious game engagement was overall high but with large amounts of variation. While women with cancer of various sociodemographic backgrounds similarly engaged in the intervention, those who engaged more were more likely to achieve the learning outcome. Future research should explore the barriers and facilitators of game engagement to promote engagement and learning outcomes.

Symptom Science 1: Interventions

COMPLEMENTARY THERAPIES FOR SYMPTOM MANAGEMENT AMONG PEOPLE WITH CANCER: RESULTS FROM A SEQUENTIAL MULTIPLE ASSIGNMENT RANDOMIZED TRIAL

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Significance and aims: Optimal sequencing of complementary therapies can help improve symptom management. A 12-week sequential multiple assignment randomized trial (SMART) of reflexology and meditative practices delivered by or practiced with informal caregivers at home was conducted to compare fatigue severity and other symptoms among solid tumor cancer patients. Methods: Patient-caregiver dyads were initially randomized to reflexology (N=150), meditative practices (N=150), or control (N=47). If a patient was a non-responder on fatigue after 4 weeks of reflexology or meditative practices, the dyad was re-randomized to either add the other therapy or continue with the original therapy alone for weeks 5-8. Four decision rules were compared: 1) Starting with reflexology, and if no fatigue response after 4 weeks, continue with reflexology for another 4 weeks; 2) Starting with reflexology, and if no fatigue response after 4 weeks, add meditative practices for another 4 weeks; 3) Starting with meditative practices, and if no fatigue response after 4 weeks, continue meditative practices for another 4 weeks; and 4) Starting with meditative practices, and if no fatigue improvement after 4 weeks, add reflexology for another 4 weeks. Symptoms were evaluated weekly via telephone using the M.D. Anderson Symptom Inventory (MDASI). Results: There were no differences among the 4 decision rules, with the exception of lower severity for summed MDASI symptoms at week 8 for rule 1 versus rule 2. Conclusions and implications: Either reflexology or meditative practices can be used as symptom management options. Adding the other therapy for non-responders may not be warranted.

Symptom Science

IMPACT OF SIDE EFFECTS ON ORAL ANTICANCER AGENT SELF-MANAGEMENT ABILITY: PATIENT PERCEPTION OF RISKS MATTERS

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Significance and aims: Severe side effects of oral anticancer agents (OAA) are believed to negatively impact patient adherence. However, such impact may vary by patients' perceptions of risks of OAA, as some patients may perceive side effects as the hallmark for the effectiveness of OAA. The aims of this study were to explore the impact of side effect severity on patients' OAA self-management ability and the influence of patients' beliefs about OAA. Methods: Secondary analysis of existing data from a descriptive study included 50 patients diagnosed with gastrointestinal cancer and receiving capecitabine therapy. OAA self-management ability was measured by the Measure of Drug Self-Management. Severity of eight common side effects of capecitabine was assessed by the PRO-CTCAE. Beliefs about capecitabine were measured by a modified Beliefs about Medications Questionnaire, calculated by mean subscale scores of Necessity minus Concern. Descriptive statistics, simple linear regression, and the PROCESS mediation analysis module were applied. Results: Capecitabine self-management ability was significantly predicted by the mean total side effect severity (b=–1.09, p=.003). The impact of side effects on self-management ability was partially medicated by beliefs about capecitabine (b=–.74, p=.04); and fully mediated by patient concern of taking capecitabine (b=–.59, p=.11), with indirect effect (b=–.49, BootSE=.18, BootLLCI=–.89, BootULCI=–.19). Conclusions and implications: Patients' OAA self-management ability decreases with increased side effect severity, which is determined by the degree of patients' worries about taking OAA. Findings indicate the importance of understanding patients' perceptions of risks of OAA and personalized education and support may improve OAA self-management and adherence.

MASTERY IN MANAGING BREATHLESSNESS MODERATES THE ASSOCIATIONS OF DYSPNEA, DISTRESS, AND QUALITY OF LIFE IN ADVANCED LUNG CANCER

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Significance and Aims: Approximately 50% of patients with advanced lung cancer (ALC) experience significant dyspnea symptoms which are associated with higher levels of distress and poorer quality of life (QOL). We explored the degree to which patient mastery in managing dyspnea moderates the associations of dyspnea with distress and QOL. Methods: From 5/2017–9/2018, we enrolled 85 patients with ALC and at least moderate dyspnea to a randomized trial of a behavioral intervention for dyspnea. Baseline self-report measures included dyspnea (Cancer Dyspnoea Scale; CDS), distress (Hospital Anxiety & Depression Scale; HADS), QOL (Functional Assessment of Cancer Therapy-Lung; FACT-L), and mastery in managing dyspnea (Chronic Respiratory Questionnaire). We calculated Pearson correlation coefficients and moderated regression analyses. Results: The sample was predominantly white (87.1%) with a mean age of 65.16 years (SD = 11.09), comprising both men and women (female = 55.3%). Patient-reported dyspnea was significantly associated with higher distress ($r=0.43$, $p<.001$) and lower QOL ($r=-0.38$, $p<.001$). Among patients with lower dyspnea management mastery, CDS scores remained associated with higher distress ($\beta=0.45$, $p<.001$) and lower QOL ($\beta=-0.38$, $p<.001$). In patients who reported higher dyspnea management mastery, CDS scores were no longer significantly related to distress and QOL: (HADS $\beta=0.12$, $p=.70$) and (FACT-L $\beta=-0.16$, $p=.63$). Conclusions and Implications: Patients with ALC with greater dyspnea experience higher distress and lower QOL than those with less dyspnea. Dyspnea management mastery appears to mitigate these relationships. Evidence-based interventions are needed to help patients cope effectively with their dyspnea symptoms and improve outcomes.

Symptom Science 2: Methods & Symptom Burden

SYMPTOM CLUSTERS ARE RELATIVELY STABLE ACROSS THE DIMENSIONS OF THE SYMPTOM EXPERIENCE IN PATIENTS WITH GYNECOLOGIC CANCER RECEIVING CHEMOTHERAPY

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Significance and Aims: Patients with gynecologic cancer experience multiple symptom clusters during chemotherapy. Little is known about the extent to which these symptom clusters vary across dimensions of the symptom experience. The study purpose was to compare the number and types of symptom clusters using the dimensions of occurrence, severity, and distress in patients with gynecologic cancer undergoing chemotherapy. Methods: Descriptive, longitudinal study. Eligible patients were English-speaking adults with gynecologic cancer receiving chemotherapy. Symptoms were assessed using a modified version of the Memorial Symptom Assessment Scale. Symptom clusters were identified through exploratory factor analysis using unweighted least squares estimation. GEOMIN rotated factor loadings with absolute values ≥0.30 were considered meaningful. Factor solutions were assessed for simple structure and clinical relevance. Results: Two hundred thirty-two patients completed the study questionnaires prior to their second or third cycle of chemotherapy. A five-factor solution was selected for each dimension. Hormonal, respiratory, and weight change clusters were identified for all three dimensions. Additional clusters were identified for occurrence (i.e., psychological, gastrointestinal), severity (i.e., psychological, gastrointestinal/epithelial), and distress (i.e., psychological/gastrointestinal, gastrointestinal/epithelial) dimensions. Conclusions and Implications: Our results suggest that hormonal, respiratory, and weight change clusters are relatively consistent across dimensions of the symptom experience. The remaining clusters suggest gastrointestinal symptom severity may be associated with epithelial symptom severity and gastrointestinal symptom distress may be associated with epithelial and psychological symptom distress. Research that explores how these symptom clusters change over time, as well as the underlying mechanisms for each of these symptom clusters is warranted.

DIFFERENCES IN GASTROINTESTINAL SYMPTOMS AMONG ONCOLOGY PATIENTS WITH DISTINCT NAUSEA PROFILES DURING OUTPATIENT CHEMOTHERAPY

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Significance and aims: Approximately 60% oncology patients continue to experience unrelieved chemotherapy-induced nausea (CIN). Limited information is available on which demographic, clinical and gastrointestinal (GI) symptom characteristics are associated with higher rates of CIN. Study purposes were to identify subgroups of patients with distinct nausea profiles and determine how these subgroups differed on demographic, clinical, and GI symptom characteristics. Methods: Oncology patients (n=1343) completed questionnaires that provided information on demographic, clinical, and GI symptom characteristics. Patients indicated occurrence of nausea and other common GI symptoms using the Memorial Symptom Assessment Scale six times over two cycles of chemotherapy. Latent profile analysis identified subgroups of patients with distinct nausea profiles. Differences among these subgroups were evaluated using parametric and nonparametric statistics. Results: Four distinct CIN profiles were identified: none (40.8%), increasing-decreasing (21.5%), decreasing (8.9%), and high (28.8%). Compared to the none class, patients in the high class were younger, had a lower functional status, a worse comorbidity profile, and were more likely to receive chemotherapy on a 14-day cycle. In terms of GI symptoms, compared to the none class, patients in the high class had higher occurrence rates of dry mouth, abdominal bloating, vomiting, diarrhea, lack of appetite, abdominal cramps, difficulty swallowing, mouth sores, weight loss, constipation, and change in the way food tastes (all p<.001). Conclusions and implications: Given 28.8% of patients were in the high nausea class suggests that unrelieved CIN is a significant clinical problem in oncology patients. This study provides insights into patient risk factors.

PERCEIVED PATIENT-CENTERED COMMUNICATION IS ASSOCIATED WITH OVARIAN CANCER SYMPTOM BURDEN

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Significance and aims: Patient-centered communication (PCC) occurs when clinicians solicit and respond to patients' preferences and concerns. According to the National Cancer Institute, PCC may improve patient-reported outcomes. Although women with ovarian cancer experience substantial symptom burden, few studies exist of PCC in ovarian cancer. We sought to identify associations between perceived PCC and ovarian cancer symptom burden. Methods: Cross-sectional, descriptive survey. Participants were English-speaking adults with ovarian cancer recruited online and from one NCI-designated cancer center. We assessed perceived PCC with the Patient-Centered Communication in Cancer Care (PCC-Ca)-36 and ovarian cancer symptom burden with the FACT Ovarian Symptom Index (FOSI)-18, with higher

FOSI-18 scores indicating lower symptom burden. We identified associations between participant characteristics and PCC-Ca-36 total, PCC-Ca-36 subscale, and FOSI-18 scores using multiple linear regression. Results: One hundred seventy-six participants completed the survey. Controlling for age, higher PCC-Ca-36 total score, working (vs. not working), and no current treatment (vs. any current treatment) were associated with higher FOSI-18 scores, while private insurance (vs. Medicare, Medicaid, or military) was associated with lower FOSI-18 scores (all $p<0.05$). When PCC-Ca-36 subscale scores were included in place of total scores, higher "fostering healing relationships" subscale scores, working, and no current treatment were associated with higher FOSI-18 scores (all $p<0.05$). Conclusion and implications: Greater perceived PCC is significantly associated with lower ovarian cancer symptom burden. This association may be driven by the "fostering healing relationships" function of PCC. Communication-based strategies to reduce symptom burden represent a novel area for future research.

CONTACT: CLINICAL OUTCOME ASSESSMENTS TRENDS IN BRAIN CANCER TRIALS

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SIGNIFICANCE AND AIMS: Clinical outcome assessments (COAs) are key to a patient-centered assessment of net clinical benefit in trials. In neuro-oncology, unique symptoms and overall poor prognosis further necessitate a focus on symptom management and quality of life. We conducted a computational survey of trends of COA use in past and ongoing neuro-oncology trials. METHODS: Data on interventional and observational trials on ClinicalTrials.gov were accessed programmatically using the AACT database. Neuro-oncology trials were isolated using brain tumor classification terms. Instrument names from PROQOLID were used to identify COA use. Linear regression was used to assess chronological trends. RESULTS: 32% (230/712) of adult neuro-oncology trials reported using a specific COA instrument. Among interventional trials, 36.1 % (209/579) used COAs, compared to 15.8% (21/133) of observational trials. COA use was most frequent in phase IV (50%), followed by phase III (46.4%), phase II (31.7%), then phase I (27.9%) trials. Rate of COA use increased linearly from 1999 to 2020 overall by 1.47%/year (95% CI: 0.61774–2.32776), and in interventional trials by 1.53%/year (95% CI: 0.57962–2.48149). EORTC QLQ-C30, QLQ, KPS, MMSE, and TMT were most frequently used, in 8.26%, 6.52%, 6.52%, 4.35%, 3.48%, and 3.04% of trials using COAs, respectively. CONCLUSIONS: A growing proportion of neuro-oncology trials have specified COA use, suggesting the efficacy of advocacy efforts. Lower COA use in early phase trials may carry considerable implications, especially considering their focus on intervention safety. Periodic investigation of COA trends enabled by similar analyses may be important to inform future trial design.

HOT TOPICS: FINANCIAL TOXICITY

Health Disparities

RACE AND INCOME DISPARITIES AT THE END-OF-LIFE AMONG WOMEN WITH METASTATIC BREAST CANCER

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Background: Metastatic breast cancer (MBC) is a progressive, life ending illness for which there are numerous treatment options. Due to multiple factors, Black and poor patients may be vulnerable to treatment distress and shortened MBC survival. The aim of this project was to compare overall survival and symptom characteristics according to race and neighborhood deprivation. Methods: Cohort of patients deceased from MBC from November 2016 until November 2019. Protocolized, retrospective chart review for MBC patient characteristic, 24 symptoms (patient self-report) at last visit before death and metastatic survival. Race measured by self-report. Income represented by zip code calculated neighborhood deprivation index (NDI). Results: N=157. Since January 2017, among the deceased cohort, Black women (n=24) survived a mean 516.91 days (343.2 SD), 16.7 months or 1.4 years vs. White women (n=143), survived 1167.42 days (1179.5 SD) 41.4 months or 3.5 years, (p=.012). Patients from neighborhoods with higher deprivation had a shorter, but non-significantly different survival, 999 days (33 months) as compared to 1141 days (38 months) from patients from less deprived neighborhoods. Symptoms of dizziness, shortness of breath, cough, nausea and palpitations were higher ($p<0.05$) among Black women with only sexual concerns higher ($p<0.05$) among White women. Conclusion: By understanding the intersection of race, income, disease related distress and survival in MBC we can begin to identify the factors targetable to interventions. These interventions should proactively address disparity in symptom profiles and overall survival.

Symptom Science

EVALUATION OF FINANCIAL TOXICITY (FT) IN PEOPLE WITH RARE CENTRAL NERVOUS SYSTEM (CNS) TUMORS USING AN INNOVATIVE WEB-BASED STUDY DESIGN

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Background Financial toxicity (FT) refers to the financial impact of medical care and other costs on patients with cancer. Research exploring FT in patients with rare CNS tumors is limited. Total income, work interference and decreased QoL are all key parameters to consider when investigating FT. Methods A web-based study of 210 participants' responses to financial, clinical, symptom burden (MDASI-BT/MDASI-SP), depression and anxiety (PROMIS-Depression/Anxiety), work interference (SF-36) and general health status (EQ-5D-3L) was reported using descriptive statistics and tests of associations. Results Patients were white (93%) employed (48%) females (72%), with mean age of 47 (19–75); 6% reported income lower than the poverty level and 23% lower than the median U.S. income. Sixty percent had to change work with the majority stopping work (31%). One-third reported lack of access to healthcare services and 10% required home care services. Difficulty walking was reported by 42% and difficulty in performing activities due to physical health by over 60%. Anxiety and depression scores aligned with the average for the U.S. population, however 21% were taking antidepressants and 42% reported not being able to complete work or activities due to depression. Approximately half of all patients reported moderate-severe pain, fatigue, and weakness with higher symptom burden and depression associated with change in work status (p<0.003). Conclusion These findings suggest that FT in patients with rare CNS tumors is associated with higher symptom burden, access to care and activities/work patterns. Future work exploring impact and targeted programs to address these outcomes are needed.

EVIDENCE OF FINANCIAL TOXICITY IN PRIMARY CENTRAL NERVOUS SYSTEM TUMOR PATIENTS: CORRELATIONS BETWEEN EMPLOYMENT STATUS, SYMPTOM BURDEN AND HEALTH-RELATED QUALITY OF LIFE

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Significance and Aims: Financial toxicity (FT) after a cancer diagnosis is the consequence of decreased earnings and increased spending. The correlation between FT and patient illness factors such as symptom burden, psychological distress, health-related quality of life in the primary central nervous system (PCNS) tumor population has not been well-described. We assessed employment status and several patient illness factors in a PCNS tumor cohort. Methods: Patient and disease characteristics and patient-reported outcomes (PROs) were collected from adults diagnosed with PCNS tumors between 9/2016–12/2019. Descriptive statistics and regression analyses were used to describe PROs. Results: Of 277 patients, 77 (28%) reported being unemployed due to tumor diagnosis. They reported difficulty walking (64%), difficulty performing usual activities (64%) and had lower general health status (p<0.001) and higher tumor-related symptom severity (p=0.004) than employed patients. Unemployed patients reported high symptom burden with an average of 6 moderate-severe symptoms for those with brain tumors patients and 10 for those with spine tumors. Both brain and spine tumor patients who were unemployed reported increased mood-related interference (p=0.020), as well as moderate-severe anxiety (30%) and depression (25%) compared to employed patients (15% vs 8%, respectively). Unemployed brain tumor patients reported worse scores in cognitive and neurologic symptom subscales (p<0.001). Conclusions and Implications: These data provide indirect evidence of financial toxicity that correlates with high symptom burden across several domains and lower health-related quality of life. Future research work will include the COST questionnaire to further evaluate the implications of FT in the PCNS tumor patient population.

THE ASSOCIATION BETWEEN SOCIOECONOMIC DISADVANTAGE AND PAIN: A STATE-OF-THE-ART REVIEW

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Significance and aims: The prevalence of socioeconomically disadvantaged (SED) individuals in the United States remains a critical issue within our health care system. The pervasiveness of this issue highlights the impact of SED on pain and overall quality of life. The aim of this state-of-the-art review is to evaluate studies that have explored SED as a variable in the acute and chronic pain experience. Methods: For this review, determinants of SED include: education level, socioeconomic status, and employment status. PubMed, CINAHL, and Embase databases were used to locate published research on the determinants of socioeconomic disadvantage and pain. All included articles were hand searched to maximize the search for relevant articles. The key search terms were: socioeconomic disadvantage, socioeconomic disparities, and pain. Study inclusion criteria included: published in English, published between the years of 1999–2020, original research study, and published in a peer-reviewed journal. Articles not published in English, review articles, editorials, abstracts, or included pediatric populations were excluded. Results: A total of 11 articles fit the inclusion criteria and were reviewed. SED was found to facilitate the gap to access, promote unhealthy pain beliefs and coping mechanisms, and is associated with working more physically demanding jobs, directly and indirectly increasing pain. Conclusion: SED is positively associated with increased pain. More research is needed to test and develop models for this relationship and standardize an instrument to measure SED. Clinicians should assess for SED as a component in the patient pain experience for effective patient-centered treatment and management.

PALLIATIVE AND PSYCHOSOCIAL CARE: TOOLS AND SYSTEMS FOR SYMPTOM REPORTING

Palliative and Psychosocial Care

SYMPTOM EXPERIENCES AND WORK ABILITY IN YOUNG ADULT HEMATOLOGIC CANCER SURVIVORS

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Background and Purpose: A cancer diagnosis and treatment in young adults (YAs; aged 20–39 years) brings disruptions to life course milestones, including work, which may impact mental health, social relationships, and financial health. Symptoms experienced by survivors may impact ability to continue to work and shift career and personal goals, captured as work-related goals (WRGs). The purpose of this study is to explore YA cancer survivors' symptom experiences and work ability in regard to WRGs. Methods: This descriptive, qualitative study used purposive and snowball sampling to recruit YAs through social media platforms (e.g., Facebook, Twitter) from April to July 2020. Participants were within 5 years of a hematologic cancer diagnosis and had completed active treatment. We audio recorded 1:1 semi-structured interviews and, after verbatim transcription, analyzed data using directed content analysis followed by thematic content analysis with the assistance of MAXQDA 10. Results: We interviewed 40 young adult participants (Mage = 28, 62% female, 82% lymphoma diagnosis). The overarching theme in this analysis reveals varying symptom experiences were linked to YA's perceptions of work ability. Participants described both physical and affective symptoms as a result of their cancer diagnosis and treatment, impacting WRGs that were either consistent or changed from before diagnosis. Conclusions & Implications: The results yield greater insight into how YAs with cancer approach future WRGs. The results also highlight specific physical and affective symptoms that may ultimately affect quality of life in this unique population of cancer survivors.

SELF-REPORTED AND PROXY-REPORTED CANCER PATIENT AND CAREGIVER SYMPTOMS

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Significance and aim: In the advanced cancer setting, caregivers often serve as proxy-report for patient symptoms while also experiencing caregiving-related symptoms. The aim of this study was to describe the associations between patient and caregiver self-reported and proxy-reported symptoms among cancer patients and their caregivers. Methods: Patients with advanced lung cancer or primary brain tumor and their caregivers self-reported and proxy-reported symptoms using the Edmonton Symptom Assessment System (ESAS) in a cross-sectional design. Descriptive statistics and partial correlations were used to compare symptom ratings. Results: Caregivers had a mean age of 57.79 years (SD = 13.12), 48.7% were male, and 80.3% were White. Dyadic relationships averaged 28.55 years (SD = 16.17). Patient self-reported symptoms had a mean of 28.04 (SD = 17.45);caregiver proxy-reported patient symptoms had a mean of 35.75 (SD = 22.3). Caregiver self-reported symptoms had a mean of 22.88 (SD = 20.12); patient proxy-reported caregiver symptoms had a mean of 20.71 (SD = 17.86). Patient self-reported symptoms were moderately correlated (r = .53, p < .001) with caregiver proxy-reported patient symptoms after controlling for caregiver self-reported symptoms and patient proxy-reported caregiver symptoms. Caregiver self-reported symptoms were moderately correlated (r = .41, p < .001) with patient proxy-reported caregiver symptoms after controlling for patient self-reported symptoms and caregiver proxy-reported patient symptoms. Conclusions and implications: Patient and caregiver self-reported and proxy-reported symptoms are moderately correlated. Further research regarding the reliability of patient and caregiver proxy assessments for symptoms is needed.

Symptom Science

USING SANKEY FLOW DIAGRAMS TO VISUALIZE THE SYMPTOM EXPERIENCE IN OLDER ADULTS WITH CANCER

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Understanding how symptoms change over time can be enhanced with data visualization methodologies. Sankey diagrams are designed to show the flow or trajectory (i.e., examining the arc from one time point to the next shows movement/change with the width of the arc corresponding to the volume/number). Sankey flow diagrams are under-utilized in symptom science, but can provide information about symptom trajectories not captured in other data visualization methods. An existing data set (clinical trials.gov NCT0210744) including patients aged 70+ with incurable solid tumors was used. Symptoms were assessed with the MD Anderson Symptom Inventory {13 symptoms and 6 interference items scored 0 none to 10(worst severity)} at 4 time (T) points over 6 months. Statistics included computing severity categories [none (0), mild (1–3), moderate (4–6), severe (7–10)], creating stacked bar and column graphs, and Sankey diagrams. 526 patients provided symptom data at entry (mean age=-77years; 49% female; mixed cancer diagnoses). Using pain as an example, the Bar and Stacked Bar graphs show a stable trend across the 4 time points suggested by the means [T1: 2.55(SD2.97); T2: 2.46(SD3.01); T3: 2.37(2.95); T4:2.33(SD2.88)]. In contrast, Sankey displays many within-subject changes. For example, among the 124 patients with mild pain at T1, at T2 35 (28.23%) feel no pain any longer; 29 (23.38%) develop moderate/ severe pain; and only 46 (37.10%) remain the same [14 withdrew (11.29%)]. While some traditional graphing methods show stable across-subject trajectories, Sankey diagrams are recommended to display the dynamic within-subject variability of the symptom experience.

