A pilot evaluation of social needs among gynecologic oncology patients in inpatient versus outpatient settings

Anna Greenwood, BS[1] Anne Nora, MD[2] Caroline Hartman, PharmD[3] Karen Summers,[4] Craig Syrop, MD, MHCDS[4] Michael Haugsdal, MD[4]

Keywords: Social determinants of health, women's health, health disparities, social needs, gynecologic oncology

Abstract

The WHO defines social determinants of health (SDoH) as the conditions in which we are born, grow, work, and live as well as other large systems that positively or negatively affect our health.[1] Many healthcare systems currently lack the resources and strategies required to accurately assess and address SDoH. Action must be taken because studies have found that chronic diseases, including cancer, are affected by SDoH.[1-3] The aim of this study is to identify the incidence of social needs in an inpatient gynecologic oncology population and its relation to patient demographics and clinical diagnostic data to guide and inform future intervention. Patients agreeing to participate in the study completed a needs assessment survey during their inpatient stay at the hospital between November 2020 to March 2021. The survey contained seven questions, six of which were questions screening for social needs including food and housing security, transportation means, financial stability, health literacy, and social support. Responses were considered positive if any degree of need was reported. Demographic and cancer diagnosis data were then collected and included zip code, race, cancer stage and age at diagnosis, treatment history, and number of hospital admissions and length of stay over the past 12 months. The most substantial reported needs across all gynecologic malignancies were social support (65%), health literacy (37%), and financial need (22%). Less need was reported in the categories of food (11%), housing (7%), and transportation (4%). SDoH have been studied in the outpatient gynecologic population and the needs seen in this study are similar to the needs of that population.[4] However, there are likely different challenges and frequencies of unmet need in the different types of gynecologic cancers that may affect the stage at which their cancer is diagnosed as well as the number of hospital admissions related to their cancer care.

[1]Carver College of Medicine, University of Iowa, Iowa City, Iowa
[2]Mayo Clinic, Rochester, Minnesota
[3]College of Pharmacy ,University of Iowa, Iowa City, Iowa
[4]Department of Obstetrics and Gynecology, University of Iowa Hospitals and Clinics, Iowa City, Iowa

Please cite this paper as: Greenwood A, Nora A, Hartman C, Summers K, Syrop C, Haugsdal M. A pilot evaluation of social needs among gynecologic oncology patients in inpatient versus outpatient settings. Proc Obstet Gynecol. 2023;12(1): Article 4 [14 p.]. Available from: https://pubs.lib.uiowa.edu Free full text article.

Corresponding author: *Michael L. Haugsdal, MD, Department of Obstetrics and Gynecology, University of Iowa, Iowa City, IA, michael-haugsdal@uiowa.edu*

Financial Disclosure*: The authors report no conflict of interest.*

Background/Introduction

The World Health Organization defines social determinants of health (SDoH) as the conditions in which we are born, grow, work, and live as well as other large systems that may positively or negatively affect our health.[1] The Institute of Medicine acknowledges that the social environments we exist within may influence health behaviors by "shaping norms, enforcing patterns of social control, providing or not providing opportunities to engage in particular behaviors, reducing or producing stress, and placing constraints on individual choice."[5] It has previously been shown that these factors may contribute to more than 70% of the collective influence upon an individual's health quality and outcomes, with direct clinical care only contributing the remaining 30% or less.[6] Such social determinants of health can be considered "upstream" factors, or those which begin to impact health equity and health outcomes prior to when an individual physically accesses the healthcare system. Currently, there are limited regulated or standardized methods in place to effectively address social determinants of health uniformly across all healthcare settings. Before this can be done, SDoH must first be defined; their clinical importance understood; and next, the unique constellation of each patient population and individual's needs identified.