FEASIBILITY AND UTILITY OF THE BRIEF MONTREAL COGNITIVE ASSESSMENT (MOCA) IN PRIMARY BRAIN TUMOR PATIENTS

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Significance and aims: Cognitive dysfunction (CD) is common in primary brain tumor (PBT) patients. Objective measures of CD are burdensome and there are only a limited number of reports evaluating their clinical utility. The purpose of this study was to evaluate the feasibility and utility of the brief Montreal Cognitive Assessment (MoCA) in PBT patients and evaluate the association with patient reported outcomes (PROs). Methods: Thirty-eight PBT patients were included between January–March 2020. PROs were completed electronically ≤ 1 week before their clinic visit, and MoCA testing completed during routine clinical assessment by trained clinical providers were evaluated. Feasibility, provider satisfaction, and score validation were assessed along with associations with PRO measures of cognition (Neuro-QOL), symptom burden/general activity (MDASI-BT) and general health status (EQ-5D). Results: Patients were primarily white (74%), college-educated (45%), males (58%) with a good performance status (58%); average age 45 (range: 19–75). Glioblastoma (32%) was most common diagnosis, most received radiation (79%). The average total MoCA score was 24 (6–30); 42% of patients had scores classified as abnormal. However, MoCA scores were not correlated to any PRO measure. Health care providers reported the MoCA was easy to incorporate into neurologic assessment (78%), taking between 5–20 minutes to complete and accurately assessing patient's cognition (67%). The majority (88%) found testing useful in determining clinical treatment planning. Conclusions and implications: MoCA testing was feasible and providers reported satisfaction with utility and accuracy in routine clinical care. Future studies will further evaluate validity and patient-reported impact on symptoms and function.

SYMPTOM MANAGEMENT: VULNERABLE POPULATIONS/CHRONIC CONDITIONS

Symptom Management

BREAST CANCER-RELATED LYMPHEDEMA INFLUENCES ON THE WORK EXPERIENCES AND QUALITY OF LIFE OF HISPANIC/LATINA SURVIVORS

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Introduction: Breast cancer-related lymphedema (BCRL), a lifelong side effect of cancer treatment, may negatively impact the ability to perform work. Factors such as sedentary lifestyle and delayed diagnosis increase BCRL risk for Hispanic/Latina survivors. A high percentage of service occupations for this demographic may challenge work ability. Method: Our multi-case, qualitative descriptive study explored work experiences and quality of life for Hispanic/Latina survivors in southern Texas. Ten participants completed demographic and SF-36 surveys and were interviewed. Semi-structured interviews focused on how work environment, BCRL experiences, and quality of life were influenced by BCRL diagnosis and management. Thematic analysis of cases was completed using in-vivo and descriptive coding and constant cross-case comparative methods. Results: Preliminary analysis illustrated how Hispanic/Latina survivors perceive the influence of BCRL on work experience as a time of change and challenge. Participants identified BCRL knowledge gap challenges and described coping with physical, psychosocial, and work activity changes. They also described creative work adaptations and discussed BCRL's impact in both positive and negative interpersonal perceptions on coping and work adaptation. Finally, while knowledge gaps and perceived negative responses in the work environment may create challenges, strong support from family, friends, and colleagues contributed to improved quality of life and continued work activities. Conclusions: Future research should incorporate the coping strategies and creative management of BCRL Hispanic/Latina survivors use to optimize work activities across the lifespan. These strategies can provide guidance for creation of survivorship care plans, education of healthcare professionals caring for survivors, and life-long occupational support.

BREAST CANCER AND DIABETES MELLITUS TYPE 2: STATE OF THE SCIENCE

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Significance and aims: Breast cancer (BC) and type 2 diabetes mellitus (T2DM) are comorbid conditions that when occurring simultaneously, can have several negative consequences on the survivor. Additionally, BC and T2DM may place a significant burden for those with both diseases, specifically in the ability to perform self-care and manage their diseases. The purpose of this state of the science literature review is to identify the link and implications of T2DM and BC with a focus among Hispanic women. Methods: A systematic search from online databases, including CINAHL, Embase and Pubmed, was conducted on articles published from 2010 to 2020. Inclusion criteria included peer-reviewed research articles in English or Spanish language. A total of nineteen articles were reviewed and included in the final review. Results: A total of 29 articles were reviewed and 19 were included in the final review. Overall T2DM was associated with an increased risk for BC and an increased risk of mortality, lymph involvement, hospitalization, chemotherapy toxicities, as well as a decreased disease-free survival period for women with concurring BC and T2DM. Hispanic women were reported to have an increased risk for mortality when compared to other ethnicities. Conclusions and implications: Study findings showed that negative outcomes occurred among patients who had both comorbid conditions, leading to difficulties in managing both comorbidities. Clinical and research evidence identified significant gaps in research related to the development and testing of self-management interventions to improve patient outcomes among these patients. Key words: Type 2 diabetes, breast cancer, Hispanic, comorbidities

Symptom Science

PAIN PREVALENCE, INTENSITY, INTERFERENCE AND MANAGEMENT: REPORTS BY CHINESE CHILDREN WITH CANCER

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Significance and aims: Pain is a frequently-reported and distressing symptoms during cancer treatment. However, there is limited evidence on pain reported by Chinese children with cancer. This study aimed to investigate the prevalence, intensity, interference and management of pain reported by Chinese children during cancer treatment and explore predictors of pain interference. Methods: We conducted a cross-sectional survey to investigate pain intensity, interference, co-occurring symptoms (anger, anxiety, depression, fatigue), pain management strategies reported by children aged 8 and older undergoing active cancer treatment in four Chinese hospitals. Results: Data were analyzed for 187 children. The prevalence of moderate to severe pain (≥ 4 out of 10) was 38.50%, with an average pain interference score of 52.97 out of 100. Approximately 24% of children were prescribed pain medicine. Pain interference and pain intensity were marginally correlated (r=0.047, P < .01), and were both positively correlated with pain duration, co-occurring symptoms, and negatively correlated with perceived pain alleviation (all P < .01). Multiple regression analyses suggested severe pain intensity (B=2.028, P = .003) and fatigue (B=0.440, P < .001) significantly predicted higher levels of pain interference (R 2 = 0.547, F=23.102, P < .001). Conclusion and implications: Chinese children with cancer reported a low pain intensity score, but a relatively high level of pain interference. According to the children's reports, pain has not been sufficiently addressed through Chinese pediatric oncology supportive care. There is an urgent requirement for comprehensive pain assessment and standardized, targeted interventions in Chinese pediatric oncology.

Symptom Science 1: Methods & Animal Models

ASSESSING THE EFFECTS OF TARGETED PELVIC IRRADIATION ON THE HEART RATE, ACTIVITY LEVELS, AND BODY TEMPERATURE OF MICE USING TELEMETRY

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Background: Fatigue is a common acute and chronic side-effect frequently seen in patients during and after radiotherapy treatment for prostate cancer. However, the etiology and onset of this symptom are ill-defined and current research on radiotherapy-related fatigue often relies on qualitative patient self-report measures. This study was conducted with an animal model to quantitatively measure the physical effects of fatigue induced by targeted pelvic irradiation. Methods: Telemetry devices were surgically implanted in 20 male wild-type mice to monitor activity levels, body temperature, and heart rate. Targeted pelvic irradiation was administered in 10 of the mice over the course of 3 days, while the other 10 received a sham treatment and served as the control. After three days of baseline recording and three days of radiation treatment, mice were monitored post-irradiation for four days. Results: In their post-treatment telemetry recordings, irradiated mice showed lower levels of physical activity that are consistent with a model of fatigue-like behavior. Irradiated mice also displayed elevated heart rates and reduced heart rate variability. In addition, irradiated mice showed disrupted circadian patterns of body temperature, heart rate, and physical activity. Conclusions: The results suggest that radiation-induced fatigue may be related to circadian disruptions of activity and body temperature. Heart rate variability is largely affected by the autonomic nervous system, so our results also suggest that radiation-induced fatigue may be associated with autonomic dysfunction. These findings can point toward new avenues for future research on the mechanisms of the fatigue related to radiotherapy in cancer patients.

PIONEER: COMPUTATIONAL PROBING OF DIFFERENCES IN SYMPTOMS AND FUNCTION OF DIVERSE BRAIN TUMOR POPULATIONS

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SIGNIFICANCE AND AIMS: Our preliminary work has revealed that non-White primary brain tumor (PBT) patients report different symptom burdens compared to White patients. We seek to improve our understanding of the symptom burden, interference, and co-occurrence across racial/ethnic groups using novel computational approaches. METHODS: Cross-sectional data from 1177 PBT patients (81% White, 8% Hispanic/Latino, 5% Black, and 5% Asian) from two institutional cohorts included demographic information and patient-reported outcomes measured using MDASI instruments. We utilized our web-based application Symptom COnsensUs NeTworks to group patients from each racial/ethnic group into communities characterized by similar symptom co-occurrence, modeling the symptom patterns for each community as networks. A symptom's "centrality" in these networks captures the degree to which the symptom co-occurs with neighboring symptoms. RESULTS: The cohort was stratified by race/ethnicity and (1–2) communities were discovered for each group; few patients (<2%) remained isolated from any communities. Among symptoms ranked mild to severe, fatigue and drowsiness were in the 2 most central symptoms (in 65% and 40%, respectively) across the communities. Contrastingly, mood-related symptoms were in the 2 most central symptoms in 40% of the non-White communities but none of the White ones. Among symptoms ranked moderate to severe, fatigue and sleep disturbance ranked in the top 2 across the communities (in 42% and 33%, respectively), whereas mood-related disturbances disproportionally affected (50% of) the non-White communities but none of the White ones. CONCLUSIONS: Novel computational approaches can point to differences in symptom co-occurrence across racial/ethnic groups, which can inform personalized symptom management interventions.

DEVELOPMENT OF A CLINICALLY RELEVANT ANIMAL MODEL OF AROMATASE INHIBITOR-ASSOCIATED ARTHRALGIA

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Significance and aims: With an increased use of aromatase inhibitors (AIs) in more breast cancer survivors over longer periods of treatment, joint pain and stiffness has emerged as primary adverse effects, leaving them at increased risk of cancer mortality. Although half of women taking AIs reported AI-associated arthralgia (AIA), the symptom cannot be successfully remedied because no clear biological mechanisms underlying AIA have been found. This study was designed to develop a clinically relevant animal model of AIA to provide insights into mechanistic studies. Methods: Female athymic nude mice were assigned to four groups: naïve control, ovariectomy, vehicle-treated, and AI-treated groups (n=9~11/group). The vehicle-treated and AI-treated groups were inoculated with breast cancer cells (MCF-7) on flanks followed by surgical removal of grown tumors and ovaries at 3 weeks after the tumor transplantation. Subcutaneous letrozole injection (10 µg/day) was given daily for 8 weeks. During AI treatment, behavioral assays, such as von Frey filament, pressure algometer, grip strength, rotarod, and dynamic weight bearing, were conducted. Results: Letrozole-treated mice showed greater sensitivity to mechanical stimuli and joint pressure, decreased grip strength, impaired motor coordination, and shifting body weight forward to avoid supporting their body weight on major knee joints compared to other control groups. Conclusions and Implications: AI treatment may cause musculoskeletal pain and dysfunction. The findings have implications that AIA may be potentially associated with central pain processing manifested by allodynia and hyperalgesia. This model system will offer a platform to help better understanding of the progression and characteristics of AIA.

REGIONAL DOSE RESPONSE ASSESSMENT OF SLEEP AND CIRCADIAN BRAIN CIRCUITRY IN CRANIAL RADIATION-INDUCED HYPERSOMNOLENCE (C-RIH) MOUSE MODEL

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BACKGROUND: Radiation therapy is the standard of care for patients with primary brain tumors. Most of these patients experience cranial radiation-induced hypersomnia (C-RIH), which impacts quality of life and treatment tolerance. Previously, we demonstrated that sleep and circadian rhythms are impacted by cranial irradiation in our RIH mouse model. The purpose of this study was to examine the underlying neurological mechanisms that drive C-RIH, looking at sleep and circadian brain circuitry using immunohistochemistry and structural MRI. METHODS: C57BL/6 mice received whole brain radiation at 8Gy or sham doses. To test short-term effects, mice were sacrificed 1hr post-radiation and brain sections were stained for γH2AX, a signal for DNA damage. In vitro, we tested the impact of radiation based on brain region using established cell lines from the cortex (CTXTNA2) and suprachiasmatic nucleus (SCN) of the hypothalamus (SCN2.2). RESULTS: Staining of γH2AX demonstrated region-specific sensitivity to radiation. As expected, the hippocampus and cortex sustained high levels of DNA damage. Interesting, the hypothalamus and several deep brain regions associated with sleep (such as the locus coeruleus) also had high γH2AX. However, the SCN had dramatically less staining as compared to the surrounding hypothalamus. In vitro, clonogenic assays showed that CTXTNA2 cells were significantly more sensitive to radiation than SCN2.2 cells ($F(5,24)=84.01$, $p<0.0001$). CONCLUSION: Brain regions important for sleep and circadian rhythms showed significant differential sensitivity to radiation both in vivo and in vitro. We are currently determining the long-term impact of radiation on these regions by examining brain volumes in high-resolution MRI.

Symptom Science 2: Markers & Measures

POLYMORPHISMS IN DNA REPAIR AND OXIDATIVE STRESS GENES ASSOCIATED WITH PRE-TREATMENT PAIN IN BREAST CANCER SURVIVORS

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Significance and Aims: Oxidative stress is observed in individuals with musculoskeletal pain (MSKP), a significant problem in women with breast cancer who receive aromatase inhibitors (AIs) to prevent cancer recurrence. Unfortunately, little is known about genetic predictors for MSKP. The purpose of this exploratory candidate gene association study was to examine relationships between polymorphisms in oxidative stress and DNA repair genes and pre-adjuvant therapy pain in postmenopausal women with early-stage breast cancer. Methods: Average pain intensity (0–10) was assessed with an item from the Brief Pain Inventory in 138 women with breast cancer prior to adjuvant therapy (AI +/-chemotherapy) and 81 age-/education-matched controls. Participants were genotyped for 39 single nucleotide polymorphisms (SNPs) of select oxidative stress and DNA repair genes. Multiple linear regression was used to determine if the presence or absence of one or more minor alleles account for pain variability. Based on the regression analysis of individual SNPs, weighted genetic risk scores (GRS) were calculated to evaluate the collective effect of multiple alleles. Results: Average pain was associated ($p<0.10$) with eight polymorphisms evaluated by either SNP main effects and/or SNP by breast cancer treatment group interactions. GRS was significantly related to pain ($b=0.771$, $p<0.0005$). A higher GRS indicates greater genetic risk for higher levels of pain. Conclusions and Implications: These findings suggest that genetic variation in DNA repair and oxidative stress pathways play a role in pre-adjuvant therapy pain in breast cancer survivors and give reason to explore whether polymorphisms influence the development of MSKP after therapy initiation.

VARIATIONS IN MITOCHONDRIAL DYSFUNCTION (MD) RELATED GENES ARE ASSOCIATED WITH SENSORY PROFILES OF THE LOWER EXTREMITIES (LE) IN SURVIVORS WITH CHEMOTHERAPY (CTX) -INDUCED PERIPHERAL NEUROPATHY (CIPN)

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Significance and aims: CIPN is a common adverse side effect of CTX that is associated with MD. Little is known about distinct sensory profiles of CIPN in the LE. This study's purposes were: to identify survivors with distinct sensory profiles of CIPN in the LE (n=405) and evaluate for variations in MD related genes associated with sensory profile class membership. Methods: Latent class analysis was used to identify survivors with distinct LE sensory profiles using measures of worst pain; loss of light touch, cold, pain and vibration sensations; and timed get up and go and balance tests. Logistic regression analysis was used to evaluate for associations between latent class membership and genetic variants (i.e., expression quantitative trail loci (eQTL, n=127) of 66 genes in the mitophagy pathway. Results: Two distinct LE sensory profiles for CIPN were identified (i.e., Less Severe (LS; 76.5%), More Severe (MS; 23.5%)). Compared to the LS class, survivors in the MS class were older, female, lived alone, had a lower functional status, higher body mass index, a worse comorbidity profile, and were more likely to report high blood pressure, heart disease, diabetes, lung disease, and kidney disease. Variations in four eQTLs across three genes (i.e., CSNK2B, TOMM7, and SRC) were significantly associated with LE class in the final regression models that included demographic, clinical, and ancestry covariates. Conclusions and implications: This study identified multiple risk factors and genetic variations in MD related genes associated with the LE sensory profiles in survivors with CIPN.

PLASMA METABOLOMIC PROFILE ASSOCIATED WITH CANCER-RELATED FATIGUE

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Background: Cancer-related fatigue (CRF) is a debilitating disease that affects up to 80% of individuals with cancer. This disease is not well understood, and few treatments are available. The aim of this study is to utilize the unbiased approach to characterize the metabolomic profile associated with CRF. Methods: 197 participants with or without prostate cancer were involved in this study. The severity of fatigue was assessed using the 13-item Functional Assessment of Cancer-Therapy Fatigue. The metabolome of each participant was measured via untargeted ultrahigh performance liquid chromatography/mass spectrometry. Discriminant metabolic features were identified using partial least-squares-discriminant analysis, and the diagnostic performance of specific classifiers was measured through Area Under the Receiver Operating Characteristics curve analysis. Pathway analysis was conducted using Fisher's Exact Test and the Kyoto Encyclopedia of Genes and Genomes. Results: 1,120 metabolites were identified. Metabolic pathways unique to the fatigued cancer vs. healthy control group were sphingolipid, histidine, and cysteine and methionine metabolism. Pathways unique to the non-fatigued cancer vs. healthy control group were inositol phosphate, ascorbate and aldarate, and starch and sucrose metabolism, primary bile acid biosynthesis, and pentose and glucuronate interconversions. Both and fatigued and non-fatigued cancer groups had significantly altered caffeine, tyrosine, sulfur, and phenylalanine metabolism, as well as altered steroid hormone biosynthesis compared to the control group. Conclusions: The metabolic phenotype of fatigued oncology patients was characterized, and significant differences were found between the metabolomes of fatigued oncology patients, non-fatigued oncology patients, and healthy controls.

QUANTITATIVE SENSORY TESTING IN THE ASSESSMENT OF PAIN IN CANCER PATIENTS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Significance and aims: Greater than 1/3 of cancer patients report moderate to severe pain, which negatively impacts psychosocial and physical function. Using objective measures such as quantitative sensory testing (QST), a non-invasive method for evaluating somatosensory function, can assist in identifying underlying pain pathophysiological mechanisms and targeted treatments. This review describes the current evidence on the use of QST and parameters demonstrating abnormal sensory function in cancer pain. Methods: Systematic searches identified 16 eligible articles published to October 2020 from PubMed, EMBASE, Web of Science, and CINAHL. Search terms included "QST," "pain," "cancer," and "assessment". The potential bias risk was evaluated by the Quality In Prognosis Studies tool. Meta-analysis was used to determine effect sizes of QST modalities on pain. Results: Studies primarily focused on patients with breast cancer undergoing surgery (n=7) and colorectal cancer receiving chemotherapy (n=4). Thermal thresholds (heat, warm, cold) were frequently used in the assessment of pain, followed by mechanical threshold to evaluate for sensory alterations. No significant standardized mean differences (SMD) were observed in cold, warm, and mechanical threshold tests although heat pain threshold seemed likely to discern cancer pain (SMD=–0.163, p=.062). Nine studies had a small sample size (<50) and a majority of studies showed a low risk of bias (n=20). Conclusions and Implications: More research using large sample sizes is warranted to validate the rationale of using QST in the evaluation of cancer pain and to explore different cancer types and treatments. A subset of QST modalities could be considered to assess pain.

HOT TOPICS: COVID19 AND DISPARITIES

COVID-Related

DEVELOPMENT OF THE ONCOLOGY NURSING SOCIETY'S RESEARCH AGENDA IN RESPONSE TO COVID-19

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Significance: The novel coronavirus 2019 (COVID-19) has created unprecedented disruption to cancer care worldwide. The Oncology Nursing Society appointed a rapid research response team to develop a COVID-19 research agenda in alignment with its mission to promote excellence in oncology nursing and quality cancer care. Methods: Priority areas related to COVID-19 were identified using a multi-step approach combining rapid literature review, consultation with experts/stakeholders, and review of research priorities from funding agencies, public health, and cancer-focused organizations. Results: Five research priorities with four cross-cutting themes related to oncology and COVID-19's impact were identified. Priorities include: 1) disparities in cancer; 2) symptom science, palliative and end-of life care; 3) access to cancer care, clinical trials, and other research; 4) communication/partnerships with patients and caregivers; and 5) nursing workforce support and staff/faculty development. Cross-cutting themes include: 1) adaptation and evaluation of new care models; 2) reduction of cancer care inequalities exacerbated by the pandemic; 3) development of new communication methods; and 4) inter-institutional and interdisciplinary collaboration. The need for research using data science, social media, infodemiology, and other innovative methods was noted. Conclusions: Research addressing priorities and themes in the research agenda is anticipated to have a high impact on the field by generating and strengthening evidence to reduce inequities in care, promoting accurate transmission of information, and advancing new models of cancer care. Oncology nurse scientists are well-positioned to address these priorities. Innovative methodologic approaches and attention to disparities are essential for advancing research and clinical care related to COVID-19.

TECHNOLOGY-BASED INTERVENTIONS TO ADDRESS THE PSYCHOLOGICAL IMPACT OF COVID-19 IN PATIENTS UNDERGOING CANCER TREATMENT

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Significance: The novel coronavirus (COVID-19) has plagued countries worldwide. Patients in active cancer treatment are more vulnerable to contracting the virus, with higher risk of complications if infected. Such vulnerability has steep consequences on everyday life for these patients, including self-isolating to limit exposure to others. Aims: To describe oncology health care professionals' (OHCP) perception of the psychological impact of COVID-19 in patients undergoing cancer treatment and evaluate supportive interventions. Methods: A qualitative design was employed using semi-structured telephone interviews. Inclusion criteria included OHCP actively practicing and providing care to patients diagnosed with cancer and undergoing treatment during the pandemic. Participants were recruited from four NCI-designated comprehensive cancer centers and one hospital-based oncology clinic in the United States. A thematic analysis using Atals.ti was completed. Results: Participants (n=30) were mostly was female (90%), White (80%), registered nurses (70%), bachelor's prepared (66.7%), and working in outpatient settings (56.7%). OHCP perceived that patients' psychological distress such as depression, anxiety and fear were exacerbated by COVID-19 and experienced isolation, loneliness, and frustration due to the protocols implemented to mitigate the pandemic. More severe cases included suicidal ideation requiring immediate action. OHCP adapted and employed a variety of innovative technology-based interventions to decrease the impact of psychological distress on their patients including telehealth and FaceTime/Zoom calls with patients and family. Conclusion/Implications: Patients with cancer were perceived to suffer severe psychological distress during the pandemic. Long-term effects of this impact on cancer patients are unknown. OHCP displayed innovative approaches to intervene using technology-based platforms.

SURVIVING THE PANDEMIC: A RETROSPECTIVE REVIEW OF OLDER CANCER PATIENTS ADMITTED WITH COVID-19

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Significance: SARS-CoV-2 infection results in more severe illness among high-risk populations, such as older adults and those with underlying comorbid conditions. Literature comparing the clinical course by age indicates older adults may experience worse outcomes than younger patients. Methods: We conducted a retrospective review of COVID-19 positive patients aged > 75 admitted to a comprehensive cancer center between March 1 and May 31, 2020. Results: We identified 70 cancer patients (median age 80) who tested positive for COVID-19 within 72 hours of admission. 35 (50%) were female and 32 (45.7%) were married. Most patients (n=66, 94.2%) were from NY state. The most common cancers were lung (n=15, 21.4%), genitourinary (n=9, 12.8%) and lymphoma (n=8, 11.4%) and 24 (34.2%) received chemotherapy within 2 months of admission with COVID. Most common comorbidities were hypertension (n=45, 64.2%), cardiovascular disease (n=19, 27.1%), and diabetes (n=19, 27.1%). The most common symptoms at presentation were fever (n=35, 50%), cough (n=34, 48.6%), shortness of breath (n=27, 38.6%) and weakness (n=25, 35.7%). During the hospital course, 38 (54.3%) were diagnosed with pneumonia, while 47 (67.1%) needed oxygen supplementation. Mechanical ventilation was needed in 8 (11.4%) of patients. Acute respiratory distress syndrome was diagnosed in 16 (22.9%). Most commonly prescribed medications were hydroxychloroquine (n=39, 55.7%) and azithromycin (n=32, 45.7%). Out of 70 patients, 17 (24.2%) died during hospitalization. Conclusion: The mortality in older cancer patients far exceeded the observed case/fatality ratio (1.9%) in the US1. Further work is underway to better characterize these findings. 1https://coronavirus.jhu.edu/data/mortality

PSYCHOLOGICAL IMPACT OF COVID-19 PANDEMIC ON INPATIENT ONCOLOGY NURSES: A CROSS-SECTIONAL STUDY

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Significance and aims: Oncology nurses are at disproportionate risk for psychological distress. We examined the association between psychological distress and work-related quality of life (WRQoL) in oncology nurses during the COVID-19 pandemic. Methods: A cross-sectional analysis examined the impact of psychological distress [IESR-22 (PTSD): Impacts of Events Scale Revised Scale; DASS-21: Depression, Anxiety & Stress Scale] on WRQoL of inpatient oncology nurses at a single cancer center controlling for potential covariates. Results: Nurses' (n=68) mean age was 34.8 years (±9.8). Most were White (n=60, 88%), non-Hispanic (n=65, 95%) females (n=66, 97%), Bachelor's prepared (n=61, 89%) and less likely to be married (n=29, 42%). The mean years of nursing and oncology experience was 9.3 years (±8.4) and 7.9 (±7.3) respectively. The mean DASS-21 score was 33.4 (±21.9) with subscales showing normal levels of depression (9±7.4), mild anxiety (9.09±7.8) and mild stress (15.3±9.4). The mean score for PTSD (28.4±15.47) suggested clinical concern. The mean score for WRQoL was 78.8±10.5. Nurses' anxiety, depression and stress were strongly correlated to PTSD ($r=.81$, $p<.0001$). WRQoL was negatively correlated to PTSD ($r= -.50$, $p<0.0001$) and anxiety, depression and stress ($r= -.59$, $p<0.0001$). In multivariate regression analysis, depression, anxiety and stress were significantly associated with WRQoL controlling for covariates ($\beta = -.498$; 95% CI, – .776 to –.219 4; [$p = 0.001$]). Conclusion and implications: Interventions to reduce depression, anxiety and stress may be important in improving WRQoL. Oncology nurses may benefit from psychological distress screening, especially for PTSD, anxiety and stress.