In 2019, a set of social determinants of health, excluding rurality, were studied in the outpatient gynecologic oncology population at a public academic medical center in Iowa.[4] The definitions and clinical importance of these social determinants of health utilized are summarized in *Figure 1*. At that time, more than half of the patients surveyed reported at least one need among the six categories screened with the most frequently reported categories of need being social support, health literacy, and financial stability.[4] Building upon that prior work, this pilot investigation sought to: 1) evaluate for the unique needs of an inpatient gynecologic oncology population, 2) compare identified inpatient needs to those previously reported for an outpatient population, and 3) identify trends specifically related to this population's demographic and clinical information.

Methods

Study approval (University of Iowa Human Subjects Office, ID: 202006221) was obtained to first survey and later perform chart review on 100 women receiving inpatient gynecologic oncology care at a single, Midwest, academic, tertiary care center between November 2020 and March 2021. Potential subjects were identified by their presence on the gynecologic oncology inpatient census and those invited to participate in the study included English-speaking patients receiving treatment for cervical, ovarian, uterine, vaginal, vulvar, or other gynecologic-related cancers as well as treatment of benign gynecologic neoplasms or premalignancies. Eligible patients were introduced to the study during their inpatient stay and invited to participate voluntarily.

Social Determinant of Health	Definition	Importance
Food Insecurity	A household-level economic and social condition of limited or uncertain access to adequate food.[7]	Those who experience food insecurity often consume nutrient-poor diets which can exacerbate risk factors, such as obesity, which may contribute to gynecologic cancers.[7,8] Patients may postpone medical care in order to buy food or may underuse prescription medications because of budget constraints.[8] Food insecurity is also associated with increased levels of stress, anxiety, depression, and psychological distress.[9]
Housing Insecurity	Difficulty paying rent, overcrowding, moving frequently, living with relatives, or having to spend most household income on housing.[10]	Housing insecurity is associated with negative physical health and increasing difficulties accessing healthcare.[10]
Transportation	Inability to travel to and from healthcare appointments, treatments, and other health-related activities.	Timely adherence to treatment optimizes prognosis potential while delayed or interrupted management is associated with increased overall morbidity and mortality.[11] Lack of access to reliable transportation has been linked to diagnosis of cervical cancer at later stages and is associated with worse survival outcomes.[12]
Financial Stability	Challenges or inability to afford costs of health care or financial challenges faced when health care costs dominate a personal budget.[13]	Financial instability among patients with cancer is most prominent in woman diagnosed at a young age.[14] Cancer-related financial burden has been found to be associated with lower health-related quality of life, increased risk of depressed mood, and higher frequency of worrying about cancer recurrence among cancer survivors.[14] Additionally, patients who report financial burden are 7 times more likely to delay or avoid care than those without.[13]
Health Literacy	The degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.[15]	Low health literacy and low cancer symptom knowledge have been shown to contribute to delays in cancer patients' presentation to care.[16] Poor reading skills have also been shown to be associated with poorer overall health, higher medical expenses, and increased number of hospital and outpatient visits relative to those with higher literacy levels.[17]
Social Support	Information, advice, or tangible aid provided through contact with one's social network that has beneficial effects on the recipient.[18]	Among older women, social support was found to be positively associated with better physical and mental health, reduced depression, and better quality of life.[19] In breast cancer patients, the absence of close ties and perceived sources of emotional support are significantly associated with increased breast cancer-specific death.[20]
Rurality	A measure determined by the USDA using US census information that takes into account population density, urbanization, and daily commuting.[21]	Rural women have been found to have lower household incomes than those in metropolitan settings and are also less likely to take part in preventative health examinations putting them at a disadvantage for receiving adequate health care.[22]

Figure 1. A summary of social determinants of health (SDoH) and associated clinical importance.

Consenting participants were given the option of reading and completing a paper copy of the social needs assessment survey independently or having the survey read aloud to them by a member of the research team who would then record the participant's responses.