PALLIATIVE AND PSYCHOSOCIAL CARE: INTERVENTIONS

Palliative and Psychosocial Care

A PALLIATIVE CARE INTERVENTION FOR PATIENTS ON PHASE 1 STUDIES

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Significance and aims Phase 1 clinical trials remain vital for oncology care. Patients on these trials require supportive care for QOL concerns. The purpose of this research was to test a Palliative Care Intervention (PCI) for patients with solid tumors enrolled in Phase I therapeutic trials with a priori hypothesis that psychological distress, QOL, satisfaction, symptoms, and resource utilization would be improved in the PCI group. Methods This unblinded randomized trial compared the PCI to usual care Phase I Clinical Trial patients. Subjects (n=479) were followed for 24 weeks, with 12 weeks as the primary outcome. The setting was two comprehensive cancer centers in the United States involving a consecutive sample, 21 years or older, English fluency, with solid tumors initiating a Phase 1 trial. The instruments used were Psychological Distress (Distress Thermometer), QOL total and subscales (FACT-G), satisfaction (FAM-CARE), survival, resource utilization (chart audit). Results PCI subjects showed improved Psychological Distress (−0.47, p=.015) and Emotional Well- Being (0.81, p=.045), with differences on variables of QOL and distress between sites. High rates of symptom-management admissions (41.3%) and low rates of Advance Directive completion (39.0%), and hospice enrollment (30.7%), despite a median survival in both groups of 10.1 months from initiating a Phase 1 study. Conclusions and implications A nurse-delivered palliative care intervention can improve some QOL outcomes and distress for Phase 1 trial participants. Greater integration of PC is needed to provide quality care and to support transitions from treatment to supportive care, especially at the end of life.

EFFECTS OF A LEGACY INTERVENTION ON THE COPING OF CHILDREN WITH ADVANCED CANCER

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Significance and aims: Legacy interventions, activities aimed at being remembered, are sometimes provided to seriously-ill children. However, the effect of such interventions on children's use of adaptive coping strategies is relatively unknown. This study examined the impact of a legacy intervention on coping strategies of children with advanced cancer. Methods: Researchers used Facebook advertisements to recruit 150 children (aged 7–17) with relapsed/refractory cancer and their parents to participate in a 2-group randomized trial. Child-parent dyads assigned to the intervention group created electronic storyboards about themselves. The control group received usual care. Assessments at baseline (T1) and post-intervention (T2) included the Response to Stress Questionnaire (RSQ) measure of primary control (i.e., direct attempts to influence the stressor), secondary control (i.e., adapting to the stressor), and disengagement coping (i.e., avoiding the stressor). Linear regressions tested the group effect on the change in RSQ scores from T1 to T2 controlling for T1 scores. Resulting group effect coefficients were translated into Cohen's d statistics. Results: The analysis sample included N=92 dyads (57 intervention, 35 control). Children were a median 10 years old (range=8–12) and 4.2 years from diagnosis (range=0.4–15.0). Strongest effects of the legacy intervention were on primary control coping (increased relative to control, Cohen's d= 0.21, p=.206) and disengagement coping strategies (decreased relative to control, Cohen's d= −0.19, p=.372). Conclusions and implications: Oncology nurses have the unique opportunity to facilitate adaptive coping strategies in children with cancer through legacy interventions. While our intervention demonstrates promise, more refinement is needed to optimize its effect.

FEASIBILITY AND PRELIMINARY EFFICACY OF A CHILD AND PARENT YOGA (CAPY) INTERVENTION IN PEDIATRIC ONCOLOGY

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Significance and Aims: Treatment for children with cancer creates undesirable psychosocial effects for children and parents. Yoga has helped alleviate these negative effects in adults, but few studies have explored pediatric yoga. This study determined feasibility and preliminary efficacy of a newly developed child and parent yoga (CAPY) intervention for children with cancer and their parents. Methods: We used a 1-group pre/post intervention design. Participants (N=14) included children (aged 8–17) within 4 weeks of newly diagnosed or relapsed cancer and their parent. The 3-week intervention included 9 30-minute yoga sessions (in-person/Zoom). Before (T1) and after (T2) the intervention, children and parents completed assessments for child and parent psychological distress, child and parent physiological stress, parent-child communication, and child physical symptoms. Parents also completed a T2 satisfaction survey. Descriptive summaries determined if benchmark thresholds were met. Results: Seven dyads consented; 35 yoga sessions were completed. Of 4 dyads completing the study, 3 (75%) parents reported they were completely satisfied. All parents (100%) were completely satisfied with yoga instructors, their physical/emotional/mental progress, and their child's treatment progress. Parents reported improved stress, anxiety, anger, depression, communication, quality of life, and feelings of hope and control. Parents reported improved child stress, anxiety, physical symptoms, depression, communication, and quality of life. Conclusions and Implications: Study results established intervention feasibility, safety and preliminary efficacy. Our novel CAPY protocol to be implemented during cancer treatment informs clinical practice. Future research includes expanding our work to a randomized clinical trial and determining efficacy for child and parent outcomes.

SYMPTOM MANAGEMENT: SYMPTOM PROFILES/ SELF-MANAGEMENT

Symptom Management

DOES THE DEVELOPMENT OF ONCOLOGY-SPECIFIC SIMULATIONS AND HANDS-ON LEARNING IMPROVE ONCOLOGY NURSE CONFIDENCE?

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Significance/Aims: Nursing staff is often comprised of new grads who are trained on chemotherapy after 1 year on the oncology unit. Despite this training, nurses express a lack of confidence in chemotherapy administration and symptom management. The often-complex dosing, timing, and monitoring of chemotherapy medications can contribute to lower nursing confidence levels versus normal drug administration. Method: The setting was a long-term acute care facility with a dedicated oncology unit with an average length of stay of 38 days. A classroom training and SIM lab educational intervention was developed, incorporating hands-on learning for new nurses during oncology orientation. Nurses were given a patient case study with hands-on simulation of chemo administration in our SIM lab. Following the educational intervention, we conducted a debrief and review. A pre- and post-survey was used to assess nurses' confidence in caring for oncology patients. Qualitative and quantitative data was collected from 12 oncology nurses during October 2020. Results: Our pre-post survey showed an increase in nurse confidence in caring for oncology patients of 9% ($p = 0.266$); in administering chemotherapy of 48% ($p = 0.006$) and in caring for patients post-chemo of 12.7% ($p = 0.139$). Qualitative responses to the SIM lab experience emphasized the need for more frequent simulation experiences with a focus on potential adverse events, side effects, and symptom monitoring. Conclusions/Implications: A simple educational intervention demonstrated a significant increase in nursing chemotherapy administration confidence. Our findings suggest that further intervention is needed to increase confidence levels in other areas.

TAILORED HOME-BASED EXERCISE (IBHE) PROGRAM FOR SYMPTOMS AND WELL-BEING AMONG LOW-INCOME CANCER SURVIVORS LIVING WITH CO-MORBID CONDITIONS

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Significant and aims: A home-based exercise program has demonstrated benefit in cancer survivors with multiple chronic conditions (MCC), but motivation and adherence to the program were listed as challenges. A Tailored Home-Based Exercise (iBHE) program using a combination of human-centered design and mobile technology was developed. This study aims to examine the effect of the 12 weeks program on symptoms and well-being among cancer survivors living with MCC. Methods: A randomized control trial was conducted in individuals diagnosed with solid tumor cancer and at least one other comorbidity (e.g., diabetes and/or hypertension). The PROMIS fatigue and pain, and short-form survey (SF-36) were used to measure symptoms and well-being at week 1 (baseline) and week 12 (completion). Results: Twenty-five cancer survivors with MCC and mean age of 73.9 (SD=6.7) were recruited and randomly assigned to the intervention (n=13) or control group (n=12). The attrition rate was 24%. At the 12 weeks, participants in the intervention group increased weekly average step count as measured by Fitbit (9–113% increase from baseline). While the control group showed worsened pain and fatigue, the participants in the intervention group reported reduced fatigue (6%) and pain (8%) and improved well-being (SF-36) in physical function (23%), role of emotional (13%), bodily pain (23%) and vitality (9%). Conclusion and Implications: Our findings support the potential benefit of a tailored home-based exercise program on symptoms and well-being. As the sample size was small and the program's sustainability is unknown, future longitudinal studies with a larger population are needed.

Symptom Science

THE DIFFERENT IMPACT OF SYMPTOMS AND ADVERSE EVENTS ON MEDICATION BELIEFS IN PATIENTS NEWLY PRESCRIBED ORAL ANTICANCER AGENTS

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Significance/Aims: Medication beliefs (MB) are associated with adherence. Oral anticancer agents (OAAs) require self-management of complex regimens and symptoms/adverse events. Aims examined effects of symptoms and adverse events on MB. Methods: Secondary analysis from a NCI-funded RCT. Inclusion criteria: ≥ 21 years of age, new OAA prescription, English speaking, Eastern Cooperative Oncology Group performance score of 0–2 or Karnofsky score ≥ 50. Data were collected at baseline, 4, 8, and 12 weeks. Beliefs about Medicine Questionnaire-Specific (BMQ) measured MB; Necessity subscale indicates medication benefits health, Concern subscale denotes misgivings about medication. The Cancer Symptom Experience Inventory and Common Terminology Criteria for Adverse Events measured symptoms and adverse events. Linear mixed effects models (LME) related BMQ subscales at each data collection point to fixed explanatory covariates. Time varying covariates (symptoms) were added to the LME in independent models. Regression analyses evaluated relationships of adverse events and BMQ subscales. Results: The sample (N=272) had stage IV cancer (71%). As symptom severity (B = 0.009, SE = 0.001, p = < .01)/interference indices (B = 0.009, SE = 0.001, p = < .01) increased, Concern increased. Those with zero (B = 0.50, SE = 0.21, p = .02), one (B = 0.70, SE = 0.21, p = .01) and two (B = 0.82, SE = 0.23, p < .01) adverse events had higher Necessity compared to those with ≥3 adverse events. Conclusion/Implications: MB are influenced differently by symptoms and adverse events. Nurses should assess and address MB that can affect adherence.

EXPLORING THE PREVALENCE AND BURDEN OF SLEEP DISTURBANCE IN PRIMARY BRAIN TUMOR PATIENTS

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Significance and Aims: Our previous work demonstrated that in primary brain tumor (PBT) patients, sleep disturbance (SD) is a core symptom and CLOCK gene polymorphisms are associated with severity of sleep abnormalities. This study aimed to identify associated clinical characteristics and co-occurring symptoms with SD in order to describe associated burden and risk to aid in interventional trial planning. Methods: Demographic, clinical characteristics, MDASI-Brain Tumor, and PROMIS Depression and Anxiety Short-Forms were collected from patients at study entry. Descriptive statistics, Chi-square tests, and independent t-tests were used to report results. Results: The sample included 424 patients (58% male, 81% Caucasian) with a mean age of 49 years (range 18-81); 58% had high-grade gliomas. Moderate-severe SD was reported in 19% of patients and was associated with younger age (mean = 5 years), poor Karnofsky Performance Status (≤ 80; OR = 2.2), tumor progression at assessment (OR = 2), and active corticosteroid use (OR = 2.4). Those with moderate-severe SD were more symptomatic with higher burden (mean = 2.3) and more moderate-severe symptoms (8 vs. 2). Patients reporting moderate-severe SD reported 3 and 4 times higher prevalence of depressive and anxiety symptoms, respectively. The most frequently co-occurring symptoms with SD were fatigue (72%), drowsiness (59%), and distress (56%). Conclusions and Implications: Targeting interventions for sleep may alleviate other co-occurring symptoms and improve life quality for PBT patients. Future work exploring identified clinical risk factors and sleep outcomes across the illness trajectory will be critical to develop biologically-based personalized interventions.

Symptom Science 1: Symptom Profiles

ASSOCIATION OF CARDIOTOXICITY AND CANCER AND CANCER TREATMENT-RELATED COGNITIVE IMPAIRMENT IN BREAST CANCER SURVIVORS

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Significance and Aims: Breast cancer survivors (BCS) may be at a greater risk for cardiotoxicities, including congestive heart failure (CHF) and hypertension (HTN), which in turn, may affect cognitive impairment, a frequent, bothersome, and potentially debilitating symptom. The purpose of this study was to examine the relationship of cardiotoxicity on cognitive function in BCS. Methods: Baseline data from a double-blind RCT for cognitive training of BCS were examined. Early stage BCS (Stage I–IIIA) who were 21 years of age and older, completed adjuvant therapy (≥ 6 months), and reporting cognitive concerns completed questionnaires and a brief neuropsychological assessment, including tests of memory, attention and working memory, speed of processing, and verbal fluency. Descriptive statistics, Pearson's correlation coefficient and separate linear regression models for each cognitive domain were ran, controlling for age and education. Results: 47 BCS, who were on average 57.3 (SD=8.1) years old, 57.8% Caucasian and had some college education (74.5%), completed the study. 44.7% of the BCS had cardiotoxicity (CHF or HTN). In bivariate correlations, cardiotoxicity was significantly associated with immediate and delayed memory and attention and working memory, but not speed of processing, verbal fluency, or subjective cognitive function. In general linear models, cardiotoxicity was significantly related to immediate and delayed memory and attention and working memory ($p<0.01–0.05$). Conclusions: BCS, who incur cardiotoxicity, may also be at a greater risk for cognitive impairment post-treatment. Results from this study inform both clinical practice and future research, specifically by examining the intersect between cancer, cardiotoxicity (cardiac disease), and cognition.

PREDICTORS OF NONADHERENCE TO RADIATION THERAPY SCHEDULES AMONG HEAD AND NECK CANCER PATIENTS

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Significance and aims: Head and neck cancer patients often undergo a demanding treatment schedule including radiation. Nonadherence to radiation therapy schedules is a documented problem among head and neck cancer patients that negatively affects treatment outcomes. This retrospective, descriptive study examined whether demographics, clinical characteristics, or symptoms were related to nonadherence among head and neck cancer patients. Methods: Electronic health records of 262 head and neck cancer patients who received radiation at a southeastern U.S. cancer center from July 2017 to June 2018 were reviewed to determine whether nonadherence was related to symptoms and other factors. Results: Statistically significant findings included that nonadherent patients were more likely to be female, be admitted as inpatients and receive outpatient IV hydration during treatment. Nonadherent patients reported higher mean symptom scores on nine symptoms measured during treatment, suggesting more symptom burden. Concurrent chemoradiation and higher scores of tiredness (AOR=1.343) and depression (AOR=1.563) predicted patients were more likely to be nonadherent. Patients with tongue tumors (AOR=.197) and increased scores of spiritual well-being (AOR=.643) and constipation (AOR=.684) were less likely to be nonadherent. Conclusion and Implications: Patients experiencing more demanding treatment regimens and tiredness and depression may be at risk for unplanned treatment breaks. Multiple symptoms at low thresholds may have a cumulative effect, therefore clinicians may consider reviewing individual screenings to determine impact on adherence to treatment regimens. Enhancing spiritual well-being may help this population adhere to their treatments. Findings support symptom screening during treatment and future research to further explore the results.

EVALUATING PATIENT SYMPTOM BURDEN USING THE M.D. ANDERSON SYMPTOM INVENTORY-BRAIN TUMOR (MDASI-BT) IN EARLY PHASE TRIAL OF A MULTI-KINASE INHIBITOR

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Significance and aims: Recurrent high-grade glioma (HGG) patients are highly symptomatic with limited therapeutic options. Understanding impact on how a patient feels/functions is key to understanding clinical benefit. The purpose of this report is to longitudinally evaluate patient-reported outcomes (PROs) in patients with recurrent HGG receiving experimental treatment. Methods: 50 HGG patients who received at least one cycle of treatment on a phase 1 trial of zotiraciclib plus dose-dense TMZ (Arm1) or metronomic TMZ (Arm2) were analyzed. MDASI-BT was completed at baseline and imaging. Descriptive statistics summarized symptom/interference subscales by time and treatment arms. Linear mixed models for symptom/

interference subscales were fitted to determine differences in treatment arms over time. Results: Compliance was >89% through cycle 4. Baseline symptom burden was 1.5 (SD=1.3) and overall interference 2.3 (SD=2.6). The affective factor (fatigue, disturbed sleep, feeling distressed, feeling sad, irritability) was rated the highest (2.3, SD=2.1) and activity-related interference (general activity, work, walking) rated the highest (2.6, SD=2.7) at baseline. Longitudinal evaluation revealed overall symptom burden (with diarrhea/fatigue) most changed and interference worsened during cycle 2 but remained unchanged to cycle 4. No significant differences between treatment arms were found in disease or treatment related symptom/interference groupings. Conclusions and implications: Disease related symptoms remained stable while overall symptom burden worsened at cycle 2, then stabilized with no treatment arm differences over time. PROs revealed that symptomatic toxicities occur but may stabilize with continued treatment, supporting the need for longitudinal assessment of early phase therapies to understand disease impact and treatment tolerability.

AN EVALUATION OF THE ASSOCIATION OF THE RANO-PRO COLLABORATIVE STANDARDIZED PRIORITY CONSTRUCTS AND PROGRESSION AMONG MALIGNANT GLIOMA PATIENTS.

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Significance and aims: Recognizing the importance of clinical outcomes assessments (COA), RANO-PRO Collaborative recommended inclusion of core symptoms/functions in clinical care/research for malignant glioma patients. This study evaluated the association between the recommended symptoms (pain, perceived cognition, seizures, aphasia, treatment-specific symptoms) and functions (weakness, walking, work, usual activities) and disease progression in these patients. Methods: 336 patients with malignant glioma were included. Scores of the MDASI-Brain Tumor, EQ-5D-3L, Karnofsky Performance Status (KPS), and Neurologic Function Score (NFS) were evaluated in relation to disease progression by chi-square tests, independent- and paired-samples t-tests, adjusted for multiple comparisons. Results: The sample was 64% male, median age=52 (21–79), 77% white, 65% had tumor recurrence. Difficulty remembering, fatigue, and weakness were worse in the group whose imaging showed disease progression versus stable disease, as well as the functions of walking, work, activity, and self-care (1.1<difference<1.8). Patients with disease progression were 4X more likely to have a poor KPS (≤80) and worse NFS. Among patients with disease progression (n=106), all symptoms, except seizures and weakness, worsened from first assessment to time of progression and up to 25% of patients reported worsening mobility, self-care, and usual activity; 49% and 39% had worsened KPS and NFS, respectively. Conclusions and implications: Identified core symptoms/functions worsen at the time of progression, highlighting the importance of longitudinal collection of COA in clinical care and clinical trials. Further analyses will focus on the sensitivity of these core constructs compared to expanded symptoms/functions and the concordance of patient- and clinician-reported outcomes.

FRAILTY STATUS, FRAILTY TRANSITIONS, AND QUALITY OF LIFE AFTER HEMATOPOIETIC CELL TRANSPLANTATION

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Significance and Aims: Frailty in hematopoietic cell transplantation (HCT) patients may be an important risk stratification tool. This study examined the effect of frailty status prior to HCT (T1) and pre-engraftment following HCT (T2) on quality of life outcomes seven weeks after hospital discharge (T3) and determined the impact of demographic and clinical characteristics on frailty transitions. Methods: This study used a comparative, descriptive design (n=67). Frailty was operationalized as unexplained weight loss, poor hand-grip strength, self-reported exhaustion, slow walking speed, and low physical activity. Transitions in frailty were operationalized as change scores. Quality of life outcomes included fatigue, muscle strength, functional ability, and patient-reported symptoms and functional ability. Differences between not frail, prefrail, or frail were examined using MANOVA. Results: Frailty status prior to HCT and pre-engraftment had no effect on quality of life outcomes other than fatigue ($p<.05$) seven weeks following hospital discharge (T3). Older age was associated with regression toward frailty (T1 to T3, $p<.05$; T2 to T3, $p<.05$,). Frailty transition scores progressed toward improvement for autologous HCT recipients and regressed toward frailty for allogeneic HCT recipients (T1 to T3, $p<.005$; T2 to T3, $p<.05$). Conclusions and Implications: Frailty status changes over time following HCT. Those who were frail pre-engraftment experienced increased fatigue seven weeks following hospital discharge. Frailty status prior to HCT and during pre-engraftment did not impact any other quality of life outcomes seven weeks after hospital discharge. Frailty transition scores worsen for allogeneic and older adults placing them at increased risk for adverse outcomes.

Symptom Science 2: Symptom Profiles

COMORBIDITY AND COGNITIVE DYSFUNCTION RELATED TO POORER PHYSICAL FUNCTIONING AND QUALITY OF LIFE IN OLDER BREAST CANCER SURVIVORS.

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Significance and Aims: Comorbidities and cognitive dysfunction are common among breast cancer survivors (BCS). Both have been related to poorer physical functioning and quality of life (QoL) in older adults; however, little is known in older BCS. This study examined the relationship of comorbidities, objective and subjective cognitive dysfunction to physical functioning and QoL in older BCS. Methods: Data were leveraged from a nationwide study (Champion). 335 BCS (Stage I–IIIA) who were ≥60 years of age, received chemotherapy, and were 3–8 years post-diagnosis completed a one-time questionnaire and neuropsychological tests, including: comorbidities (self-report), subjective attention (Attentional Function Index), objective cognitive function (Rey-AVLT, Digit Span, COWA), physical functioning (PF-10), and QoL (Index of Wellbeing). Descriptive statistics and separate linear regression analyses were conducted. Results: BCS were on average 69.79 (SD=3.34) years old and 5.95 (SD=1.48) years post-diagnosis. Most were stage II (67.7%), White (93.4%), had at least some college (51.6%) and reported on average 3 (SD=1.81) comorbidities. All 6 physical functioning models were significant ($p<.001$); with more comorbidities, and worse subjective attention identified as significantly related to decreased physical functioning. One model was significant for QoL ($p<.001$); with only worse subjective attention identified as significantly related to worse QoL. Objective cognitive function measures alone were not significant in the physical functioning or QoL models. Conclusions and Implications: More comorbidities and poorer subjective attention were most important and should be incorporated in future research and practice when investigating or assessing for issues regarding physical functioning and QoL.

THE INFLUENCE OF SYMPTOMS ON HEALTH-RELATED QUALITY OF LIFE AMONG OLDER ADULTS SURVIVORS OF COLORECTAL CANCER IN A NATIONAL SAMPLE

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Significance/Aims: Older adults account for 64% of all cancer survivors in the United States and are at risk to experience decreased health-related quality of life (HRQOL). This study aimed to gain a better understanding of HRQOL and its correlates in a national sample of older adult survivors of colorectal cancer. Methods: This secondary analysis utilized the linked Surveillance Epidemiology and End Results-Medicare Health Outcomes Survey (SEER-MHOS) dataset (N=20,738) for cohorts 1 to 15 (1998–2014). Hierarchical multiple regression analysis was calculated to analyze the contribution of characteristics of the individual and environment (i.e., age, gender, race, marital status, education, income, and geographic location), biological function (i.e., cancer stage, current cancer treatment, time since diagnosis, and comorbidities), symptoms (i.e., pain, depression, and fatigue), functional status, and general health perception on HRQOL as measured by the mental and physical composite scores on the RAND SF-36. Results: In the final model, depression ($\beta=0.37$, SE=0.21, $p<0.001$), fatigue ($\beta=0.50$, SE=0.01, $p<0.0001$) and functional status ($\beta=-0.23$, SE=0.01, $p<0.001$) significantly predicted mental HRQOL (R2=0.55). For physical HRQOL, pain ($\beta=0.34$, SE=0.003, $p<0.001$), depression ($\beta=-0.13$, SE=0.11, $p<0.001$), functional status ($\beta=0.58$, SE=0.004, $p<0.001$) and general health perception ($\beta=-0.20$, SE=0.05, $p<0.0001$) were significant predictors (R2=0.89). Symptoms accounted for the largest percentage of variance in mental and physical composite scores, accounting for 43% and 61%, respectively. Conclusions/Implications: Given the notable impact of symptoms on mental and physical HRQOL, ensuring adequate symptom management is key to improving the HRQOL of older adult survivors of colorectal cancer.

CO-OCCURRENCE OF EVENING FATIGUE AND DEPRESSION PROFILES ARE ASSOCIATED WITH POORER QUALITY OF LIFE (QOL) OUTCOMES IN OUTPATIENTS WITH CANCER RECEIVING CHEMOTHERAPY (CTX)

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Significance and aims: Evening fatigue and depression (EFD) are common symptoms in patients receiving CTX. Little is known regarding their co-occurrence. Study purposes were to identify subgroups of patients with distinct EFD co-occurrence profiles and determine differences in demographic and clinical characteristics and QOL outcomes. Methods: EFD were measured using the Lee Fatigue Scale and Center for Epidemiological Studies-Depression scale in outpatients (n=1334) over two cycles of CTX. Subgroups were identified using combined latent profile analysis. QOL was measured using the Multidimensional QOL Scale-Cancer. Results: Five distinct co-occurrence profiles were identified (i.e., Low Evening Fatigue and Low Depression (LFD) (20.0%), Moderate Evening Fatigue and Low Depression (MFLD) (39.3%), Increasing and Decreasing Evening Fatigue and Depression (IDFD) (5.3%), Moderate Evening Fatigue and Moderate Depression (MFD) (27.6%), High Evening Fatigue and High Depression (HFD) (7.8%)). Compared to the LFD and MFLD classes, patients in the MFD and HFD classes were less likely to be married; had a lower functional status and worse comorbidity profile, and were more likely to report depression. Compared to the LFD class, patients in the HFD class were more likely to be younger, female, live alone, and have breast cancer. Scores for total QOL, psychological and social well-being differed significantly among the classes (i.e., LFD > MFLD > IDFD > MFD > High). Conclusions and implications: This study identified multiple risk factors associated with the co-occurrence of more severe EFD. Co-occurrence of these symptoms results in significant decrements in QOL.

PRELIMINARY ANALYSIS OF THE SYMPTOM CLUSTER EXPERIENCE AMONG CAREGIVERS OF PATIENTS WITH CANCER

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Background: Caregivers of persons with cancer experience physical and emotional burden, supporting loved ones undergoing treatment. In cancer patients, stress is associated with a psychoneurologic symptom cluster of depressed mood, anxiety, pain, fatigue, and sleep disturbance. The stress of caregiving may trigger similar symptom profiles among caregivers and warrants investigation. Purpose: We present a preliminary analysis of data from an ongoing feasibility study assessing symptom clusters in N=30 cancer patient-caregiver dyads. We aim to describe (1) symptoms experienced by cancer caregivers, (2) caregivers' perceptions of symptom clusters, and (3) causal attributions of clustered symptoms. Methods: Caregivers (individuals who support an adult undergoing cancer treatment) provided eight weekly symptom reports using a web-based assessment system. Participants described their symptom experience including symptom clusters, their duration, relationships among symptoms, and causal attributions. Results: To date, n=15 dyads have completed participation. At least one-third of caregivers experienced anxiety (n=11), sleep problems (n=10), headache (n=8), fatigue (n=8), depressed mood (n=6), feeling irritable/angry (n=5), or feeling lonely/isolated (n=5). Twelve caregivers described symptoms occurring in clusters. The most identified clusters included fatigue & sleep problems (n=3), headache & sleep problems (n=3), and anxiety, fatigue & sleep problems (n=2). Emotional and physical symptoms were most frequently attributed to concerns about the loved one's cancer and changes in everyday life. Conclusions: Findings suggest that caregivers of patients with cancer may experience symptoms that co-occur in clusters and that are attributed to concerns for the loved one as well as role changes, leading to an opportunity for targeted intervention.

RELATIONSHIPS BETWEEN MOOD DISTURBANCE, SELF-REPORTED FUNCTION, AND DISEASE PROGRESSION IN GLIOMA PATIENTS

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Significance and Aims: Glioma patients report significant physical and role functioning limitations, as well as depressive/anxiety symptoms, throughout their illness trajectory. This study aimed to explore relationships between these mood disturbances and functional limitations with progressive disease (PD) in glioma patients. Methods: Demographic, clinical characteristics, MDASI-Brain Tumor (interference items), and PROMIS Anxiety and Depression Short-Forms were collected at the time of imaging surveillance, before discussing the results. Comparisons between those with/without PD as well as change scores with PD were calculated at study entry and at subsequent assessments. Independent t-tests, Chi-square tests, and paired sample t-tests were used to report results. Results: The sample included 438 glioma patients (62% male, 84% Caucasian) with mean age of 50 (range 18–82) and 58% had stable disease. On average, PD patients reported significantly greater anxiety ($p=0.008$), depression ($p<0.001$), and symptom interference ($p<0.001$) than those with stable disease. Additionally, more patients with PD reported moderate-severe anxiety (25%) and depression (22%) than patients with stable disease (15% and 12%, respectively). When evaluating change scores, those with PD had worse symptom interference ($p<0.001$) and stable mood disturbance, while patients with stable disease had improved depression ($p=0.018$) and stable anxiety symptoms. Conclusions and Implications: This study supports that there may be a subset of patients with significant mood disturbance that portends a worse illness trajectory independent of tumor/disease status. Identifying these patients and targeting interventions for those with baseline mood disturbance could prevent worsening of mood states and symptom interference at the time of disease progression.

PALLIATIVE AND PSYCHOSOCIAL CARE POSTERS: SOCIODEMOGRAPHIC CONSIDERATIONS

Palliative and Psychosocial Care

SURVIVAL STATUS AND ASSOCIATED FACTORS OF DEATH AMONG CERVICAL CANCER PATIENTS ATTENDING AT TIKUR ANBESA SPECIALIZED HOSPITAL, ADDIS ABABA, ETHIOPIA,2019.

Mulugeta Wassie, University of Gondar, Gondar; Zeleke Argaw, Addis Ababa University, Addis Ababa; Yosef Tsige, Addis Ababa University, Addis Ababa

Significance and aims: Cervical cancer is a cancer of uterine cervix caused by mostly sexually-acquired infection called Human papillomavirus (HPV). Death of cervical cancer varied 18-fold between different regions of the world. In developing countries, less than 50% of women with cervical cancer survive longer than 5 years. The objective of this study was to asses survival status and associated factors of death among cervical cancer patients at Tikur Anbesa Specialized Hospital, Ethiopia,2019. Methods: Institutional based retrospective cohort study was conducted from March to April 2019 at Tikur Anbesa Specialized Hospital oncology department.Data was collected from patient's chart using pre-tested and structured checklist. Differences in survival among different variables was compared using the log-rank test.Variables with p-value <0.05 in multivariate analysis were considered as significantly associated to the outcome variable. Results: The overall survival rate was 38.62% at five years.There were a significance differences in survival experience between categories of stage of cervical cancer, age of patients, comorbidity, substance use, base line anemia and treatment modalities. Being stage IV [AHR = 11.76; 95% CI (4.02–34.4)],being advanced age [AHR = 5.99;95%CI (2.1–17.08)], being comorbid [AHR=1.58; 95%CI(1.14–2.19)],using substance [AHR=1.56;95%CI (1.09–2.22)] and being anemic [AHR=1.6;95% CI (1.11–2.36)] increased the risk of death. Conclusions and implications: The five-year overall probability of survival was lower than high and middle-income countries. The authors recommend that it is better to expand cervical cancer early screening programs, treatment facilities and strengthen awareness in collaboration with public medias about cervical cancer prevention, screening and treatment options.

IS POVERTY ASSOCIATED WITH ILLNESS UNCERTAINTY IN PARENTS OF CHILDREN WITH CANCER? — AN EXPLORATORY ANALYSIS

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Significance and aims: To examine the association between parental illness uncertainty and poverty as measured by parent-reported household income stratified into two categories of the U.S. federal poverty level (≤ 200% versus > 200%, [FPL]). Methods: We conducted a secondary analysis of two datasets comprising 89 parents of children with newly diagnosed cancer at a single cancer center. Multivariate linear regression models were fitted to characterize the association between parental uncertainty (Parental Perception of Uncertainty Scale, PPUS) and poverty, controlling for potential confounders. Results: Parents' mean age was 40.4 years (± 8.12). Most were White (n = 72, 81%), female (n = 74, 83%) of non-Hispanic origin (n = 82, 92%) and married (n = 77, 86%). A majority of children were diagnosed with hematologic malignancies (n = 58, 65%) with a mean age of 6.5 years (±4.8). Mean PPUS score was 77.8 (± 10.8). Twenty-one (24.7%) parents reported poverty (≤ 200% FPL). Parents with high income (FPL > 200%) reported higher PPUS scores (median = 78.5; IQR 72–85) compared parents with low income (median = 72; IQR 70–77). In the regression analysis, higher income (FPL > 200%) was significantly associated [B = 8.19; 95% CI: (2.38, 14.00); p = 0.006] with higher parental uncertainty. Conclusion and Implications: Uncertainty is prevalent among parents of children with recently diagnosed cancer. In this study, higher income was associated with greater illness uncertainty. Future studies should comprehensively examine illness uncertainty and its association with socioeconomic status among parents of children with cancer.

Symptom Science

ASSOCIATIONS BETWEEN DEMOGRAPHICS AND QUALITY OF LIFE IN CHILDREN IN THE FIRST YEAR OF CANCER TREATMENT

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Background: Symptom distress and the impact on quality of life (QOL) among children with cancer is well documented. Research is emerging on the child's voice in QOL-symptom reports, but existing QOL questionnaires are burdensome and objective biologic markers are lacking. Thus, we examined children's symptoms and QOL from parent and child perspectives and one biologic marker (body posture). Methods: A cross-sectional secondary analysis of prospective data from children receiving creative-arts therapy examined potential associations among demographics with QOL measures (PedsQL, Faces Scale, posture) and between QOL measures. Results: Children (n = 98) in the sample ranged in age from 3–17 years (M = 7.8) and were in the first year of cancer treatment. No significant associations were found among the child's sex, race/ethnicity, socioeconomic status (SES), or distance from hospital and total PedsQL. Older age was associated with worse parent and child PedsQL, and worse pain, nausea, worry, and posture ($p<0.05$). Greater worry ($\beta=0.503$) and worse posture ($\beta=0.414$) were most strongly correlated with older age. Poorer posture was associated with worse child PedsQL (total score, nausea, treatment anxiety, cognitive) and parent PedsQL (pain, nausea). Worse scores on Faces Scale, PedsQL, and posture were all associated ($R=0.210–0.387$, $p<0.05$). Conclusion: Interventions to improve QOL may target the subpopulations of older patients and those with more nausea and worry. Accuracy and interpretation of symptom distress in children is problematic. The Faces Scale and posture may be suitable, readily obtained measures of QOL in pediatric oncology that hold promise for future study.

THE POSSIBILITY OF OBESITY MISCLASSIFICATION IN WOMEN WITH GYNECOLOGIC CANCER

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Significance and aims: As obese women with gynecologic cancer (GynCa) tend to experience more frequent and severe treatment-related symptoms, accurate assessment of obesity and obesity-related risk control are imperative for symptom management. However, body mass index (BMI), which is often used to measure obesity but ignores body composition, may not precisely reflect body adiposity in the population. This study aimed to compare BMI with body fat percentage (BFP) in diagnosing obesity in women with GynCa. Methods: We analyzed data from 200 Korean women (aged 25–78) hospitalized to receive chemotherapy to treat GynCa. BMI was calculated using body weight and height measured with an automatic height and weight scale. BFP was calculated using the Clinica Universidad de Navarra-Body Adiposity Estimator (CUN-BAE). The agreement on obesity classification between BMI and BFP was analyzed using Cohen's Kappa. Results: Based on BFP, 12.5% (n=25) of women were obese (40% or higher for women aged 20–39 and 41% or higher for women aged 40–79), while only 4.5% (n=9) of women were obese based on BMI (30kg/m2 or higher). Sixteen women (8.0%) were BMI-based overweight but BFP-based obese. BMI and BFP showed weak agreement in diagnosing obesity (Cohen's kappa = 0.496; 95% confidence interval = [0.291, 0.701]; p <.001). Conclusion and implications: BMI underdiagnosed obesity in Korean women with GynCa. Obesity misclassification may result in not only inaccurate estimation of the role of obesity on symptoms but also loss of opportunity to reduce obesity-related risks. The use of BFP should be considered in women with GynCa.

FACTORS RELATED TO UNPLANNED EMERGENCY DEPARTMENT AND HOSPITAL ADMISSIONS IN OLDER ADULTS UNDER TREATMENT FOR CANCER

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Older adults are at high risk for severe toxicity due to cancer treatment which can lead to unplanned emergency department (ED) visits and hospital admissions (HA). Knowledge of factors related to these admissions is critical for practitioners so they can identify at-risk patients early and provide education for patients to actively self-manage symptom at home. The purpose of the study was to examine the incidence and factors related to ED and HA in older adults under treatment for cancer. An exploratory retrospective cohort study was conducted. Date from 402 electronic medical records were extracted. Repeated measures, Poisson regression was used to obtain risk ratios with 95% confidence intervals for independent predictors of outcomes. Twenty percent of the sample experiences an unplanned ED visit and 18% experienced a HA. The most common reasons for ED visits were for management of symptoms related to pain and nausea/vomiting/dehydration. The most common reasons for HA were infection and nausea/vomiting/dehydration. Risk factors for both ED and HA were initial chemotherapy cycle and functional impairment. Having esophageal cancer and receiving more than 3 chemotherapy drugs increased risk for ED visits. Receiving IV fluids between treatments and being prescribed home antiemetics (except lorazepam) increased risk for HA. Unplanned ED and HA occur in older adults under treatment for cancer. Helping practitioners identify at-risk patients and educate older adults about the common reason for these admissions and subsequent self-management strategies that can be done at home may reduce the number of these unplanned admissions.

SYMPTOM MANAGEMENT POSTERS: INTERVENTIONS

Symptom Management

ESSENTIAL OILS EFFECT ON CHEMOTHERAPY-INDUCED PERIPHERAL NEUROPATHY AND QUALITY OF LIFE IN BREAST CANCER SURVIVORS

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Chemotherapy-induced peripheral neuropathy (CIPN) is a painful, debilitating consequence of cancer treatment and is considered the most adverse of non-hematologic events. Pharmacological approaches to CIPN are often ineffective and cause adverse effects. Essential oils (EOs) are an underutilized non-pharmacological approach to pain reduction. EO mechanisms of action include non-competing inhibition of 5-HT, AchE, and Substance P, and antagonism of TRPA1 and TRPV1. The purpose and quantitative specific aim for this mixed methods study was to explore the EO intervention's (EOI) effect on pain and quality of life (QOL) in breast cancer survivors experiencing chronic lower extremity CIPN. This pilot study utilized a randomized, single-blind, placebo-controlled design. Twenty-six participants were enrolled, stratified by baseline pain score, and randomized to intervention (n=13) and placebo (n=13) groups. Participants applied the EOI (containing Curcuma longa, Piper nigrum, Pelargonium asperum, Zingiber officinale, Mentha x piperita, and Rosmarinus officinalis ct. cineole) or placebo topically every eight hours for six weeks. Pain was assessed weekly using the SF-MPQ-2 and daily with a VAS. QOL was assessed using the QOL:CIPN20 and QLACS questionnaires. Data were analyzed using generalized estimating equations. Tests of model effects were significant for visit (SF-MPQ-2, p = .000; VAS, p = .008; QLACS Pain subdomain, p = .026), but not for group*visit interactions. The EOI demonstrated 50% more pain reduction than placebo, but was not statistically significant due to sample size. Regardless of group assignment, pain and QOL improved. Further research is warranted to enhance EO efficacy as a complementary nursing intervention for CIPN.

DEVELOPMENT OF A NURSE LED GYN ONCOLOGY SURVIVORSHIP PROGRAM: A FEASIBILITY STUDY

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The purpose of this study is to determine the feasibility of a nurse-led survivorship clinic (NLSC) in women diagnosed with gynecological cancers who completed treatment at a military medical center. Secondary aims are: to assess the effect of the NLSC on quality of life (QOL); to assess the effects of the NLSC on psychological distress and pain; and to assess participants' satisfaction with the NLSC. A descriptive, single group with fourteen participants met with an advanced practice nurse (APN) every three months for five visits. Surveys administered examined unmet needs, anxiety, depression, pain, quality of life, and client satisfaction (CSQ-8). Each patient received an individualized treatment summary survivorship care plan. Results: Most patients had multiple psychological and physical needs on entry. The highest area of unmet need was emotional health, and clinically we noted a high prevalence of sleep issues and fatigue. QOL measures showed no improvement throughout the study. The CSQ-8 survey results showed a high level of satisfaction by the majority of patients. Exit interviews showed satisfaction with the clinic, perception that while some needs were met, and patients preferred that clinical visits with oncologists be integrated into the program. Conclusions and implications: Most patients were highly satisfied with the clinic and a shared-care model should be considered, but QOL did not improve. With the transition to the post-treatment phase of their cancer journey, patients felt the additional time spent with the APN was of value and should be expanded to other cancer patients.

A MORNING BRIGHT LIGHT THERAPY INTERVENTION TO IMPROVE CIRCADIAN HEALTH IN ADOLESCENT CANCER SURVIVORS: METHODS AND PRELIMINARY FEASIBILITY

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Circadian rhythm disturbances are common among pediatric cancer patients and are associated with poor health outcomes. Social zeitgeber theory suggests that intervening in the cascade of events that disrupt circadian rhythms may improve health outcomes. Sunlight is a "zeitgeber," or environmental cue instrumental in maintaining circadian rhythms. Bright white light (BWL) therapy, a proxy for sunlight, has been used successfully to prevent deterioration of circadian rhythms in adult cancer patients, and to re-entrain these rhythms in adolescents with circadian rhythm disorders. This study aimed to develop and assess preliminary feasibility of a BWL therapy intervention for supporting circadian health of adolescent cancer survivors. We hypothesized that adolescents could independently manage BWL in their home, coordinated by nurses using a mail-, phone- and internet-based format, with minimal side effects. Adolescents were instructed to use BWL for 30 minutes daily on awakening, for 28 days. Actigraphs, measuring the circadian activity rhythms (CARs) of sleep and wake, were worn for 7 days at baseline and week 4. Adverse events were screened serially. Analyses were descriptive and nonparametric. Eight adolescents participated. On average, BWL was used on 61% of days, and for 15 minutes/day. Adverse events were generally mild, although one participant discontinued BWL due to persistent nausea. This nurse guided remote BWL therapy intervention in adolescent cancer survivors demonstrated preliminary feasibility. Future studies with larger samples are required to verify the feasibility of this study, and to determine its safety and effectiveness in supporting CARs.

EXPLORATORY ANALYSES OF FACTORS INFLUENCING ENGAGEMENT WITH A WEB-BASED SYMPTOM MANAGEMENT INTERVENTION FOR WOMEN WITH RECURRENT OVARIAN CANCER

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Significance and aims. A web-based symptom management intervention (WRITE Symptoms) reveals how recurrent ovarian cancer patients interact with online interventions. The purpose of this study is to examine (1) domains of intervention engagement (IE) and (2) factors that influenced IE for WRITE Symptoms. Methods. Data were extracted from 166 participants, including baseline patient characteristics (e.g., age, employment, emotions, comorbidities) and symptom representations. Two IE domains, breadth (number of posts/modules completed from website data and use of symptom management strategies from self-reports), and depth (total and average number of words in symptom posts from website data) were created based on exploratory factor analysis. Multivariate regression was used to examine factors associated with IE breadth and depth. Results: Breadth and depth domains were negatively correlated (r=–.55). For IE breadth, 9 factors were in the final model (F(9, 141)=2.9, p=0.0035, Cp=2.13, R2=0.16). There were no statistically significant independent predictors, only significant interactions (comorbidities and age; comorbidities and depression). For IE depth, 15 factors were in the final model (F(15, 135)=3.55, p=0.00004, Cp= 10.73, R2= 0.28). Statistically significant independent predictors were symptom consequences (positive) and employment (negative); three sets of significant interactions also influenced IE depth: education and anxiety; symptom controllability and depression; symptom severity and comorbidities. Interaction effects will be presented in detail. Conclusions and Implications. Comorbidities, symptom representations, and personal characteristics interacted to influence IE breadth and depth. Future efforts should tailor content to address these important factors to improve IE and the efficacy of online symptom management interventions.

Symptom Science

HYPNOSIS FOR PAIN RELIEF WITH CANCER SURVIVORS

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Significance and Aims: More than a third of the nearly 17 million cancer survivors in the U.S. experience chronic pain. Pharmacotherapy, the primary treatment modality, has significant adverse effects and does not eliminate pain. Efficacy testing of integrative therapies for pain relief is needed in this population. The purpose of this randomized controlled trial is to evaluate the efficacy of a recorded hypnosis intervention (RHI) for chronic cancer-related pain in cancer survivors. Psychological factors will be examined as potential indicators for who will most likely respond to RHI. Methods: A convenience sample of 100 cancer survivors with chronic pain is being recruited from two cancer centers. Currently, 72 participants are randomly assigned to the intervention group (n=38) or the attention control (n=34). Participants listen daily for 28 days to hypnosis or relaxation (attention control) recordings on a MP3 player. Study measures include Stanford Hypnotic Clinical Scale, PROMIS (pain, anxiety, depression, fatigue, sleep, self-efficacy, social and physical function), Fear of Progression Questionnaire, Connor-Davidson Resilience Scale, and a demographic questionnaire. Data are collected in-person at baseline and by phone at week 2 and 4. Participants receive weekly phone calls with a reminder to complete a daily paper diary (pain, anxiety). Structured interviews to evaluate intervention acceptability are conducted at week 4. Data analysis will include descriptive and inferential statistics. Results: Study will be completed in 2021. Conclusions and Implications: The RHI offers a low-cost, accessible, and convenient hypnosis delivery method with the potential to reduce chronic pain.

SYMPTOM SCIENCE & MANAGEMENT POSTERS: SURVIVORSHIP

Symptom Management

BREAST CANCER-RELATED LYMPHEDEMA AND RURAL SURVIVORS' RETURN TO WORK

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Significance and Aims Breast cancer-related lymphedema (BCRL) is a lifelong condition Millions who develop breast cancer are under retirement age and at a lifetime risk for developing BCRL. Rural survivors may face unique challenges in terms of access to health care and BCRL/survivorship resources. This multiple-case study describes how BCRL influences the work experiences and quality of life (QoL) of survivors living in rural southwest Missouri. Methods We used semi-structured interviews to investigate BCRL's effects on rural survivors' work experiences and QoL. Survivors with BCRL (n=13) were recruited from rural Missouri counties. Cases were analyzed using in-vivo coding and constant cross-case comparative methods. Results Preliminary analysis revealed that survivors process issues influenced by BCRL well into survivorship. Participants voiced their sense of resilience in surviving breast cancer and then navigating subsequent BCRL diagnoses while living in a rural setting. Upon initial BCRL diagnosis, survivors received intensive treatments, and later, established self-care regimens including self-massage and compression garments. Survivors identified strategies for working around their BCRL condition when completing work and home responsibilities. As time progressed, survivors' work and life routines normalized with BCRL. That is, BCRL became something rural survivors managed, but not something they dwelt upon. Conclusions and Implications Survivors alleviate BCRL's negative impacts and improve their QoL by establishing coping strategies. This provides guidance for client-centered survivorship care-planning and occupational rehabilitation of rural survivors with BCRL. This study provides the foundation for developing information for rural survivors that supports mental preparation and coping skills for BCRL self-management.