The needs assessment survey used in this study is similar to that which was used by the team to previously study the outpatient population at the same institution.[4] A key difference between the two studies is that in the prior study, the needs assessment was administered during outpatient clinic visits and patients remained anonymous. Their clinical information regarding their gynecologic malignancies was not collected. Further details on the methods of that previous, outpatient study can be found in Nora et al.[4]

The social needs assessment survey tool contained seven questions, six of which were validated questions querying specific categories of social determinants of health derived from prior published studies. The five questions screening for housing, food insecurity, transportation, financial stability, and social support were derived from the *Accountable Health Communities Health-Related Social Needs Screening Tool* developed by the Centers for Medicare and Medicaid Services.[23] An additional sixth question screening for health literacy was derived from *Brief Questions to Identify Patients with Inadequate Health Literacy* by Chew et al.[24] As previously described by Nora et al.[4], the same collection of six questions had been previously utilized as an anonymous screening survey distributed to a convenience sample of women attending the outpatient gynecologic oncology clinic at the same institution between January and February of 2020. For the current pilot, a final seventh question queried patients' highest level of education. An example of the needs assessment survey can be found in the supplemental information. Participating subjects were also invited to consent to a medical chart review to collect specific demographic data including race, age at cancer diagnosis, cancer stage at diagnosis, cancer treatment history, number of hospital admissions and number of days spent as inpatient in the past 12 months, and the zip code of their residence. Patient medical record numbers were captured at time of initial survey to allow for review of consenting participants' records.

Study data were collected and managed using REDCap electronic data capture tools hosted at the University of Iowa.[25] All studied variables were reported in categorical format. Patients who indicated at least one social need on the assessment were classified as positive screens. Those who did not report any needs on the questionnaire were classified as negative screens. The average number of social needs reported per patient was calculated based on patient characteristics. Patients with negative screens were included in calculations of the average number of needs for each patient category. Statistical analysis was

completed in Microsoft Excel and SPSS.[26,27] Each demographic feature and social need were compared between groups utilizing Chi-squared test or Fisher's exact test when assumptions of Chi-squared were not met. An α threshold of 0.05 for significance was prespecified. Chi-squared values were often unable to be calculated because of insufficient sample size. The results of this study of inpatient gynecologic oncology patients were then compared to that of Nora et al., a study previously completed in the outpatient gynecologic oncology setting at the same academic institution using Chi-squared and Fisher's exact tests.[4]

Table 1. Inpatient gynecologic oncology patient demographics and social needs screening responses, with average number of needs indicated on the surveyed reported per patient in each demographic category.

	Total (n=98)	≥1 Positive Questionnaire Responses (n=79)	No Needs Reported (n=19)	Average Number of Needs
Race[a]:				
NH White	93 (94.9%)	74 (93.7%)	19 (100%)	1.4
Black of AA	4 (4.1%)	4 (5.1%)	0 (0%)	2.3
Asian or Pacific Indian	1 (1.0%)	1 (1.3%)	0 (0%)	5.0
Education Level[b]:				
Some high school	2 (2.0%)	1 (1.3%)	1 (5.3%)	2.0
High school diploma or equivalent (GED)	28 (28.6%)	26 (32.9%)	2 (10.5%)	2.0
Some college	23 (23.5%)	20 (25.3%)	3 (15.8%)	1.4
College graduate	21 (21.4%)	15 (19.0%)	6 (31.6%)	1.0
Trade/technical/vocational school	13 (13.3%)	10 (12.7%)	3 (15.8%)	0.8
Advanced degree (Masters, PhD, JD, MD, etc.)	11 (11.2%)	7 (8.9%)	4 (21.1%)	0.8
RUCA Level:				
Rural	10 (10.2%)	8 (10.1%)	2 (10.5%)	2.0
Small Town	8 (8.2%)	7 (8.9%)	1 (5.3%)	1.6
Micropolitan	20 (20.4%)	19 (24.1%)	1 (5.3%)	1.7
Metropolitan	60 (61.2%)	45 (57.0%)	15 (78.9%)	1.3

[a]Hispanic and American Indian/Alaskan Native were not included in the table as no patients self-identified with these races.
[b]The category of "No high school education" was not included in the table as no patients self-identified with this group.

Results

One hundred and forty inpatients from the gynecologic oncology census were invited to participate in this study, of which 40 declined, producing a

participation rate of 71%. One hundred participants completed the questionnaire and all consented to chart review. Two participants were later excluded from analysis as one was non-English speaking and the second underwent a risk-reducing surgery without the presence of neoplasm.