EXPLORING FACTORS ASSOCIATED WITH LONG-TERM OPIOID THERAPY IN CANCER SURVIVORS: AN INTEGRATIVE REVIEW

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Significance and Aims: The prevalence of chronic pain in cancer survivors is double that of the general population. Opioids are the foundation of cancer pain management; however, there is a paucity of literature on the efficacy and safety of long-term opioids therapy (LTOT) in cancer survivors (define as > 3 months beyond curative cancer treatment). Key to improving chronic pain management and opioid safety is to understand the factors associated with LTOT. The purpose this review was to analyze research of the prevalence of LTOT and prescribing factors in cancer survivors. Methods: This review included data search results from: Web of Science, PubMed, Embase, Cochrane, and Google Scholar. Results: Twenty-one quantitative studies were included. Findings describe an association of LTOT with several biopsychosocial factors including cancer type, medical and mental health comorbidities, and socioeconomic factors. Specific cancer types had consistently had high rates of LTOT such as head and neck cancer. Those who underwent curative cancer surgery has high LTOT rates of up to 45%. Low socioeconomic status was associated with LTOT in the majority of studies. Nearly half the studies reported an association of mental health diagnoses and substance use disorder with LTOT. Conclusion and implications: The studies in this review shed light on the factors associated with LTOT in cancer survivors. On average cancer survivors use LTOT at five times the rate of the national average. This review suggests that there is a critical need for specialized research on chronic cancer pain and opioid safety in cancer survivors.

EXPLORING PHYSIOLOGIC AND PSYCHOSOCIAL SEQUELAE POST-COMPLETION OF PRIMARY CANCER THERAPY

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Significance and aims: The 16.9 million cancer survivors in the US, whether completed with treatment or managing cancer as a chronic condition, have unique supportive care needs. These include symptom management, wellness, and adherence to treatment and follow-up, which may influence quality and quantity of life. The primary aims of this trial in progress are to evaluate 1) feasibility and acceptability of a 6-month digital health coaching (DHC) program; and 2) trends in clinical and patient reported outcomes (PRO) for individuals within 1 year of completion of primary therapy. Methods: This multi-center trial will recruit up to 1000 individuals, aged 18 and older, who have completed all treatment or are receiving maintenance therapies. Cohorts of 100 tumor agnostic or specific participants will be enrolled at each site, including both academic and community cancer centers across the US . Participants are enrolled in a 6-month DHC program that combines weekly calls and digital delivery of evidence-based content focused on management of late and long-term effects of therapy, nutrition and exercise, fatigue and associated symptoms (e.g., sleep disturbance, depression), medication adherence, surveillance for and managing fear of cancer recurrence. Outcome Measures: Outcomes, including recruitment, retention and acceptability, PROs (e.g. PROMIS, PRO-CTCAE), and wearable data (collected via Fitbit), will be collected at baseline through month 9 and assessed in relationship to clinical data (including microbiota). Implications: Outcomes will provide insight into the feasibility, and experience of symptom burden, health self-efficacy, and physiologic and psychosocial well-being, of cancer survivors engaged in a DHC program.

Symptom Science

SEXUAL DISTRESS IN LYMPHOMA PATIENTS: CLINICAL AND RESEARCH IMPLICATIONS

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Significance and Aims: Between 20% and 54% of male lymphoma survivors experience difficulties with at least one aspect of sexual function (Arden-Close et al., 2011). However, healthcare professionals do not routinely assess sexual distress (Hautamäki et al., 2007). The understanding of sexual distress is essential for appropriate follow-up of lymphoma patients from diagnosis to survivorship. The purpose of this review was to evaluate the existing evidence about sexual distress in lymphoma patients and identify implications for clinical practice, knowledge gaps, and future research needs. Methods: Databases included PubMed, CINAHL, and PsycINFO. Inclusion criteria consisted of lymphoma diagnosis, peer-reviewed publications from 2009–2020, English language, and adults 18 years old or greater. Exclusion criteria included animal studies and studies about hematological cancers that exclude lymphoma. Results: Eleven articles describing sexual health in lymphoma patients were identified. Main themes and gaps to inform clinical practice and research directions were identified. Conclusion and Implications: Available evidence indicates that lymphoma survivors report more sexual problems than the general population. Interventions to prevent or improve cancer and cancer treatment-related sexual distress can enhance the sexual quality of life of lymphoma survivors. References: Arden-Close, E., Eiser, C., & Pacey, A. (2011). Sexual functioning in male survivors of lymphoma: A systematic review. *The Journal of Sexual Medicine, 8*(7), 1833–1840. doi:10.1111/j.1743-6109.2011.02209.x. Hautamäki, K., Miettinen, M., Kellokumpu-Lehtinen, P. L., Aalto, P., & Lehto, J. (2007). Opening communication with cancer patients about sexuality-related issues. *Cancer Nursing, 30*(5), 399–404.

Symptom Science 1 Posters: Symptoms and Interventions

DISTINCT EVENING FATIGUE PROFILES IN PATIENTS WITH GASTROINTESTINAL CANCERS RECEIVING CHEMOTHERAPY

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Significance and Aims: Patients with gastrointestinal (GI) cancers experience moderate to high levels of evening fatigue during chemotherapy (CTX) that can decrease their functional status and quality of life (QOL). Study purposes were to identify subgroups of patients with distinct evening fatigue profiles and evaluate for differences among these subgroups in demographic and clinical characteristics, co-occurring symptoms, and QOL outcomes. Methods: Patients with GI cancers (n=405) completed questionnaires (e.g., Lee Fatigue Scale) six times over two cycles of CTX. Latent profile analysis (LPA) was used to identify distinct profiles of evening fatigue severity trajectories. Differences in demographic and clinical characteristics, co-occurring symptoms, and QOL outcomes among the subgroups were evaluated using parametric and non-parametric analyses. Results: Three distinct evening fatigue classes (i.e., Low (24.9%), Moderate (44.7%), Very High (30.4%)) were identified. Compared to the Low class, patients in the Moderate and Very High classes were: younger, White, and had a higher comorbidity burden. Compared to the Low and Moderate classes, patients in the Very High class were: female, had child care responsibilities, and had lower performance status. Patients in the Very High class reported higher levels of anxiety, depressive symptoms, sleep disturbance, and pain, and lower levels of attentional function and QOL at enrollment. Conclusions and Implications: Findings provide new insights into risk factors and co-occurring symptoms for higher levels of evening fatigue in patients with GI cancers. Clinicians can use this information to identify patients who are at highest risk for evening fatigue and develop personalized symptom management interventions.

SYMPTOM TRAJECTORIES IN POSTMENOPAUSAL WOMEN PRESCRIBED ANASTROZOLE FOR EARLY STAGE BREAST CANCER

Maura McCall, University of Pittsburgh; Susan Sereika, University of Pittsburgh, Pittsburgh, PA; Peg Rosenzweig, School of Nursing, University of Pittsburgh, Pittsburgh, PA; Stephanie Snader, University of Pittsburgh, Pittsburgh, PA; Yvette Conley, University of Pittsburgh, Pittsburgh, PA; Cathy Bender, School of Nursing, University of Pittsburgh, Pittsburgh, PA

Significance and aims: Among postmenopausal women prescribed anastrozole for hormone receptor positive breast cancer (BC), symptoms experienced are highly variable and are associated with suboptimal treatment adherence and poorer quality of life. We aim to characterize symptom trajectories from pre-anastrozole through 18 months post-initiation, as well as identify predictors of group membership. Methods: Self-reported symptom data were from a prospective cohort study following women who were prescribed anastrozole for early stage BC. Measures that were strongly correlated over time (Beck Depression Inventory, Profile of Mood States anxiety and fatigue subscales, Breast Cancer Prevention Trial cognitive subscale) were entered into a factor analysis. The measures loaded onto the same dimension. Sum scores from the 4 measures were rescaled into a symptom profile score (SxPS) with higher scores indicating greater symptom burden. SxPS at pre-anastrozole, 6-, 12-, and 18-months will be analyzed using group-based trajectory modeling (GBTM). Predictors (demographic and clinical characteristics) of trajectory group membership will be identified using logistic regression. Results: The sample at pre-anastrozole (N=359) was mostly White (96.9%), average age of 61, highly educated (average years of education=14.9), married/living with partner (69.4%), with stage 1 cancer (68.9%). Mean (±standard deviation) SxPS scores were 16.9±12.9 at pre-anastrozole, 15.8±12.8 at 6 months, 16.1±14.4 at 12 months, and 15.8±14.8 at 18 months. Trajectories will be identified and predictors of group membership will be reported. Conclusions and implications: Identifying symptom trajectories and their predictors in women with BC can aid in targeting intervention timing and informing strategies for future symptom management interventions.

ANDROGEN DEPRIVATION THERAPY FOR PROSTATE CANCER: AN EXPLORATORY STUDY OF COGNITIVE FUNCTION AND THE ROLE OF CENTRAL ADIPOSITY

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Significance/Aims. Androgen deprivation therapy (ADT) for prostate cancer (PC) may cause cognitive disfunction. This prospective sub-study was conducted to assess cognitive function for men with PC receiving ADT and explore relationships between cognitive function and central adiposity. Methods. Thirty-eight adults participated in a randomized, controlled, exercise/nutrition intervention trial. A subset (N=33) was assessed for cognitive function at baseline (T1), six (T2) and twelve months (T3) with dual-energy x-ray absorptiometry (DEXA) scanning (N=24) at T1/T2. Results. No between-group differences in changes in cognitive function were demonstrated. A medium intervention effect size for less decline in verbal fluency was seen at T3 (d=0.49709, p=0.2379). Visceral fat mass reductions were greater for the intervention group at T2 (p=0.0173). Changes in total fat mass correlated with changes in body mass index (BMI) but not waist-hip ratio (WHR). The intervention modified the effect of changes in total fat mass on visual spatial ability (regression interaction p=0.0423). Conclusions/Implications. Declines in self-reported cognitive function were not seen. Decreased visceral adiposity was not associated with improved visuospatial abilities. Central adiposity increased without significant increases in BMI or WHR, providing further evidence that DEXA may be preferred for measuring central adiposity. Well powered prospective research is needed to fully characterize the potential impact of ADT and exercise/nutrition interventions on cognitive function. These study results were encouraging as gross deficits in cognitive function were not seen. Men initiating ADT should be encouraged to participate in interventional studies to reduce visceral fat and further advance the science in this area.

SLEEP QUALITY, PHYSICAL ACTIVITY, AND CARDIORESPIRATORY FITNESS IN POSTMENOPAUSAL WOMEN WITH EARLY-STAGE BREAST CANCER

Maura McCall, University of Pittsburgh; Susan Sereika, The University of Pittsburgh, Pittsburgh, PA; Kirk Erickson, The University of Pittsburgh, Pittsburgh, PA; Amanda Gentry, University of Pittsburgh School of Nursing, Pittsburgh, PA; Cathy Bender, School of Nursing, University of Pittsburgh, Pittsburgh, PA

Significance and aims: Postmenopausal women often report sleep problems, and physical activity may affect sleep quality. We explored relationships among sleep quality, physical activity (PA), and cardiorespiratory fitness (CF) levels in postmenopausal women with early-stage breast cancer. Methods: Using a cross-sectional design, we measured sleep quality and PA and CF levels within 2 years of primary treatment completion. Women reported sleep quality using the Pittsburgh Sleep Quality Index (PSQI). Higher global (0–21) or component (0–3) scores indicated poorer sleep quality. PA and CF were measured using the Bodymedia SenseWear armband and submaximal graded exercise test, respectively. Data were analyzed using descriptive statistics and partial correlations, controlling for age and armband wear time. Results: The sample (N=92) was mostly White (85.4%), well-educated (mean education=15.6±2.6 years), obese (mean BMI=31.3±6.5 kg/m2), and on average 63.29±7.62 years old. Most had stage 1 breast cancer (60.5%). Mean global PSQI scores were 6.83±3.52. CF was well below average (mean relative VO2=17.27±3.88), and mean PA was below current daily activity recommendations (mean number of steps/day=5,304±2,647). Better habitual sleep efficiency was associated with greater number of steps/day (r=–.224, p=.034) and higher levels of light PA/day (r=–.216, p=.042). Fewer sleep disturbances were associated with greater moderate-intensity activity levels (r=–.238, p=.024) and greater average daily energy expenditure (r=–.224, p=.034). Conclusions and implications: Results suggest that modest amounts of light-to-moderate daily physical activity may be associated with better-quality sleep in postmenopausal women with breast cancer. Further research on sleep quality and PA duration and intensity is warranted.

Symptom Science 2 Posters: Symptom Clusters

OVARIAN CANCER SYMPTOM CLUSTERS: WHAT CAN THE NIH SYMPTOM SCIENCE MODEL REVEAL?

Diane Mahoney, University of Kansas School of Nursing, Kansas City, KS; Janet Pierce, University of Kansas School of Nursing, Kansas City, KS

Background/Purpose: Ovarian cancer remains the most lethal gynecologic cancer in the United States and most women are diagnosed at advanced stage disease. Although ovarian tumors are considered asymptomatic during early carcinogenesis, women experience symptoms prior to diagnosis, throughout treatment, and with recurrent disease. The absence of biologic measures to validate symptoms creates challenges for determining appropriate management. The purpose of this review is to investigate ovarian cancer symptom clusters and explore the applicability of the NIH Symptom Science Model (NIH-SSM). Methods: A focused PubMed literature search was conducted of studies published from January 2000 to July 2020 using combinations of key terms. Inclusion criteria were studies that reported on ovarian cancer symptom clusters. Results: Women reported bloating, pelvic/abdominal pain, increased abdominal size, loss of appetite, feeling full quickly, indigestion, weight loss, and urinary complaints for up to 2 years before diagnosis. One prediagnostic symptom cluster was bloating, increased abdominal size, and urinary complaints. Three symptoms clusters experienced during and post chemotherapy were (1) loss of appetite, nausea, vomiting, diarrhea, and weight loss; (2) fatigue, anxiety, depression, insomnia, and dry mouth; and (3) pain and peripheral neuropathy symptoms. Quality of life was lower among short-term survivors and greater symptom burden was associated with poor physical functioning and low survival. Conclusion: The NIH-SSM can advance our understanding on the biology of ovarian cancer symptom clusters and the extent to which they signal early disease, predict symptom risk, and inform on development of therapeutic interventions to relieve symptoms and improve quality of life.

SYMPTOM EXPERIENCE OF OLDER ONCOLOGY PATIENTS WITH LOW VERSUS HIGH LEVELS OF MULTIMORBIDITY PRIOR TO CHEMOTHERAPY

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Significance and aims: Older adults are at increased risk for developing cancer and other chronic conditions. Study purposes were to investigate differences in demographic and clinical characteristics in older oncology patients with low multimorbidity (LM, <2 multimorbidities) and high multimorbidity (HM, ≥2 multimorbidities), and evaluate differences in symptom occurrence, severity, and distress ratings between the two groups. Methods: Older oncology patients' symptoms (n=125) were assessed using the Memorial Symptom Assessment Scale (MSAS) prior to chemotherapy. Data were analyzed using parametric and nonparametric tests. Results: Except for total number of multimorbidities, overall comorbidity burden, and the occurrence of nine specific comorbidities, no differences were found in demographic and clinical characteristics between the two multimorbidity groups. Compared to LM group, the HM had significantly higher number of symptoms, significantly higher occurrence rates for feeling nervous, difficulty sleeping, dry mouth, and pain, and significantly higher severity ratings for pain, feeling sad, lack of energy, feeling drowsy and worrying. For distress, the HM group reported significantly higher ratings for pain, worrying, feeling sad, feeling nervous and "I don't look like myself". Conclusions and implications: - The number of multimorbidities has a significant impact on the occurrence, severity and distress of symptoms commonly associated with cancer in older oncology patients. Our findings suggest that the symptoms with the highest severity ratings are not necessarily the most distressing. Nurses should identify comorbidities and assess symptoms prior to chemotherapy to identify patients at risk and make referrals for interventions.

PAIN, PHYSICAL ACTIVITY, AND CARDIORESPIRATORY FITNESS IN POSTMENOPAUSAL WOMEN WITH EARLY-STAGE BREAST CANCER

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Significance and aims: Postmenopausal women with breast cancer frequently report pain, and physical activity and better fitness may reduce pain. We examined possible relationships among pain, physical activity (PA), and cardiorespiratory fitness (CF) in postmenopausal women with breast cancer. Methods: Using a cross-sectional design, we assessed pain, PA and CF in women with early-stage breast cancer within two years of primary treatment completion. Pain was assessed with the Brief Pain Inventory (BPI) with higher scores indicating greater pain and the Breast Cancer Prevention Trial Inventory (BCPT), with higher scores indicating greater symptom burden. PA and CF were measured using the SenseWear Armband and a submaximal graded exercise test, respectively. Data were analyzed using partial correlations, controlling for age and armband wear-time. Results: Women (n=100) were 63.29±7.62 years old, mostly white (85.4%), and well-educated (15.6±2.6 years). Most had stage 1 breast cancer (60.5%) and a BMI of 31.3±6.5 kg/m2. BPI average pain was 2.05±2.15, and worst pain was 2.77±2.87. Peak VO2 averaged 17.27±3.88ml/kg/min. Lower pain severity was associated with more minutes of light intensity PA (r=–.287,p=.005). Greater pain severity was associated with fewer minutes of light and moderate PA(r=–.357,p=.000; r=–.295,p=.004), and with fewer minutes of PA(r=–.295,p=.004). Lower musculoskeletal pain burden was associated with more minutes of moderate and moderate to vigorous levels of PA(r=–.253, p=.021). Conclusions and implications: The results suggest that greater amounts and intensity of PA and CF may be associated with decreased pain in postmenopausal women with early-stage breast cancer.

SYMPTOM PROFILES BY DIAGNOSIS OF ADOLESCENTS AND YOUNG ADULTS WITH CANCER IN ACTIVE TREATMENT

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Significance: Many adolescents and young adults (AYAs) with cancer have persistent symptoms that are poorly managed. Improving understanding of symptoms within diagnoses may support personalized symptom care. This study aims to describes symptom profiles in AYAs with acute lymphocytic leukemia (ALL), sarcoma, Hodgkin lymphoma (HL), non-Hodgkin lymphoma (NHL), and brain cancer. Methods: This secondary analysis included pooled data from two multisite studies of symptoms in AYAs ages 13–29 years (N=118) receiving chemotherapy. Symptoms were assessed with the heuristics-based Computerized Symptom Capture Tool. Descriptive statistics were calculated to identify profiles of the ten most frequently reported symptoms within diagnostic groups by age (13–17 vs. 18–29 years), gender, and time since diagnosis. Results: The ten most frequently reported symptoms varied across diagnoses; only lack of energy and hair loss were common across diagnoses. Some symptoms, such as hair loss, were reported more frequently by males than females with ALL, sarcoma, and brain cancer, while females with HL and NHL reported pain more frequently than males with these diagnoses. In ALL and NHL, younger AYAs reported more fatigue, while in sarcoma, HL, and brain cancer, older AYAs reported more appetite problems. Across diagnostic groups, AYAs ≤6 months from diagnosis reported more symptoms than those >7 months; however, symptom prevalence remained substantial over time in ALL and sarcoma. Conclusions: Symptom profiles within diagnoses may suggest trends, but each AYA's symptom experience is dynamic and individual. While studying profiles may be helpful, there is a need to take a personalized approach to symptom management.

PALLIATIVE AND PSYCHOSOCIAL CARE POSTERS: SYMPTOM PROFILES

Palliative and Psychosocial Care

IMPACTING ONCOLOGY PATIENTS' ANXIETY AND PERCEIVED SELF-EFFICACY TO COPE WITH CHEMOTHERAPY TREATMENT USING VIRTUAL REALITY

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SIGNIFICANCE & AIMS: First time chemotherapy patients do not know what to expect prior to starting treatment. Incorporating the use of virtual reality (VR) is an innovative approach to immerse oncology patients in their therapy environments. The purpose of this study was to examine the effect watching a customized pre-chemotherapy VR educational video had on anxiety levels and feelings of self-efficacy to cope with treatments. METHODS: The Cognitive-Motivational-Relational theory guided this study. A single group, quasi-experimental pilot study using a customized VR video was conducted among diverse oncology patients receiving chemotherapy for the first time. The State-Trait Anxiety Inventory, heart rate, and blood pressure measured present anxiety and the Cancer Behavior Index-B measured self-efficacy to cope. Experience and satisfaction were assessed. Descriptive, inferential, and content analyses were performed. RESULTS: Thirty-five patients participated. Anxiety levels, heart rate, and blood pressure significantly decreased (p<.0001) from baseline scores after watching the VR video. Feelings of self-efficacy significantly increased (p<.0001) from baseline scores after watching the VR video. Most participants reported being satisfied using VR (n=34, 97%) and all participants (N=35, 100%) reported the VR experience reinforced their previous in-person pre-chemotherapy education. CONCLUSIONS & IMPLICATIONS: This study contributed to the limited knowledge about using customized VR videos to aid in chemotherapy treatment preparation. Participants enjoyed the experience, felt less anxious, and more confident to face their cancer treatments after watching the customized VR video. Personalized educational VR videos could be created to meet the health and educational needs of diverse patient populations.

UNDERSTANDING RISK FACTORS AND SOMATIC SYMPTOMS ASSOCIATED WITH DEPRESSIVE SYMPTOMS IN RARE CENTRAL NERVOUS SYSTEM (R-CNS) TUMORS

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Significance and aims: A cancer diagnosis can be associated with depressive symptoms and somatic symptoms related to the tumor can identify patient suffering. Our purpose was to identify the risk and incidence for depressive symptoms and co-occurrence of somatic symptom burden in R-CNS patients. Methods: 343 R-CNS patients completed patient reported outcomes. T-scores ≥60 on PROMIS-Depression and MDASI-BT symptom ratings ≥5 represented moderate-severe (M-S). Descriptive statistics, independent samples t-tests and Chi-square were used for analysis. Results: Patients were primarily female (57%), mean age 47 years (18–85) with brain location (64%) and ependymoma subtype (48%), averaging 3.6 years (0–36) from diagnosis. Patients reported M-S depressive (13%) symptoms with items 'I felt depressed' and 'I felt unhappy' rated most high (mean 3.5), with no prior radiation (53% v 69%, OR=.50) and pineal region, gliomatosis cerebri, and choroid plexus associated. Symptoms more likely being reported in patients experiencing M-S depressive symptoms were: M-S fatigue (OR=8.3), difficulty understanding (OR=5.6), disturbed sleep (OR=5.2), pain (OR=5.2), feeling drowsy (OR=3.8) in brain and lack of appetite (OR=16.0), fatigue (OR=15.2), disturbed sleep (OR=13.7), feeling drowsy (OR=13.7), and sexual dysfunction (OR=13.0) in spine. Conclusion and implications: 13% of patients reported M-S depressive symptoms, with extremely rare/centralized tumors as well as lack of treatment other than surgery associated with occurrence. Multiple co-occurring somatic symptoms, including those common in other cancers as well as neurologic/cognitive symptoms associated with tumor location were reported. Future research should consider somatic symptoms and their impact on patients' wellbeing to ensure targeted interventions meet patients' needs.

Symptom Management

EXAMINING COMMONLY REPORTED MODERATE TO SEVERE SYMPTOMS AND THEIR PATTERNS IN WOMEN WITH

GYNECOLOGIC CANCER RECEIVING CHEMOTHERAPY

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Significance/Aims: Many gynecologic cancers are treated with chemotherapy. While the common side effects of chemotherapy are known, they have not been studied to determine daily-reported patterns over multiple cycles or whether there are subgroups demonstrating different patterns. The study aims were to: 1) determine the percentage of moderate-severe symptoms (MSS) levels (4 on 0–10 scale) and 2) analyze the pattern and co-occurrence of MSS over the first 3 cycles of chemotherapy. Methods: A secondary analysis of daily-reported symptoms was conducted. Presence and severity at MSS levels were calculated as proportions of symptom reports. Symptoms were graphed for each patient over the first three cycles of chemotherapy and analyzed for patterns in cycle of onset, persistence over time (duration) and clustering. Results: The sample consisted of twenty-six women who reported symptoms over three cycles. Pain, fatigue, and trouble sleeping were the most common MSS and experienced by 77% of women. These three symptoms also co-occurred although sleep was only in a subset of clusters. Three onset/duration patterns emerged: MSS in cycle 1 only (n=7), MSS beginning cycle 2 (n=4), and MSS reported through all cycles (n=9). Conclusions/Implications: Women treated for gynecological cancers frequently experience MSS during multiple cycles of chemotherapy. Preliminary evidence suggests there may be several patterns of onset and duration. Symptom clustering is noted for pain, fatigue, and disturbed sleep. Nurses should consistently assess symptoms over time given varying patterns of onset and duration. Further study is warranted to verify distinct classes of symptoms to better target symptom care.

USE OF IMMERSIVE VIRTUAL REALITY TO IMPROVE DISTRESS AND ANXIETY IN PRIMARY BRAIN TUMOR PATIENTS: A PHASE II FEASIBILITY TRIAL

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Significance and Aims: Approximately 20% of primary brain tumor (PBT) patients experience significant distress at the time of neuroimaging & clinical evaluation. Virtual reality (VR) technology is increasingly being utilized in clinical populations to improve psychological symptoms, though little is known about the biological pathways involved. We hypothesize that VR can improve distress symptoms through a combination of distraction and promotion of relaxation, both of which may blunt the physiological stress response. This study aims to provide preliminary evidence on the feasibility and efficacy of a VR intervention to reduce distress and anxiety in this population. Methods: This phase 2 trial will include a sample of 120 PBT patients. Patients will complete baseline and post-intervention assessments surrounding a 5-minute VR intervention delivered via telehealth, followed by repeat assessments at 1 week and 4 weeks. Patient-reported outcomes (PROs) will be completed electronically during the study to measure changes in distress and anxiety, as well as effects on symptom burden, general health status, and cognitive function. Correlative salivary stress biomarkers will be collected remotely and aligned with the PROs collection timepoints. Results: Patient-reported distress and anxiety will be correlated with stress biomarkers and other PROs after the VR intervention to assess for efficacy and patient satisfaction. Conclusions and Implications: VR interventions have the potential to reduce distress and anxiety for PBT patients, which may improve their health-related quality of life and tolerance of oncologic therapies. Findings from this study may inform design of a future randomized controlled phase 3 trial.

Symptom Science

OUTPATIENTS WITH CANCER RECEIVING CHEMOTHERAPY (CTX) HAVE DISTINCT ANXIETY SYMPTOM PROFILES THAT ARE ASSOCIATED WITH POORER QUALITY OF LIFE OUTCOMES

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Significance & Aims: Anxiety occurs in ~50% of oncology patients undergoing CTX. Limited information is available on the phenotypic characteristics that contribute to inter-individual variability in anxiety in these vulnerable patients. Study purpose was to identify subgroups of patients with distinct anxiety symptom profiles and determine which demographic and clinical characteristics and quality of life (QOL) outcomes differed among these subgroups. Methods: Outpatients (n=1327) were recruited during their first or second cycle of CTX and completed the Spielberger State Anxiety Inventory six times over two cycles of CTX. Latent profile analysis was used to identify subgroups of patients with distinct anxiety symptom profiles. QOL was measured using the Multidimensional Quality of Life Scale–Cancer (MQOLS) and the Medical Outcomes – Short Form-12 (SF-12). Results: Four latent classes with distinct anxiety symptom profiles were identified (i.e., Low (47.7%), Moderate (28.3%), High (19.5%), Very High (4.5%)). Compared to the Low group, patients in the High and Very High groups reported a lower annual income, a lower functional status score, were less likely to be married or partnered, and had a higher comorbidity burden. For the physical and psychological subscales and total MQOLs scores and the SF-12 Mental Component summary score, differences among the profiles were in the expected direction (Low>Moderate>High>Very High). Conclusions and Implications: Four subgroups of patients with distinct anxiety profiles were identified. Over 50% of the patients experienced moderate to very high levels of anxiety. Clinicians should routinely assess for anxiety in oncology patients and provide appropriate referrals to supportive services.

SYMPTOM MANAGEMENT POSTERS: METHODS & THEORY

Symptom Management

SMART ONCOLOGY NURSING: LITERACY, GOALS, COACHING AND EMPOWERMENT

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Significance and Aims: Cancer treatment in the outpatient oncology research setting creates unique needs for educational and psychosocial support. Delivering self-care and symptom management education using a universal approach to health literacy can empower patients as they struggle to understand, apply and activate information to make well-informed health decisions. The aim was to assess the impact of a nurse-designed SMART educational intervention on goal attainment, patient empowerment and satisfaction. Methods: Sixty-eight adult patients with cancer, receiving treatment at an oncology research center were included. This randomized controlled trial using a mixed methods design evaluated the impact of a SMART educational intervention. The intervention included four nurse-designed learning modules (medication review, nutrition, coping/anxiety, sleep/fatigue), along with goal setting and coaching to help patients activate knowledge. Patient-driven measurable goals and action plans were created. Evaluation of knowledge retention and re-education occurred. Patient Empowerment Scale (PES) changes and action plan goal attainment were examined in addition to patient satisfaction (adapted short assessment of patient satisfaction survey). Results: Goal attainment ranged from 76.7%–100% depending upon the learning module. Empowerment scores were high at baseline and throughout. All patients indicated being “very satisfied” or “satisfied” with the intervention and choices in decisions affecting care. Patients provided powerful statements explaining the impact of the intervention on physical and mental well-being. Conclusions and implications: Registered nurses utilizing a universal approach to health literacy can deliver a SMART educational intervention that provides education and coaching to support oncology patients in creating and attaining symptom management and self-care goals.

THE ONCOLOGY NURSING SOCIETY’S TRANSITION TO CLINICAL PRACTICE GUIDELINES FOR SYMPTOM MANAGEMENT IN CANCER CARE

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Significance and Aims: Evidence-based practice is the foundation of professional nursing. Synthesizing and evaluating evidence remains a barrier to implementing best practice. Clinical practice guidelines have emerged as systematically developed recommendations to guide healthcare professionals in clinical decision-making. The Oncology Nursing Society transitioned several EBP resources to clinical practice guidelines, with a goal to assist nurses and other healthcare professionals in best practice implementation to improve symptom management. Methods: Five prevalent symptoms were selected: hot flashes, constipation, lymphedema, radiodermatitis, and skin toxicities. ONS convened expert guideline panels of nurses, multidisciplinary colleagues, patients, and a methodologist. These panels developed clinically relevant questions for each topic. Separate panels of nurse experts were convened to complete the systematic review for each identified question. This process was guided by GRADE methodology. Results: The five topic groups made recommendations based on the evidence, with consideration of benefits and harms, patients' values and preferences, resource use, equity, acceptability, and feasibility. To meet high rigor and transparency, each topic has a published guideline, systematic review, and clinical summary. This 'bundle' of resources also includes a dedicated website with additional resources to guide implementation. Conclusions and Implications: Evidence-based guidelines have the potential to offer clinicians and patients best practice support for cancer care. Oncology nurses are the first line of defense in symptom and side effect management and play a key role in developing these resources. The development of these and future oncology symptom management guidelines has the potential to improve the quality of cancer care.

LESSONS FROM SPECIFYING REQUIREMENTS OF A CLINICAL DECISION SUPPORT SYSTEM FOR CANCER SYMPTOM MANAGEMENT

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Cancer symptom management clinical practice guidelines (CPGs) exist but operationalizing them takes years. Advances in measurement and integrating patient reported outcomes (PROs) into electronic health records (EHRs) provide opportunities to increase the implementation of CPGs through clinical decision support for symptom management (CDS-Sx). This project developed a rule-based, CDS-Sx that leveraged CPGs to improve symptom management. Experts in symptom science, clinical care, informatics, and user-centered design developed requirements for the CDS-Sx. ADAPTE guided development of the algorithms for fatigue and constipation. Once the algorithms were developed, we curated patient education materials, identified PROs, selected technical requirements, and created user interface (UI) prototypes. Usability testing was conducted to refine the UI. Clinician and patients were interviewed while using the prototype on an iPhone. Expert panels drafted, revised, and approved the algorithms and educational materials following feedback from clinicians (n=17). Clinicians (n=10) requested brief guidance for symptom management, an intuitive interface, and no extra work. Patients (n=9) found data entry for PROs acceptable, but collection of medication usage data was less acceptable. Technical standards and tools selected included the HL7 FHIR APIs, FHIR data model, SMART on FHIR, and CDS Hooks. Technical design choices included choice of surveillance or problem focused PRO collection, CDS integration with the EHR using SMART on FHIR, and data collection from patients via smart phone. Clinician features identified as desirable included: smart phrases for documentation and billing codes. Advanced practice nurses and patients expressed high interest in a CDS-Sx that standardizes evidence-based pathways for cancer symptom management.

CUT-POINTS IN NCI PRO-CTCAE MEASURES INDICATING CLINICALLY MEANINGFUL PAIN FOR PATIENTS WITH HEAD AND NECK CANCER

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Significance and aims: Patient-reported symptom measures with clinically meaningful cut-points provide valuable information about treatment toxicities. This study aims to identify clinically meaningful cut-points for the NCI Patient Reported Outcomes version of the Common Toxicity Criteria for Adverse Events (PRO-CTCAE™) pain questions. Methods: We conducted a secondary data analysis of 98 participants enrolled in a clinical usefulness study of the NYU Electronic Patient Visit Assessment (ePVA)© for head and neck cancer using an anchor-based approach. Participants completed the ePVA followed by the NCI PRO-CTCAE™ during the same study visit. The anchor question was the ePVA item asking if patients experienced pain in the past seven days (Yes/No). Analysis included logistic regression and receiver operating characteristic (ROC) curves to identify cut-points for three PRO-CTCAE™ questions measuring pain frequency, severity, and interference. Results: Participants were mean age 61 and primarily male (65%), White (78%), undergoing treatment

(63%). Greater than half of participants (57%) reported pain. The clinically meaningful cut-off score for PRO-CTCAE™ pain questions of frequency, severity, and interference was 1 (range 0 – 4, 0=least, 4=worst). The pain frequency cut-point of 1 most aligned with patient report of pain in the past seven days (ROC = .9375, 95% CI 0.89 – 0.97, Sensitivity 95%, Specificity 76%, Positive Predictive Value 84%, Negative Predictive Value 91%). Conclusion and implications: NCI PRO-CTCAE™ pain scores > 1 may warrant evaluation for pain management interventions in patients with head and neck cancer.

A PROPOSED THEORY FOR SYMPTOM CLUSTER MANAGEMENT

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Symptom cluster management is in its infancy in oncology. Understanding the concepts and statements involved may help to advance symptom cluster management. The purpose of this article is to present a proposed theoretical framework for symptom cluster management. The concept analysis, statement synthesis and theory synthesis by Walker and Avant (2004) were used in the development of this proposed theoretical framework. A search for published empirical and theoretical articles using the words "symptom," and "symptom cluster" combined with "management" or "strategies" was conducted in scientific databases and the web. The defining characteristics of symptom cluster management include the basic and the effectiveness components. Tha basic component of a symptom cluster management includes the purpose, type, nature and the composition while the effectiveness component includes the the desirability, dose, temporal dimension and bio-behavioral aspect. The antecedents include socio-demographic characteristics, symptom cluster characteristics, individual clinical characteristics, individual illness factors and situational factors or symptom experience. The consequences are clustered as personal related, health related, social-related outcomes and existential outcomes. For the empirical referents, although there is also no explicit measurement tool for the components of a symptom cluster management, measurement tools for the outcomes in symptom cluster management were identified. Relational statements were also identified. Theoretical assertions include: 1) Situational factors or symptom experience is a moderating variable to symptom cluster management and; 2) The effectiveness of a symptom cluster management lies in the consideration of both the basic and effectiveness component. The findings may advance this area of interest.

SYMPTOM SCIENCE & MANAGEMENT POSTERS: RISK REDUCTION & CAREGIVERS

Palliative and Psychosocial Care

EXPERIENCE OF INFORMAL CAREGIVERS OF PATIENTS WITH HEAD AND NECK CANCER ALONG CANCER SURVIVORSHIP: A SYSTEMATIC REVIEW

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Significance and aims: Informal caregivers play integral roles in supporting and providing care to people with head and neck cancer, who are at high risk of experiencing long-term treatment toxicity. Caregivers' needs are often being neglected in the current healthcare practices. Method: We searched literature before November 2019 in CINAHL, MEDLINE/PubMed and PsychINFO with the following key words [head and neck cancer or oral cancer or oropharyngeal cancer] AND [caregivers or family members or relatives or informal caregivers] AND [needs]. Results: We found 18 quantitative descriptive studies, 2 randomised control trial, 3 quasi-experimental studies, and 6 mixed-method studies from January 2004 to July 2019. Three major needs for caregivers were identified, 1) information needs 2) psychological needs, and 3) social needs. Studies were analysed and organised chronologically along the patients' survivorship. Conclusions and implications: Informal caregivers for people with head and neck cancer are at high risk of experiencing caregiving burden. Unlike the decreasing need on information, social and psychological needs of informal caregivers remain consistently high in post-treatment survivorship. Remarkably, there is a lack of study examining interventions on supporting informal caregivers′ caregiving skills and psychological needs at the point of care.

MULTI-PHASE ADAPTION OF A SELF-DIRECTED COPING INTERVENTION FOR AMBULATORY PATIENTS UNDERGOING HEMATOPOIETIC STEM CELL TRANSPLANTATION (HSCT) AND THEIR CAREGIVERS: PHASE 1

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Interventions targeted towards facilitating coping strategies for patients and their primary caregiver (CG) are likely to enhance care processes and health-related outcomes for these dyads. Recently, Coping Together (CT), a self-directed, coping skills intervention was found to facilitate coping and illness adjustment for prostate cancer dyads. This two-phase study aims to adapt CT to be HSCT-specific through exploring perceptions and recommendations from HSCT dyads. The five CT booklets were developed in Australia, to provide pragmatic coping strategies for dyads contending with cancer-related challenges. To adapt these booklets to clinical and broader North American contexts in Phase 1, thirteen semi-structured interviews were conducted with a convenience sample of three HSCT patients, two CGs, two dyads and six multidisciplinary clinicians. In-depth interviews were audio-recorded, transcribed verbatim and analyzed for content. Participants (N = 13) underscored the value of CT's content and access. Recommendations for adaptation included: (1) revise content, namely "HSCT-specific" information, omitting Australian language/semantics, and amount (i.e., length, depth); (2) enhance booklets' structure (i.e., format, presentation – namely, graphics, flowcharts, anecdotes); and (3) streamline access (i.e., self-directed modality – using CT "cover-to-cover" or "skipping to what's happening right now," distribution "months prior to HSCT"). Fewer suggestions pertained to content on effective coping strategies and CGs' experience. This ongoing study fills a knowledge gap with respect to personalizing information for a group of HSCT dyads who have various unmet needs, particularly in the early recovery phases. Phase 2 will explore the experiences of HSCT dyads and further refine the CT booklets.

ROLE OF CANCER SURVIVOR HEALTH AND HEALTH SERVICE USE IN SPOUSES' UTILIZATION OF MENTAL HEALTHCARE (MHC)

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Significance and aims: Spouses of cancer survivors are at increased risk of poor mental health outcomes but are known to underuse supportive services. This study sought to determine how the health and healthcare use of the cancer survivor were associated with their spouse's depression and anxiety-related healthcare utilization. Methods: This observational study used data from the Medical Expenditures Panel Survey to identify married individuals with a cancer-related medical event or disability ("cancer survivors"), and linked health and healthcare utilization data across spousal dyads. Spouses reporting a prescription for an anti-depressant or anti-anxiety medication or any psychotherapy were flagged as having utilized MHC. Correlates of utilization were assessed, with a focus on health and healthcare use of the cancer survivor. Results: More than a quarter of spouses of cancer survivors utilized MHC over the ~2.5 years of follow-up. Controlling for their own predisposing, enabling and need characteristics, spouses were less likely to utilize MHC if the cancer survivor reported more health conditions or elevated depressed mood, compared to dyads in which the survivor reported low distress and depression. Spouses were nearly three times more likely to utilize MHC if the cancer survivor had utilized mental health-related medical care (OR=2.98, 95% CI=2.17 to 4.09). Conclusions and implications: The findings enhance our understanding of how health outcomes are intertwined in families with cancer and reinforces the importance of a family-centered approach to cancer care that facilitates psychosocial care. Providing family-centered supportive care may facilitate the well-being of both cancer survivors and their spouses.

Symptom Management

SYMPTOM MANAGEMENT AFTER RISK REDUCTION FOR INHERITED CANCER RISK

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Risk reduction interventions offered to individuals with inherited risk for cancer can cause symptom and quality of life (QOL) concerns. Supportive care interventions should target the unique needs of the high-risk population. We identify interventions to improve QOL in adults with inherited risk who have completed cancer risk reduction, focusing on non-surgical or non-pharmacologic QOL interventions. PubMed, Web of Science, CINAHL, clinicaltrials.gov, and Embase were searched using: hereditary breast and ovarian cancer, "BRCA" (PubMed only), familial adenomatous polyposis, "hereditary" diffuse gastric cancer, Lynch Syndrome, inherited cancer risk and quality of life. Results were limited to citations in English between 2015 to 2020. Interventions for children were excluded. A total of 709 titles and abstracts were screened and two interventions were identified. Interventions were included only once, therefore one Cochrane review was excluded. One randomized trial of an eight-week in-person mindfulness-based stress reduction intervention in 66 female BRCA1/2 carriers (hereditary breast and ovarian cancer) post prophylactic oopherectomy with menopausal symptoms found that the intervention improved menopause specific QOL. Additionally, a non-randomized study of a three-month Mediterranean diet intervention to reduce inflammation and improve QOL in 28 APC carriers (familial adenomatous polyposis) after prophylactic colectomy reported feasibility; QOL data not reported. Mindfulness based stress reduction could improve menopause related QOL post-prophylactic oophorectomy and future work may suggest diet as an intervention post-colectomy. Published QOL focused interventions for patients completing risk reduction of all sex and cancer syndromes are limited and should be the target of future oncology nursing research.

TRAINING FAMILY CAREGIVERS USING A SIMULATION-BASED INTERVENTION

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Training and support of family caregivers to assume multiple, complex tasks of caregiving, including symptom management, is not integrated into clinical practice. The purpose of this clinical trial is to measure the effect of a psychoeducational intervention that incorporates simulation techniques focused on skill development to improve caregiver and patient outcomes. Simulation, commonly used in training healthcare professionals, is a well-established form of experiential learning. However, we lack definitive evidence of the effectiveness of this approach to training family caregivers. This two-group, randomized clinical trial (1R37CA240707-01), which opened to accrual in December 2019, will recruit 180 caregivers. Patients must be receiving radiation therapy for rectal, anal, esophageal, lung, or head/neck cancer. Adult caregivers are identified by the patient. The intervention, modified to adhere to COVID-19 safety procedures, involves one in-person session, followed by two telephone sessions. The control group receives usual care. Data are collected at baseline, end of radiation treatment, and 4- and 20-weeks post-radiation treatment. The primary outcome is caregiver anxiety at 20 weeks post-radiation treatment. Other caregiver outcomes include depression, HRQOL, and fatigue. Patient outcomes (HRQOL and interrupted treatment course) and healthcare utilization outcomes are being measured. Despite a 4-month pause in enrollment due to the pandemic, 33 patient-caregiver dyads have enrolled during the first year of the study. The refusal rate is 23.3% for caregivers and 29.8% for patients. The findings will provide crucial information for translating the psychoeducational and simulation methods used in this intervention to other caregiver populations and clinical settings.

SYMPTOM SCIENCE 1 POSTERS: METHODS

Symptom Science

A SMART HEALTH SENSING SYSTEM TO SUPPORT PATIENTS AND FAMILY CAREGIVERS IN MANAGING CANCER PAIN: RESULTS FROM PILOT TESTING

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Significance: Technology can support cancer symptom management but must consider the experience of both patients and family caregivers, as well as the environmental context. This study tested feasibility and acceptability of a smart health sensing system, Behavioral and Environmental Sensing and Intervention for Cancer (BESI-C), to monitor pain in the home setting. Methods: This was a descriptive pilot study involving dyads of outpatients with cancer and their primary family caregiver. 2-week BESI-C deployments collected data via: 1) environmental sensors that measure noise, humidity, barometric pressure, light, and temperature; 2) Bluetooth beacons that localize movement; and 3) smart watches worn by patients and caregivers with heartrate monitors, accelerometers, pedometers and a custom application to record pain events via ecological momentary assessments (EMAs). Sensor data streams were integrated to describe the context for pain events. Post-deployment surveys and structured interviews assessed participant experience with BESI-C. Results: 5 deployments (n=10 participants) were completed. Feasibility challenges included: rurality of dyads; battery life/EMA reliability; and deployment procedures. Regarding acceptability (1, strongly disagree; 5, strongly agree), dyads assessed BESI-C as: low-burden (4.6/5); easy to use (4.6/5); few concerns with privacy (4.0/5); and helpful to manage cancer pain (4.6/5). Participants reported BESI-C improved dyadic communication and expressed interest in seeing and sharing their respective data. Conclusions: It is feasible to deploy BESI-C and dyads find the system acceptable. Leveraging user-centered design, BESI-C offers an innovative, holistic approach to monitor cancer pain and mitigate escalation of pain and distress by delivering just-in-time personalized interventions to patients and caregivers.

EXPLORING THE ROLE OF MITOPHAGY IN CANCER-RELATED FATIGUE

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Significance and Aims: Cancer-related fatigue (CRF) is a debilitating symptom reported by prostate-cancer patients receiving external-beam radiation therapy (EBRT). Recent studies suggest an association between a faulty mitophagy process and CRF symptoms. We propose that EBRT induces CRF by suppressing mitophagy, leading to increased oxidative stress. This exploratory analysis suggests exposure to EBRT dysregulates mitophagy, contributing to CRF. Methods: Fatigue scores (FACIT-F) and peripheral-whole blood samples were collected at five time points. RNA was isolated and reverse transcribed for gene expression analysis by quantitative PCR. Differentially expressed genes ($P<0.05$) had fold changes (FC) with a threshold set at 1 +/- 0.3-fold up- or down-regulated. A custom RT2 PCR Assay profiled expressions of 86 genes associated with mitochondrial regulation. Results: A significant reduction in FACIT-F scores was observed during mid and end points of EBRT compared to baseline, while a trend towards recovery was revealed at 14 days and 6 months after treatment. Six differentially expressed genes ($P=0.01–0.04$) during and after EBRT were linked to mitophagy, mTORC1 and mitochondrial regulation. mTORC1 (Klrb1) and mitochondrial activity (Ndufv1) genes were down-regulated during EBRT, while four mitophagy-related genes (Gabarapl2, Bcl2l1, Fis1 and Pink1) were up-regulated post EBRT. Conclusions: Findings suggest a link between CRF and defective mitophagy in participants with prostate cancer. The identified genes represent potential targets for development of novel therapeutics of CRF during EBRT. Future research will explore other genes implicated in mitophagy and mitochondrial regulation, such as Foxo3, and validate them using real-time PCR.

INROAD: DETECTION AND EVALUATION OF CIRCADIAN RHYTHM FROM HEART-RATE AND ACTIVITY DATA

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SIGNIFICANCE AND AIMS: Our prior work has reported an association of genetic variants in two key circadian clock genes with hypersomnolence in malignant glioma patients, highlighting the need to better understand how circadian disruption and chronotypes affect the development of treatment-related symptoms. This study aims to identify and develop computational tools for characterizing the patients' circadian rhythms disruption using heart rate and activity data obtained through wearable devices, thus, enabling the examination of the relationship between circadian disruption, chronotypes, and sleep disturbance. METHODS: Data from three healthy individuals were collected using Fitbit devices over one month. The participants represent different chronotypes as identified through the Morningness Eveningness Questionnaire. Heart-rate data, activity intervals, calories burned, activity intensity, number of steps, and metabolic equivalents were collected at multiple time intervals. CosinorPy package was used for analysis. RESULTS: Circadian rhythm curves and associated parameters (period, amplitude, onset, and peak of the cycle) were fitted and assessed for statistical significance. Differences were observed in the rhythms between the individuals as anticipated by their self-reported chronotypes. Ongoing work is identifying the characteristics of the circadian rhythm that can be reliably derived using activity data, as well as the aspects of sleep disturbance that are uniquely captured by the individual approaches. CONCLUSIONS: Computational analysis of data from wearable devices can elucidate interconnections between treatment and development of sleep and circadian disruption across the trajectory of an illness with applicability across cancers, thus paving the way to tailoring management of treatment side-effects based on each patient's chronotype.