In Nora et al., 250 patients were invited to participate in the anonymous survey of which 222 were completed. Importantly, no demographic or clinical information was collected on the patients so the outpatient cohort could not be directly compared to the inpatient in those respects.

The average age of the inpatient cohort at time of surveying was 63 years old. (*Table 1)* details the participants' demographics and social needs assessment survey responses. The small sample size prevented Chi-squared calculation. Participants were overwhelmingly Non-Hispanic White. About 60% of patients surveyed resided in a metropolitan area while the rest resided in micropolitan, or rural areas as classified by the RUCA code. All respondents were educated at or above high school levels, with one-third reporting college graduation. Overall, the mean number of social needs identified per participant was 1.5.

Inpatient study participants were being treated for cervical, ovarian, uterine, vaginal or vulvar, benign neoplasms or premalignancy, or other-gynecologic cancers. Other cancers included neoplasms described to have originated from the fallopian tube, colon, peritoneum, or of mullerian origin. Subject responses to the survey were stratified and compared by cancer type. (*Table 2*)

Table 2. **Cancer types and responses to the social needs assessment, with average number of needs reported per patient.**

Cancer Type	**Total (n=98)**	**≥1 Positive Questionnaire Responses (n=79)**	**No Needs Reported (n=19)**	**Average Number of Needs per Patient**
Cervical	10 (10.2%)	9 (11.4%)	1 (5.3%)	1.3
Ovarian	27 (27.6%)	20 (25.3%)	7 (36.8%)	1.4
Uterine	27 (27.6%)	23 (29.1%)	4 (21.1%)	1.4
Vaginal/Vulvar	11 (11.2%)	10 (12.7%)	1 (5.3%)	1.5
Benign Neoplasm/Premalignancy	14 (14.3%)	8 (10.1%)	6 (31.6%)	1.5
Other	9 (9.2%)	9 (11.4%)	0 (0%)	2.0

Additionally, the stage at which cancer was diagnosed was used to compare the level of need identified in patients with early (stage 0-2) vs. late (stage 3-4) stage of disease at diagnosis. Both sub-groups (early vs. late) reported similar levels of need for housing, food, transportation, financial need, health literacy, and social support.

The highest level of education attained was collected for this patient population and there seemed to be no correlation between the level of education and the number of inpatients who reported a need in the category of health literacy. (*Table 3*) Respondents with a high school diploma or equivalent, which was also the largest educational level group, reported the greatest frequency of health literacy need.

Comparing women with or without reported health literacy needs, there was no difference in the average number of hospital admissions in the last 12 months ("with need": 1.58 admissions vs. "without need": 1.61 admissions, p=0.91). Likewise, the average number of inpatient hospital days in the last 12 months was no different between the two groups ("with need": 6.94 days vs. "without need": 6.58 days, p=0.855).

Table 3. **Inpatient subjects (N=98) who endorsed a health literacy need by education level.**

	Positive Screen in Health Literacy
Some high school (n=2)	1 (50%)
High school diploma or equivalent (GED) (n=28)	18 (64.3%)
Some college (n=23)	5 (21.7%)
College graduate (n=21)	4 (19.0%)
Trade/technical/vocational school (n=13)	4 (30.8%)
Advanced degree (Masters, PhD, JD, MD, etc.) (n=11)	4 (36.4%)

The results of this inpatient study were compared to the prior outpatient findings of Nora et al.[4] and a significant difference was identified between the inpatient and outpatient cohorts across the need for social support. Nearly two-thirds of the inpatient population reported some level of need for social support compared to approximately one-third of the outpatient population (65.3% vs. 32.4%, p <0.001).

Table 4. **Inpatient vs. outpatient positive responses to validated questions about various social determinants of health.**

	Number of Positive Screens		
	Inpatient (n=99)	Outpatient(4) (n=222)	p
Housing	7 (7.1%)	9 (4.1%)	.373[a]
Food Insecurity	11 (11.2%)	24 (10.8%)	1
Transportation	4 (4.1%)	11 (5.0%)	1.00[a]
Financial Need	22 (22.4%)	54 (24.3%)	.825
Health Literacy	36 (36.7%)	62 (27.9%)	0.149
Social Support	64 (65.3%)	72 (32.4%)	<.001

p values for Chi-square except where otherwise noted.
ap value for Fisher's Exact Test

Discussion

Cancer Type

The greatest number of inpatients screening positive on the needs assessment questionnaire were those with uterine and ovarian cancers; however, the highest average number of needs per patient were reported from women with other cancers, benign neoplasm/premalignancy, and vaginal/vulvar cancers. Unfortunately, the sample size for each cancer type was too small to apply statistical analysis that might detect a significant difference between the groups. Unlike in the setting of cervical cancer, there is not an effectively studied, universal screening method for uterine and ovarian cancer. Patients with cancer originating from the ovary often present with more advanced stage disease and the needs of populations with advanced disease may be greater compared to those with cancers that are more easily screened.[28]

Health Literacy

While the inpatient gynecologic oncology population demonstrated highest levels of need in health literacy among patients who reported a high school diploma or less, we did not observe a decrease in health literacy needs with higher educational attainment. Interestingly, the lowest reported level of need was present in the group with a college degree and the group with an advanced degree saw almost a doubling of reported need. The US Department of Education has reported that 22% of American adults have basic health literacy, indicating possession of skills necessary to perform simple and everyday literacy activities. Indeed, according to the Department of Education, average health literacy increases with each higher level of educational attainment.[15] Unfortunately, 14% have below basic

health literacy, indicating a possession of no more than the most simple and concrete literacy skills. Furthermore, health literacy is not equitably distributed. White and Asian/Pacific Islander adults had higher average health literacy than Black, Hispanic, American Indian/Alaska Native, and multiracial adults.[15]

It is unclear why an increase in health literacy needs in patients with a college degree or greater was observed. However, in the Department of Education's report on health literacy, it was found that adults ages 65 and older have lower average health literacy than adults in younger age groups. Notably, about 45% of the gynecologic oncology inpatients in this study were 65 years of age or older which may confound the health literacy needs observed according to educational level. This is an important consideration because it may suggest that methods and strategies of communicating cancer diagnoses and potential management plans may need to be modified based on patient age and regardless of level of education.

Inpatient vs. Outpatient

Both inpatient and outpatient populations reported similar frequencies of need in housing, food insecurity, transportation, financial need, and health literacy. The most frequently reported needs in both populations were health literacy, social support, and financial need. Our finding of a significant difference between the inpatient and outpatient groups expressing need for social support calls to question, but leaves unanswered, whether needs in social support may contribute to more frequent inpatient care, more severe disease, or whether those with more severe disease and requirements for hospitalization in turn require more social support. Interpretation of this finding is further complicated because the inpatient surveys took place both amid the SARS-CoV-2 pandemic and before vaccines were widely available. Thus, the emergence and impact of COVID-19 represents a time course confounder for comparison of the outpatient study (performed prior to 2019) to this inpatient population. This concern would be in line with literature that COVID-19 did lead to an increase in social isolation[29] and that COVID-19 may have contributed to delays or changes to treatment, such as with chemotherapy treatments which resulted in more advanced disease or cancer-related complications.[30] Social support is thought to promote biologic or behavioral adaptation in the face of stress or threats to health. Additionally, it was found that women who are well-connected deal more effectively with their physicians, families, friends, and colleagues and navigate through crises more successfully by managing negative emotions and obtaining more information.[18] Indeed, the impact of social support has been studied extensively in breast cancer patients where there is a link between social contact, emotional support, and survival.[18]

Limitations

This pilot study has several limitations. First, although it provides directionally significant information, the small sample

size prevented statistical analysis between several groups because our pilot population contained insufficient numbers of non-White and rural participants for comparisons. Indeed, if setting power to 80% and alpha to 0.05, and assuming the same sample distributions, we would need 4,980 cases to detect the observed difference in rate of positive screening for need by race; 1,656 cases to detect the observed difference in rate of positive screening for need by rurality, or 1,032 cases to detect the observed difference in rate of positive screening for need by education. Nevertheless, our data does provide important information for feasibility scoping for multi-site screening which achieves sampling that is representative of the general population of the United States. Utilizing the same assumptions, a sample size of only 1,248 cases would be needed to detect the observed difference in rate of positive screening for need by race.