ANDROGEN DEPRIVATION AND SLEEP DISTURBANCE: REMOTE ASSESSMENT AND INTERVENTION

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Significance/Aims. Men with prostate cancer receiving androgen deprivation therapy (ADT) are at risk for sleep disturbance that may exacerbate cognitive changes. Difficulty returning to sleep after awakening due to hot flashes/night sweats and nocturia is common. Associated negative thoughts and behaviors result in insomnia. Cognitive behavioral therapy for insomnia (CBT-I) is an effective intervention to improve sleep quality for a variety of populations, including cancer survivors. The study purpose is to 1) determine the feasibility of remotely assessing fitness, physical activity, cognitive function, and sleep outcomes, 2) remotely deliver a telehealth CBT-I intervention (teleCBT-I) to improve sleep outcomes, and 3) garner feedback/recommendations to refine the teleCBT-I content. Methods. Fifteen men receiving ADT will be assessed at baseline for fitness (functional fitness test), physical activity (accelerometer), cognitive function (neurocognitive tests) and sleep disturbances (actigraphy). Sleep disturbance assessment will be repeated post-intervention. The teleCBT-I is a 4-week program conducted via HIPAA-compliant videoconferencing. TeleCBT-I includes: time in bed restriction, stimulus control, sleep hygiene education, cognitive therapy and daily sleep logs. Mindfulness/relaxation techniques are emphasized to reduce the frequency and associated distress for night sweats and hot flashes. Descriptive statistics and paired t-tests ($\alpha = 0.05$ to control type I error rate) will be calculated. Conclusions/Implications. Remote monitoring will demonstrate feasibility to expand access to our interventional work to rural and underserved populations and will increase the generalizability of our findings going forward. Preliminary data for the impact of teleCBT-I on sleep quality will inform effect size estimation to power a randomized controlled trial.

HAND GRIP STRENGTH IS ASSOCIATED WITH FATIGUE AMONG FEMALE CANCER SURVIVORS

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Background: Fatigue is highly prevalent among cancer survivors, and is associated with impaired functioning. Although hang grip strength (HGS) has been used to evaluate muscle function and physical performance, the clinical significance of HGS in cancer is not known. The purpose of this study was to examine the association between HGS and fatigue for cancer survivors in a population-based sample of US adults. Methods: Data were analyzed from the 2011–2014 National Health and Nutrition Examination Survey (NHANES), a series of ongoing cross-sectional, large-scale nationally representative surveys. Inclusion criteria were NHANES participants ≥ 20 years of age with a self-reported diagnosis of cancer. HGS was measured by a dynamometer. Fatigue was self-reported by using a single item from the Patient Health Questionnaire-9. Multiple linear regression models were used after adjusting for age, race, body mass index (BMI), and sleep hours. Results: Among 713 cancer survivors (60.6% female; mean age 62.5 years), common cancer types were breast (16.9%), skin (12.5%), cervical (11.4%), melanoma (10.5%), and prostate (10.4%). Women had significant lower handgrip strength (26.8 vs. 41.8 kg) compared to men. In the unadjusted model, strong HGS was significantly associated with low fatigue scores in women, but not in men. In multivariate adjusted models for women, HGS was significantly associated with fatigue ($b = -.69$), age ($b = -.23$), and BMI ($b = .09$). Conclusions: Weak HGS was associated with higher fatigue in female cancer survivors. Further longitudinal studies are needed to confirm the causal relationship between fatigue and HGS among cancer survivors.

Symptom Science 2 Posters: Reviews/Big Data

VISUALIZING SYMPTOMS USING MHEALTH DATA IN CHILDREN WITH SERIOUS ILLNESS

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Background: mHealth technologies (wearables, smartphone apps) capture patient-generated data which illustrate persons' health and symptom status; however, these devices generate voluminous detailed information resulting in data overload and fatigue. Users may overlook, misinterpret, or disregard important information. Visualizing data collected by mHealth technologies in succinct, easy to understand, and interpretable formats can add meaning and utility to patients and clinicians. Aims: Identify key features that seriously children, and their parents and clinicians want to see in visualizations of symptom data obtained via mHealth technologies to enhance application to practice. Methods: Analysis of data from children (ages 8–17 years) with serious illness enrolled in a mHealth study of symptoms experienced by people with health problems. Visualizations of their symptom data were created to explore the perspectives of the children (n=14) and their parents (n=14) using semi-structured interviews, and with clinicians (n=30) using an investigator developed survey. Results: Children, parents, and clinicians perceived the visualizations as effective tools for combining data to convey symptom occurrences and patterns, and potentially to improve communication about symptoms. Children requested that visualizations be made available throughout treatment, either in the study app or the EHR so their clinicians could see the child's symptoms. Clinicians suggested that the visualizations could help stimulate conversation about symptoms with the children and their parents. Conclusions: These findings highlight the need for optimal visualization of mHealth data to enhance its utility in communications that inform clinical care. Future research will focus on improving the visualizations to show relationships between symptoms.

QUALITY OF LIFE IN HEMATOLOGIC MALIGNANCIES: A REVIEW OF SEX DIFFERENCES

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Background: Men and women are distinctly different, and how they respond to a cancer diagnosis and treatment is no exception. Quality of life data in hematologic malignancies defining how men and women differ are rare. Purpose: The purpose of this integrative review is to examine the scientific literature for publications encompassing comparisons of quality of life between men and women diagnosed with hematologic malignancies. Methods: A literature search focused on gender/sex differences in hematologic malignancies, and limited to English language, age 18 and older, research publications between 2005–2021 on databases of PubMed, CINAHL, and PsycINFO. Data were extracted according to PRISMA guidelines and use of COVIDENCE software. Key words and phrases included QOL, QoL, health related QOL (HRQOL), gender, neoplasms, cancer, carcinoma, hematologic malignancy. Results: Nine out 511 studies were identified to meet search criteria. Review of research showed women reported more pain, greater physical impact of disease and treatment, worse fatigue, fatigue severity and interference and higher symptom burden compared to men. However, data concerning differences in anxiety and depression between men and women were inconclusive with conflicting results between studies. Limitations: Selection bias is possible due to limiting the search to English language and adults. Conclusions: The large number of hematologic malignancies with only slight male predominance mandate further study into the differences in quality of life between genders/sex. The results of this review will provide information to enhance delivery of more personalized and patient-centered care.

PROTEUS: ADVANCING THE USE OF SYMPTOMS AND OTHER PATIENT-REPORTED OUTCOMES IN CLINICAL TRIALS AND ROUTINE PRACTICE

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Significance and aims: Patient-reported outcomes (PRO) provide patients' perspectives regarding symptoms, functioning, and well-being. Methodologic tools to aid the design, implementation, and application of PROs in clinical research and practice have been developed. The PROTEUS Consortium (Patient-Reported Outcomes Tools: Engaging Users & Stakeholders) is partnering with stakeholders, including the ONS, to optimize the use of PROs both in clinical trials and routine care through implementation and dissemination of these tools. Methods: For clinical trials, PRO guidance tools address measure selection (ISOQOL Minimum Standards); protocol writing (SPIRIT-PRO); analysis (SISAQOL); reporting (CONSORT-PRO); graphic formats (Recommendations for PRO Data Display); and applying the findings (Clinician's Checklist for Reading and Using an Article about PROs). For clinical practice, guidance include: ISOQOL User's Guide for Assessing PROs in Clinical Practice; Users' Guide for Integrating PROs in Electronic Health Records; Recommendations for PRO Data Display; a PRO-cision Medicine Methods Toolkit for interpreting and acting on PRO data; and the ePROs in Clinical Care website. Results: PROTEUS includes approximately 40 participants representing research/methods organizations, advocacy, government and regulatory agencies, funders, and clinical trial groups. PROTEUS is collaborating with these organizations on implementation and dissemination strategies. Examples of ONS strategies include Congress presentations and configuring the tools for nurses to use in either clinical trials or clinical practice applications. Conclusions and implications: The PROTEUS Consortium is working with key stakeholders to ensure that patients, clinicians, and other decision-makers have relevant data from the patient's perspective to make the best possible decisions in research and clinical care.

EXPERT CONSENSUS ON THE USE OF PHYSICAL ACTIVITY ON BIOPSYCHOSOCIAL HEALTH IN YOUNG ADULT CANCER SURVIVORS: A MODIFIED DELPHI STUDY

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Significance: Physical activity (PA) provides functional, cardio-metabolic, and psychosocial benefits for young adult cancer survivors. As a precision health intervention, PA also offers critical independence at this life stage. However, currently there are no practice guidelines specific to young adult cancer survivors. Aims: Identify areas of expert consensus on the impact of PA on young adult cancer survivors' biopsychosocial health guided by Revised Symptom Management Theory. Methods: We conducted a four round modified Delphi study of multidisciplinary international experts (Round I/II n =18; Round III n = 57, Round IV n = 45) with expertise in exercise oncology, symptom management, survivorship care, AYA cancer care, using a mixed method approach of qualitative interviews and iterative Likert scale surveys. Experts represented diverse clinical perspectives (medicine, nursing, occupational therapy, physical therapy, behaviorists, exercise oncology, community providers) Analysis: content analysis, descriptive statistics (% agreement, SD, mean); interrater reliability (Kappa). Results: There is a need for guidelines for the healthcare team on PA use in young adult survivorship care 91.1% (n 41); PA should be integrated into young adult cancer care as part of supportive oncology 91.1% (n 41) to mitigate symptoms of fatigue 91.0% (n 41), cardio-metabolic health 88.9%(n 40), loss of muscle mass 86.7%(n 39), excess body fat 77.8%(n 35), and anxiety/depression 77.8%(n 35). Conclusions and implications: The results of this study identify areas of consensus to warrant PA implementation in young adult survivorship care. Areas of consensus/lack thereof offer a blueprint to guide future physical activity symptom management research and clinical endeavors.

SYMPTOMS AND COMORBIDITIES OF OLDER ADULT LUNG CANCER PATIENTS IN THE 2017 MEDICARE CLAIMS DATA

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Significance/Aim: In patients with lung cancer (LC) co-morbid conditions and symptoms complicate treatment, diminish quality of life and shorten survival. We aimed to describe the burden of treatment-related symptoms and comorbidities characterized by use of diagnostic codes in older adults with LC receiving Medicare-related healthcare. Based on the literature, we hypothesized increased rates of pain and mental health diagnoses in older adults with LC. Methods: The study population included adults >65 years from the 2017 5% standard random national sample of Medicare carrier file data. A total of 18073 patients with LC were identified among 1,478,670 beneficiaries. We compared all ICD-10 coded diagnoses for patients with and without LC (comparison) using relative risk ratios (RR). Results: We identified 651 frequently coded ICD-10 diagnoses among patients with LC, including 38 symptoms and 18 major co-morbidities. Compared to patients without LC, those with a LC history had increased risk (RR; 95% CI) of general pain (2.78; 2.71–3.13), depression (1.46; 1.41– 1.60) and anxiety (1.75; 1.71.–2.10). Emphysema (9.15; 8.89–9.85), COPD (4.60; 4.41–4.76), and heart failure (2.01; 1.95–2.18) were also notably increased in LC patients. Within the LC group, males had an almost two-fold risk of anxiety (1.96; 1.90–2.74). Conclusions/Implications: Patients with a LC history have more pain, mental health disorders, and other comorbid conditions that may affect long-term outcomes. Future analysis of Medicare D and SEER-Medicare data may discern the impact of LC features (pathology, stage, adjuvant treatment) combined with comorbidity prevalence (pain, anxiety/depression, cardiovascular disease) on recurrence rates and mortality.

PALLIATIVE AND PSYCHOSOCIAL CARE POSTERS: TRAININGS

Palliative and Psychosocial Care

PALLIATIVE CARE TRAINING FOR PEDIATRIC ONCOLOGY PROVIDERS IMPROVES TIMELINESS OF PEDIATRIC PALLIATIVE CARE INITIATION

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Significance and aims: The benefits of pediatric palliative care (PCC) among pediatric oncology patients are well documented. While the World Health Organization (1998) and American Academy of Pediatrics (2000) recommend that PCC be introduced at the time of diagnosis of pediatric cancer, palliative care services are greatly underutilized among pediatric patients. A 2018 meta-analysis found that only half of pediatric oncology patients receive PCC by end of their lives; the average time from diagnosis to the first discussion of referral is 509 days, from consult to death is 86 days, and from initiation to death is 57 days. Barriers to PCC utilization include healthcare structure, insufficient training, differing expectations of care, and difficulty initiating challenging conversations, and perceived conflicting in care philosophy. This study aims to identify training opportunities to address these barriers, thereby improving timeliness of PCC integration. Methods: PubMed and CINAUL were searched to identify PCC and communication training programs and to evaluate their impact on timeliness of PPC referrals and confidence in integrating PCC. Results: Continuing education, including the Education for Physicians on End-of-Life Care and End-of-Life Nursing Education Consortium programs, improves clinician understanding of PCC, increases confidence in integrating PCC, and reduces time to referral. Frameworks for challenging conversation help providers hold empathetic, informative conversations about “bad news”, prognosis, and goals of care. Conclusions and implications: Timely PCC initiation requires a multidisciplinary approach. Education programs in PCC and communication aid the primary care team in making timely referral and services when a referral is not possible.

BUILDING THE CONCEPT OF FOSTERING FEARLESS TENACITY FOR ONCOLOGY NURSING PRACTICE AND RESEARCH

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Background Cancer is a traumatic and life changing event and cancer treatment can heighten one’s trauma experience. A cancer diagnosis not only affects patients’ physical, emotional and mental health, it also impacts caregivers and social networks. It is important for nurses to understand and support the patient process of getting along day-by-day when experiencing challenges and adversity associated with a cancer diagnosis and treatment. Purpose The purpose of this paper is to describe development of a model that will guide intervention for practice and research to foster fearless tenacity with persons who have been diagnosed and are being treated for cancer. Method A ten-phase concept-building process was used beginning with recollection of a practice story-(1); naming the concept-(2); selecting a theoretical perspective-(3); literature review/synthesis culminating in preliminary core qualities of the concept-(4); confirming core qualities through interviews and developing a synthesis story (n=6)-(5); creation of a mini-saga-(6); defining core qualities-(7); defining the concept-(8); structuring a model-(9); designating a research direction-(10). Result The core qualities of fostering fearless tenacity are: connectedness; mastering the moment with realistic optimism; and self-worth. Fostering fearless tenacity is nursing action to support individual ability for mastering the moment with realistic optimism that develops in a spirit of connectedness to strengthen one’s sense of self-worth during a time of adversity. Conclusion The practice story and information from cancer survivors during concept building lays the foundation for guiding nursing practice interventions and offers insights into future research direction to support persons diagnosed and being treated for cancer.

INTERDISCIPLINARY TRAINING OF PEDIATRIC ONCOLOGISTS AND NURSES TO ENGAGE IN EARLY PALLIATIVE CARE DISCUSSIONS WITH PARENTS OF CHILDREN WITH A NEWLY DIAGNOSED POOR PROGNOSIS CANCER

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Significance-Aims: To foster informed and timely healthcare decisions by parents of children with a poor-prognosis cancer, the NIH-NINR launched a campaign to encourage clinicians to engage in early palliative and end-of-life care (PC/EOL) discussions. Skilled interdisciplinary communication is essential to ensure parents of these children receive clear and comprehensive information and subsequently reduce symptom burden at EOL; however, clinicians lack training in interdisciplinary and PC/EOL communication skills. Our multi-site, randomized-clinical trial of a PC/EOL communication intervention for parents of children with cancer involved training RN/MD teams to conduct skilled early and ongoing PC/EOL discussions with parents. The aim is to describe training processes and outcomes for RN/MD dyads to deliver the intervention to parents of children newly diagnosed with a poor-prognosis cancer. Methods: To prepare RN/MDs to deliver the intervention we provided 3-days of in-person interdisciplinary protocol training using actors as parents to focus on goals of care and prognostic understanding. Due to pandemic-related delays, subsequent training of new sites and booster-intervener training was delivered virtually prior to study activation. Results: Nine RN/MD teams were trained. Both in-person and virtual training were acceptable, RNs and MDs were equally engaged in role-play activities. Participants demonstrated competency and felt confident in their ability to deliver the intervention. Conclusions-Implications: Training processes, learning outcomes and learner acceptability were positive. Despite pandemic-related delays in participant recruitment, the RN/MD teams are highly engaged in start-up activities and eager to deliver the intervention. PC/EOL communication training procedures are acceptable to RN/MD dyads, whether completed in-person or virtually.

Symptom Management

NRG ONCOLOGY NCORP: OPPORTUNITIES FOR MULTI-SITE, POPULATION-BASED SYMPTOM, CANCER CARE DELIVERY AND DISPARITIES RESEARCH

Mary E. Cooley, Dana-Farber Cancer Institute; Debra L. Barton, University of Michigan School of Nursing, Ann Arbor, MI; Kathleen Castro; Heidi Donovan, University of Pittsburgh School of Nursing, Pittsburgh, PA; Katherine Yeager, Nell Hodgson Woodruff School of Nursing, Emory University, Atlanta, GA; Deborah Bruner, Emory University, Atlanta, GA

The conduct of multi-site studies is needed to access a population-based sample and generate findings that are generalizable and increase the impact of research. The NCI Community Oncology Research Program (NCORP) provides an infrastructure for nurse scientists to conduct practice changing clinical trials. The aims for this poster are to: 1) describe the NCORP and NRG Oncology (NRG) as an exemplar, 2) identify research priorities for NRG related to symptom, cancer care delivery and health disparities research, and 3) describe nursing research conducted within NCORP. NRG documents, pubmed, google, and NCI websites were searched to identify relevant research studies and priorities. NCORP is comprised of seven Research Bases, including NRG, and 46 community sites, 14 of which are minority/underserved sites. NRG's unique focus includes women's health and radiation therapy delivery. Research priorities address gender-specific symptoms such as lymphedema and enhancing sexual health as well as behavioral interventions that decrease cancer risk or mitigate cancer-related symptoms. The goal for cancer care delivery is to conduct pragmatic trials of interventions that have efficacy in limited settings and test these interventions in broader community settings, including the integration of patient-reported outcomes into clinical practice and implementation of evidence-based symptom management strategies across the cancer care trajectory. The priority for health disparities is to develop and test interventions to address poor health outcomes, especially among high-risk groups; racial and ethnic minorities, rural populations and the elderly. Exemplar nursing research studies have focused on ameliorating erectile dysfunction, fatigue, and testing a web-based symptom management intervention.

Symptom Management Posters: Family, Children, & Caregiver Research

OPIOID PRESCRIBING FOR ADOLESCENTS AND YOUNG ADULTS WITH SARCOMA

Melissa Beauchemin, Columbia University, New York, NY; Rohit Raghunathan, Columbia University Irving Medical Center, New York, NY; Melissa Accordino, Columbia University Irving Medical Center, New York, NY; Jason Wright, Columbia University Irving Medical Center, New York, NY; Justine Kahn, Columbia University Irving Medical Center, New York, NY; Dawn Hershman, Columbia University, New York, NY

Significance/aims: Adolescents and young adults (AYAs) with sarcoma undergo procedures that can result in pain. Adult cancer patients are at increased risk of chronic opioid use, and AYAs are vulnerable to misuse. However, opioid prescribing practices in AYAs with sarcoma are not known. We described opioid use after active therapy and identified factors associated with continued use post-treatment. Methods: Included subjects were identified using IBM Marketscan® database and were 10 – 26 years old, had ICD-9 or -10 coded sarcoma diagnosis between 2008 – 2016, received anti-cancer therapy within 30 days of first diagnosis code, and were continuously enrolled in one insurance plan both >12-months before diagnosis and after last therapy. Primary outcome was opioid use, defined as at least one opioid prescription during the year following treatment completion. Covariates included age, sex, insurance, treatment type, prior opioid use, mental health (MH) and substance use (SU) diagnoses. Results: We included 1,355 patients; 75% had commercial insurance, 20% had a previous MH, and 2% had previous SU diagnosis. 65% of subjects used opioids during treatment, 28% received at least 1 prescription in the year post-therapy, and 14% received at least 2 prescriptions post-therapy. Medicaid insurance was associated with 80% higher likelihood of opioid use post-therapy. Conclusions: Opioid use in AYAs with sarcoma is common, and a significant proportion continued to use opioids post-therapy. Medicaid insurance, MH disorder, and prior opioid use were associated with continued use post-therapy. Further research is needed to establish safe and effective opioid prescribing practices.

ONCOLOGY TELEPHONE TRIAGE: SYMPTOM MANAGEMENT AND NURSE CONFIDENCE AND SKILL

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Significance and Aims: Outpatient oncology nurses are responsible for symptom assessment/management and care coordination during telephone triage. Nursing telephone triage interventions can improve patient outcomes and clinical efficiency. Therefore, the lack of education and training in telephone triage can greatly impact patient care. Using a prospective pre/post-test design, we sought to determine if a telephone triage educational workshop would improve oncology nurses' knowledge, confidence, and skill over 12 weeks. Methods: The educational intervention incorporated an online didactic lecture, group case scenario, and feedback on a virtual triage simulation. Evaluation was conducted pre and post-intervention through an online, 13-item survey (knowledge and confidence) and simulation utilizing a 56-item skills checklist (skills). Results: Thirteen oncology nurses were enrolled, 54% did not have telephone triage experience prior to this job. A total of 12 participants completed the workshop. From pre to post-test there was a 1.0 out of 5.0 (IQR: 2.8) improvement in confidence (p=.008) and a 26.3% (IQR: 15.2) improvement in skills (p=.002). There was no difference in knowledge scores from pre to post-test (p=.11). Conclusions and Implications: This workshop was associated with statistically significant improvement in oncology nurse confidence and skill, using prescribed telephone triage models. It benefits an existing process within the outpatient center and it highlights a novel educational strategy that may optimize nursing practice and improve patient care, experience and safety. Further, new nurse oncology orientation now includes a didactic lecture on telephone triage using this workshop's resources and will impact oncology standard operating procedures.

SUPPORTING PARENTS AS CAREGIVERS THROUGH A SYMPTOM ASSESSMENT APP DESIGNED FOR CHILDREN WITH CANCER

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Significance: mHealth tools can aid children with cancer in communicating their symptom experiences. Less is known about how children's mHealth tools may also support the care provided by parents. This study investigated how a newly developed symptom assessment app for children, Color Me Healthy, could support parents in their caregiving role. Methods: We completed a secondary analysis of qualitative interviews conducted with 19 parents (18 mothers; median 35 years old, range 26–48 years) of children (6–12 years of age) receiving cancer treatment who participated in a feasibility/acceptability trial of the Color Me Healthy app. We used thematic analysis to examine how the app could support parents in their caregiving role with attention to managing the child's symptoms. Results: Parents perceived the app as beneficial to 1) include their child's voice as a way to enhance understanding of the cancer symptom experience; 2) provide a supportive and safe environment for the child to report symptoms; and 3) support communication between the child, parent caregiver, and clinical team. Parents described how children's real-time symptom reports provided them with a more complete understanding of the child's experience. Several parents related using their child's data to direct interventions to alleviate symptoms. Conclusions: Perceived benefits of the Color Me Healthy app extended to parent caregivers. Parents' responses support the app's future implementation to facilitate symptom assessment and management without adding undue burden to the family's daily routine. Future studies should evaluate the app's efficacy to support parents' caregiving skills in addition to children's symptom outcomes.

PRELIMINARY UNDERSTANDING OF SYMPTOMS AND FUNCTIONAL NEEDS IN OLDER ADULTS WITH AML AND THEIR CAREGIVERS DURING CHEMOTHERAPY

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SIGNIFICANCE: Acute Myeloid Leukemia (AML), a disease common in older adults, can be stressful for the patient and burdensome for the caregiver. In 2018 the new regimen of hypomethylating agents (HMA) in combination with Venetoclax was approved, which can be administered outpatient. This change generated a transfer of care burden onto family caregivers as patients no longer stayed in the hospital for the duration of treatment. Caregivers may not be adequately prepared to assume the primary caregiving role due to rapidly changing symptoms, decreased function, and impact in quality of life (QOL). AIMS: To explore symptom and functional experiences of patients with AML and their caregivers' during the first 2 cycles of HMA + Venetoclax treatment. METHODS: Descriptive qualitative design using semi-structured interviews of 6 patients and 5 caregivers. Content analyses were conducted of both patient and caregiver interviews at 30 and 60 days. RESULTS: Two themes emerged for the patients: (1) rapidly changing symptoms and (2) feeling restricted due to functional decline. Two themes emerged for caregivers: (1) emotionally overwhelming and (2) high burden for coordinating treatment schedule. One common theme shared between patients and caregivers was overwhelming shock of initial diagnosis. CONCLUSIONS: Potentially the distress related to symptom, emotional, and functional needs of patients with AML and caregivers offers insights for future work. IMPLICATIONS: Referrals for cancer rehabilitation management will lead to prolonged recovery benefits. Using a multidisciplinary team approach will lead to improved symptoms, better maintenance and prevention of functional decline, ultimately leading to improved QOL.

SYMPTOM SCIENCE & MANAGEMENT POSTERS: TOOLS, MEASURES & METHODS

Palliative and Psychosocial Care

USING PATIENT REPORTED OUTCOMES TO DESCRIBE THE PATIENT EXPERIENCE ON PHASE I CLINICAL TRIALS

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Abstract Significance/Aims Symptoms are common in Phase I trial patients. We assessed the validity of PRO-CTCAE items in relation to previously validated assessments of quality of life and psychological distress. We utilized data from a randomized trial testing a palliative care support intervention for Phase I trial patients. Methods Patients (n=479) were accrued to the parent study prior to initiating a Phase I clinical trial with data collected at baseline, 4, and 12 weeks. We determined the correlation of PRO-CTCAE with Distress Level, FACT-G total, and subscale domain scores. Results Patients were predominantly female (56.8%), over age 60, and 30.7% were from minority populations. The correlation coefficient for Distress Level for all PRO-CTCAE items was small to moderate (Pearson $r = 0.33$ to 0.46). Pearson's correlation coefficient for FACT-G total was moderate ($r = -0.45$ to -0.69). Stronger associations were noted for mood items of the PRO-CTCAE only (with Distress Level, $r = 0.55$ to 0.6; with FACT-G, $r = -0.54$ to -0.6). PRO-CTCAE symptom interference scores had the strongest correlation with Distress Level (Pearson $r = 0.46$) and FACT-G Total (Pearson $r = -0.69$). Correlations between PRO-CTCAE items and corresponding FACT-G (total and subscales) and Distress levels reached statistical significance for all items ($p < .001$). Conclusion Evidence demonstrates validity of PRO-CTCAE in a heterogeneous US sample of patients undergoing cancer treatment on Phase I trials, with small to moderate correlations with Distress Level for all PRO-CTCAE items, and moderate correlations with quality of life as measured by FACT-G Total.

IMPLEMENTATION OF A STANDARDIZED DISTRESS SCREENING TOOL AND MANAGEMENT PROTOCOL FOR ADULT METASTATIC COLORECTAL CANCER PATIENTS IN AN OUTPATIENT UNIT

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Significance and Aims: Up to 50% of cancer patients experience clinically significant cancer-related distress. Unmanaged distress is linked to increased hospitalizations, decreased quality of life and survival. At a university-based Cancer Center, the formal evaluation of distress in oncology patients is not conducted. This quality improvement project involved implementing a screening protocol for distress including a screening tool, staff training, and referral processes to identify and manage distress in adult oncology outpatients with metastatic colorectal cancer. Methods: The National Comprehensive Cancer Network's Distress Thermometer and Problem List screening tool was integrated into the patient portal at the project site. This tool asks patients to rate their distress on a scale of 0-10 with high distress being defined as 4 or higher. The tool was distributed to patients with metastatic colorectal cancer through the portal for completion prior to infusion appointments. During appointments, infusion nurses conferred with patients with high-distress and initiated appropriate referrals to resources including social work, psychiatry, palliative care, or chaplaincy. Preliminary Results: During the first 6 weeks of the project, 93% of eligible patients received the tool, 61% completed the tool with 40% indicating high distress. All patients who indicated high distress received additional nursing interventions and/or resource referrals. Conclusions and Implications: A formal distress screening protocol is an effective, evidence-based practice to identify patients experiencing cancer-related distress and initiate nursing care and resource referral. Preliminary findings show low screening completion rate by patients, which is being addressed by raising awareness of the staff to promote completion.

Symptom Science

MEASURING SYMPTOM DISTRESS IN NEURO-ONCOLOGY: A DESCRIPTIVE FEASIBILITY REPORT

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SIGNIFICANCE AND AIMS: Patients with Central Nervous System (CNS) tumors face significant symptom burden and mobility issues related to their disease and associated treatment. We describe the utility and feasibility of two established measures of mobility, the Timed Up and Go (TUG) and Timed Sit to Stand (TSS) tests, in quickly and accurately assessing patient mobility issues in a neuro-oncology clinic. METHODS: Adult patients undergoing routine care for a primary brain tumor (PBT) completed the TUG/TSS tests and the MDASI-BT, which assessed symptom severity and interference with daily activities, during clinic visits over a 6-month period. Research assistants assessed feasibility metrics (test completion times and rates) and collected clinical and demographic data. Mann-Whitney tests, Kruskal-Wallis tests, and Spearman's rho correlations were used to interrogate relationships between TUG/TSS completion times and clinical characteristics. RESULTS: The study cohort included 66 patients, 59% male, with a median age of 48 years (20–77). TUG/TSS tests were completed by 94% of patients. Older patients ($p<0.001$) and those who were newly diagnosed ($p=0.024$), currently on corticosteroids ($p=0.025$), or had poor (≤ 80) KPS ($p<0.01$) took longer to complete the TUG and TSS tests. Worse self-reported activity-related interfer¬ence was associated with longer completion times on both the TUG and TSS tests ($p<0.001$). CONCLUSIONS AND IMPLICATIONS: The TUG and TSS tests are feasible for PBT patients and may aid in clinical care. Older age, being newly diagnosed, using steroids, and poor KPS, as well as high activity-related interference, were associated with great impairment, highlighting the tests' clinical sensitivity.

RELEVANCE OF GERIATRIC ASSESSMENT FOR PRIMARY BRAIN TUMOR PATIENTS: IMPLICATIONS FOR RESEARCH AND CARE

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Jing Wu, NIH/NCI/CCR/NOB, Bethesda, MD; Mark Gilbert, NIH/NCI/CCR/NOB, Bethesda, MD; Terri Armstrong, National Cancer Institute, National Institutes of Health, Bethesda, MD; Heather Leeper, NIH/NCI/CCR/NOB

SIGNIFICANCE AND AIMS: Geriatric Assessment (GA) utility has been evaluated in older adults diagnosed with solid tumors other than primary brain tumors (PBT). We assessed several key GA domains in adults diagnosed with PBT. METHODS: Patient and disease characteristics and GA domains within patient-reported outcomes (PROs) including symptom burden (MDASI-BT), Anxiety/Depression (PROMIS-short forms) and general health status (EQ5D-5L) were collected between 9/2016–8/2019 from adults diagnosed with PBT. Descriptive statistics and regression analyses were used to describe PROs. Results: Of 581 participants, 92 were 65-85 years old (mean age 70 years; “older”) and 489 were ≤64 years (mean age 46; “younger”). Older patients were 49% less likely to receive chemotherapy and twice as likely to have KPS ≤80 (p=0.003, OR=1.98). More older patients reported problems with mobility (57% vs 44%), self-care (38% vs 26%), and usual activities (64% vs 51%) than younger patients. Charlson Comorbidity Index mean scores were significantly higher in older patients (3.5 vs 0.6, p<0.001). The 3 most frequently reported moderate-to-severe symptoms were the same in both groups: fatigue (44% vs 41%), feeling drowsy (29% vs 30%) and difficulty remembering (28% vs 29%). Feeling distressed was the only symptom whose frequency differed between the age groups (11% older vs 27% younger, p=0.001). CONCLUSIONS AND IMPLICATIONS: Older PBT patients had lower performance status, more co-morbidities and increased functional impairments, affirming GA relevance with similar symptom burden in both age groups. Findings support inclusion of older patients in symptom intervention trials while assessing GA as part of these studies.

Symptom Science 1 Posters: Markers & Interventions

METABOLIC SIGNATURES ASSOCIATED WITH PSYCHONEUROLOGICAL SYMPTOMS CLUSTER IN CHILDREN WITH CANCER RECEIVING CHEMOTHERAPY

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Significance/Aims: Children with cancer receiving chemotherapy suffer from a cluster of psychoneurological symptoms (PNS) which includes pain, fatigue, anxiety, and depressive symptoms. Metabolomics is a promising method to differentiate biological pathways of PNS. This study aimed to examine associations between metabolites and the PNS cluster in children with cancer receiving chemotherapy. Methods: Forty children enrolled. Pain, fatigue, anxiety, and depressive symptoms were assessed using the Pediatric PROMISÒ scales. T-scores were computed and divided dichotomously (Yes/No) via a cutoff point of 50. The PNS cluster ranged from 0 (all T-scores < 50) to 4 (all T-scores ≥ 50). Serum metabolites were analyzed using untargeted metabolomics. All data were collected before, and 10–17 days after, beginning a chemotherapy cycle. Linear regression assessed metabolites associated with PNS and the PNS cluster over time. Results: Participant demographics: females (55%), mean age (13.2 years), diagnoses of acute lymphocytic leukemia or Hodgkin’s lymphoma (70%). Among 9,276 unique m/z-retention time features, 454 metabolites were associated with pain, 281 with fatigue, 551 with depressive symptoms, 596 with anxiety, and 300 with the PNS cluster. Fatty acids metabolic pathways were associated with pain: fatty acid biosynthesis (P=0.0004), fatty acid metabolism (P=0.0007), and fatty acid activation (P=0.004). Amino acid metabolic pathways were associated with multiple symptoms: Tryptophan associated with fatigue (P=0.0004) and anxiety (P=0.015). The PNS cluster was associated with Carnitine shuttle (P=0.015) and Tryptophan (P=0.037). Conclusions/Implications: Fatty acid and amino acid metabolic pathways were associated with PNS in children receiving chemotherapy. These findings require further investigation.

WORST PAIN PHENOTYPES IN ONCOLOGY OUTPATIENTS UNDERGOING CHEMOTHERAPY

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Significance and aims: Pain is a significant problem for oncology patients undergoing chemotherapy. Little is known about factors that contribute to worst pain (WP) phenotype profiles. Identify subgroups of patients (n=934) with distinct WP severity profiles and evaluate for modifiable and non-modifiable risk factors. Methods: Patients completed demographic questionnaire, Brief Pain Inventory, Multidimensional QOL

Scale-Cancer, and Medical Outcomes Study-Short Form-12. Using six ratings of WP (i.e., 0 to 10 numeric rating scale), latent profile analysis was used to identify subgroups of patients with distinct WP severity profiles. Results: Three latent classes with distinct WP profiles were identified (Low [17.5%; WP = ~3], Moderate [39.9%; WP = ~5.5], High [42.6%; WP = ~8]). Compared to the other two classes, patients in the high WP class were more likely to be single and unemployed, have a lower annual household income, have a higher body mass index, have a higher level of comorbidity, and have a poorer functional status. Patients in the high WP class are more likely to have both cancer and noncancer pain, a higher number of pain locations, higher frequency and duration of pain, worse pain quality scores, and higher pain interference scores. Compared to the other two classes, patients in the high WP class reported lower satisfaction with pain management and lower QOL scores. Discussion and Implications: Our results suggest that unrelieved pain is a significant problem for over 70% of outpatients. Clinicians need to perform ongoing pain assessments and initiate appropriate pharmacologic and nonpharmacologic interventions.

THE VAGINAL MICROBIOME AS A BIOMARKER OF PELVIC HEALTH AND PATIENT-REPORTED OUTCOMES IN WOMEN RECEIVING PELVIC RADIATION

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Significance and aims: Pelvic radiation is associated with significant toxicity in a large fraction of women. We aim to determine whether women who experience vaginal toxicity have a distinct microbiome than those who do not (1) at baseline (pre-treatment) or (2) over the course of treatment and recovery (longitudinal). We also aim to explore potential mechanisms of microbiome-associated development of vaginal toxicity through analysis of correlation with deconvolved immune cell abundances and host gene expression. Methods: In a sample of 89 women initiating pelvic radiation treatment for gynecologic or lower GI cancer, we will collect patient reported outcome survey data, pelvic exam findings, and a vaginal swab at baseline, 1,3,6,12,18 and 24 months post treatment. Microbe relative abundances will be generated and processed to established markers of vaginal health (i.e. the Lactobacillus to Prevotella ratio). By using an RNAseq-based microbiome measurement we will capture a snapshot of the human transcription within the swab including immune and epithelial cells. We will associate the microbial abundances with transcripts of human inflammatory pathways and deconvolved immune cell abundances. Results: This trial has been IRB approved and has opened for accrual. Conclusions and Implications: This proposal is innovative because it is the first time that the vaginal microbiome has been studied with vaginal health and patient-reported outcomes in women receiving pelvic radiation therapy over time. Results of this study will make a significant impact by advancing knowledge of the mechanism underlying changes in pelvic health after radiation, and provide insight into optimal therapeutic approaches.

IMMEDIATE EFFECTS OF AN AUDIO-RECORDED HYPNOSIS INTERVENTION FOR CHRONIC PAIN MANAGEMENT IN CANCER SURVIVORS: A PILOT RANDOMIZED FEASIBILITY TRIAL

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Significance and aims: Chronic pain is a significant problem among cancer survivors. Hypnosis audio-recordings offer a complementary and integrative pain management approach. The aim of this secondary analysis of a pilot randomized feasibility trial was to evaluate the immediate effect of a hypnosis audio-recording on pain intensity in cancer survivors. Methods: Forty cancer survivors with chronic cancer-related pain were randomly assigned to the treatment (n=21) or wait-list (n=19) groups. Participants received an in-person nurse-delivered hypnosis session using a script for pain reduction and given a pre-recorded version of the script on an MP3 player. They were asked to listen to the recording daily for four weeks: treatment group (weeks 1 thru 4), wait-list group (weeks 5 thru 8), and complete 0 – 10 numeric pain intensity scales before and after listening to the recording. Results: Pre- and post-recording pain intensity levels were similar for the treatment (pre M = 4.81, SD = 1.57; post M = 3.92, SD = 1.67) and wait-list (pre M = 4.85, SD = 1.61; post M = 3.88, SD = 1.52) groups. Mean pre- to post-recording difference in pain intensity was 0.88 (SD = 0.80, t (14) = 4.29, p = .001) for the treatment group and 0.97 (SD = 0.65, t (12) = 5.35, p < .0001) for the wait-list group. Conclusions and implications: A significant reduction in pain intensity immediately following use of a hypnosis audio-recording was replicated in the wait-list group. These preliminary findings suggest that hypnosis audio-recordings may be useful for cancer survivors.

ROLE OF BRAIN-DERIVED NEUROTROPHIC FACTOR IN SYMPTOM IMPROVEMENT BY EXERCISE: A NARRATIVE REVIEW

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Significant and aims: Cancer survivors suffered from multiple symptoms before, during, and after cancer treatment. A recent study suggested the role of brain-derived neurotrophic factor (BDNF) in symptoms experience. Exercise has been found to change BDNF levels by modulating brain activity and improve symptoms such as fatigue, depression, and sleep disturbance. This narrative review aims to examine the role of BDNF in symptom improvement by exercise. Methods: We searched PubMed and CINHAL from 2010 to 2020, using the following keywords: “exercise/physical activity”, “Brain-Derived Neurotrophic Factor/BDNF”, “fatigue”, “pain”, “depression”, and “sleep”. Studies in mental health disorder, animal studies, study protocols, review papers, and non-English language studies were excluded. Results: A total of 18 studies were included. Studies suggested the role of BDNF in many neural processes, energy homeostasis, and cardiovascular regulation. Many studies suggested the role of circulating BDNF in mood and cognition. During exercise, circulating BDNF was increased with vigorous or mixed of low resistance and high repetitions exercise. In BDNF polymorphisms studies suggested that individuals with BDNF Met allele have a poor physical performance during the exercise. Only two studies were in cancer. A study suggested that exercise increased the level of BDNF in breast cancer survivors. Conclusions and implications: This narrative review provides insights that a change of BDNF by exercise could have a potential role in symptom improvement. However, these are small sample size studies. More longitudinal studies with a larger sample size are needed to develop biological targets for future precision treatments for symptoms development.

Symptom Science 2 Posters: Methods

PSYCHOLINGUISTIC SCREENING FOR COGNITIVE DECLINE IN CANCER SURVIVORS: A FEASIBILITY STUDY

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Significance and aims: Androgen deprivation therapy (ADT) is a prostate cancer treatment that may cause cognitive decline. Neurocognitive testing detects change but is intensive and anxiety-provoking. Because language is dependent on cognition, speech reflects cognitive decline. This study tested feasibility for using speech complexity analysis by evaluating relationships between psycholinguistic and neurocognitive metrics. Methods. Five-minute recordings of the study interview and in response to a prompt were collected from 13 men at 6-month intervals. Recordings were transcribed and coded for noun-verb clauses. Spearman correlations were computed between neurocognitive and psycholinguistic measures. Results. In prompted speech, time 1 Color Trail Making Test B correlated with mean clauses per utterance (MCU) (rs = – 0.62, p = 0.03) and right-branching clauses per utterance (RCU) (rs = –.69, p = 0.01). Auditory verbal learning correlated with MCU (rs = 0.63, p = 0.02) and RCU (rs = 0.61, p = .03). Verbal fluency correlated with left-branching clauses per utterance (LCU) (rs = .72, p = 0.01). At time 2, Wechsler-IV Block Design correlated with mean length of utterance in words (MLU) (rs = 0.8, p = 0.01), MCU (rs = 0.83, p = 0.01), LCU (rs = 0.73, p = 0.03) and RCU (rs = –0.69, p = 0.03). There were no relationships in the study interview speech. Conclusion. Findings suggest relationships between neurocognitive and psycholinguistic measurements in prompted speech. If confirmed in further research, natural language processing of speech complexity may provide inexpensive, unobtrusive, automated screening for cancer treatment-related cognitive decline.

AGE-RELATED DIFFERENCES IN SELF-REPORT AND OBJECTIVE MEASURES OF COGNITIVE FUNCTION IN OLDER PATIENTS PRIOR TO CHEMOTHERAPY

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Significance and aims: Older adults are at increased risk for cancer-related cognitive impairment (CRCI). Study purposes were to evaluate for differences in demographic and clinical characteristics and subjective and objective measures of cognitive function (CF) between younger older adults (YOA, 60-69 years) and older adults (OA, ≥70 years). Methods: Older oncology patients' (n=139) CF was assessed using subjective (Attentional Function Index, European Organization for the Research and Treatment of Cancer Quality of Life Questionnaire (EORTC) CF scale) and objective (Montreal Cognitive Assessment, Trail Making Test (TMT) A & B) measures prior to the initiation of chemotherapy. Data were analyzed using parametric and nonparametric tests. Results: No differences were found between the two groups of older adults for any of the subjective or objective CF measures, except that OA patients had higher TMT B scores than the YOAs. Compared to the general population, OAs had significantly higher EORTC CF scores and YOAs had significantly worse scores for all of the objective tests. A clinically meaningful difference between group difference was found for the TMT B test. Conclusions and implications: Both subjective and objective measures should be used to obtain a complete picture of CF in older patients. TMT B may be a useful screening measure of CF in older patients. Clinicians can use this information to identify older oncology patients who are at increased risk for CRCI during and following chemotherapy.

ASSESSING SLEEP AND CIRCADIAN RHYTHMS IN PRIMARY BRAIN TUMORS PATIENTS: AN INNOVATIVE OBSERVATIONAL STUDY DESIGN USING SMART WEARABLES

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SIGNIFICANCE AND AIMS: Severe sleep disturbances occur in up to 54% of the primary brain tumor (PBT) population. Evidence within our laboratory suggests a strong relationship between sleep disturbances and polymorphisms in circadian clock genes in PBT patients. Smart wearable devices (i.e. Fitbits) can continuously monitor patient behaviors and provide detailed physiological measurements of sleep, activity, and heart rate. We hypothesize that smart wearables can reliably capture physiological sleep disturbances and circadian disruption complementing well-established patient reported outcomes (PROs) measurements. This clinical trial is designed to assess sleep and circadian rhythms in the PBT population across the disease trajectory using data collected from smart wearable devices. METHODS: This observational study will include a sample of 160 PBT patients divided into 4 cohorts based on their disease trajectory (newly diagnosed, first recurrence, second recurrence, imaging surveillance). Patients will wear a Fitbit Charge 3 continuously for one month to monitor sleep including daytime napping, sleep quality and sleep architecture. PROs will be completed electronically at distinct timepoints and include those related to perceived sleep disturbances, morningness-eveningness subtypes, brain tumor specific symptom burden, anxiety, depression, cognition and general health status. RESULTS: Anticipated outcomes include correlations between physiological sleep measurements, clock gene polymorphisms and self-reported sleep disturbances, as well as identification of sleep and circadian issues at the different stages of disease to inform 'just-in-time' intervention planning. CONCLUSIONS AND IMPLICATIONS: Smart wearables have the potential to identify biologic mechanisms that contribute to the development of negative clinical outcomes and decreased quality of life.

DIFFERENCES IN SELF-REPORT AND PERFORMANCE-BASED MEASURES OF PHYSICAL FUNCTION IN OLDER PATIENTS PRIOR TO CHEMOTHERAPY

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Significance and aims: Maintenance of physical function (PF) is an important outcome for older adults. Study purposes were to identify differences in subjective and objective measures of PF between younger older adults (YOA, 60–69 years) and older adults (OA, ≥70 years); compare the PF scores with age-matched samples from the general population; and evaluate for associations between subjective and objective measures of PF. Methods: PF was assessed in 139 oncology patients using subjective (i.e., European Organization for Research and Treatment of Cancer Core Quality-of-Life Questionnaire; physical function and role function (QLQ-C30 PF and QLQ-C30 RF)) and objective (i.e., Short Physical Performance Battery (SPPB)) measures prior to initiation of chemotherapy. Data were analyzed using parametric and nonparametric tests. Results: Compared to YOA, OA were less likely to be employed and more likely to have high blood pressure. No differences were found between the two age groups in any of the subjective or objective measures of PF. Compared to the age-matched general population, YOA and OA had significantly lower scores for both the subjective and objective measures of PF. Large effect sizes were found for differences in QLQ-C30 role function, SPPB balance, and SPPB total scores between the YOA group and the age-matched general population samples. Correlations between the subjective and the objective measures were low. Conclusions and implications: The evaluation of PF is of great importance for older patients prior to chemotherapy. Longitudinal studies are warranted to evaluate for changes in PF during and following chemotherapy.

DEVELOPING AN ELECTRONIC SYSTEM FOR PATIENT/PROXY-REPORTED SYMPTOM ASSESSMENT AND TRACKING IN CHILDREN WITH CANCER: A CO-DESIGN EXEMPLAR

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Significance/Aims– Electronic systems facilitate the collection of patient-reported symptom data and can enhance the integration of patient-reported symptom assessments into practice. However, barriers exist to the implementation of these electronic systems, including poor system usability (i.e. systems that are difficult to use, confusing, or are not useful) and lack of system use by patients/families. The primary aim of this study was to explore child and parent needs, desires, and barriers in the design of electronic symptom-reporting systems intended for children with cancer and their parents. This presentation describes co-design, how it differs from a focus group approach, the co-design methods we used to enhance the preliminary development of an electronic symptom-reporting system, and the important role co-design can play in enhancing collection of electronic patient/proxy-reported symptom data. Methods– Six child/adolescent with cancer and parent dyads were recruited from a pediatric medical center in the Midwest for this descriptive, qualitative research study. Study activities included individualized, creative, co-design sessions that were guided by a semi-structured interview protocol. Results– Unanticipated results were obtained through the co-design method, including an appreciation of: 1) the role an electronic system can play in facilitating communication between children and parents; 2) how the child's health information is used by parents; and 3) how patient/proxy-reported symptom assessments can be psychologically burdensome in children with advanced cancer. Conclusions/Implications– Co-design provided unique insights into the challenges children and parents experience in managing symptoms, and the role of electronic systems in addressing those challenges and improving patient/proxy-reported symptom assessments.