Additionally, the generalizability of this study may be reduced by both the high homogeneity of the population which limited assessments of the impact of race and rurality on needs, as well as its single site nature. By comparison, a similar study performed in Los Angeles among primarily Hispanic patients reported their population needed help reading hospital materials more frequently than needing more social support.[31] However, we feel these differences in findings further highlight the responsibility of health systems to consider not only the needs of gynecologic oncology patients in general, but of assessing and addressing the unique health equity needs of their own specific populations served.

We compared the current inpatient findings to the outpatient population of our team's previous study Nora et al.[4] However, those surveys were anonymous and obtained by convenience sampling. Given the outpatient survey's anonymous nature and administration over multiple clinic sessions, data independence could theoretically be compromised through repeated sampling of an individual with their resultant overrepresentation in analysis. However, this is logistically unlikely because of the short period of time during which patients were surveyed (two months). Further, while unlikely because of the time course differences, it is possible that previously surveyed outpatients were included in our inpatient sample. However, even if true, when taken alone, our findings have relevance to the needs and social determinant gaps experienced specifically by inpatients receiving gynecologic cares. With timeframes for surveying that crossed the onset of the COVID-19 pandemic, potential time course effects could have been exacerbated by COVID-19's impact upon on access, treatments delays, visitation restrictions, self-isolation, and available family or community social support.

Future directions

Applying an upstream approach to gynecologic oncology involves working to attain health equity or allowing each person to have the opportunity to attain his or her full health potential by striving to address social determinants of health that most impact a population before

they lead to more negative downstream outcomes.[32] More broadly, advancing health equity for gynecologic oncology patients will mean that the greatest needs for this population will first be identified, tracked, and those factors most influential in relation to negative health outcomes will be addressed. Our pilot findings support that greater attention should be paid to the health literacy and social support needs for this population at both the individual and systems' levels of care. Ideally, systems of care will begin to incorporate routine standardized screening for health literacy along with directing greater and appropriate resources to the counseling needs of at-risk patients both in ways which empower and meet their capabilities. In practice, addressing issues of social support will require both screening and systems' engagement with community-based organizations to assure that patients can be well-connected and supported where they live. We hope our results will inspire further study of the unique social determinant needs of the gynecologic oncology population and utilize a larger, more diverse group of women, and with a sufficient period of follow-up to assess how differences in social determinants of health impact treatment, survival, and health outcomes according to disease type, stage, and population demographics. Should such SDoH-related differences exist, both system and individual-based interventions could then be designed, studied, and implemented to improve health quality and outcomes for this unique patient population.

References

1. Social Determinants of Health. World Health Organization, 2020. [cited 2021 December 22]. https://www.who.int/health-topics/social-determinants-of-health#tab=tab_1

2. Temkin SM, Rimel BJ, Bruegl AS, Gunderson CC, Beavis AL, Doll KM. A contemporary framework of health equity applied to gynecologic cancer care: A Society of Gynecologic Oncology evidenced-based review. Gynecol Oncol. 2018 Apr;149(1):70-77. https://doi.org/10.1016/j.ygyno.2017.11.013. PMID: 29605053.

3. Coughlin SS. Social determinants of breast cancer risk, stage, and survival. Breast Cancer Res Treat. 2019 Oct;177(3):537-548. https://doi.org/10.1007/s10549-019-05340-7. Epub 2019 Jul 3. PMID: 31270761.

4. Nora AE, McDonald ME, Syrop CH, Haugsdal ML. Upstream oncology: identifying social determinants of health in a gynecologic oncology population. Proc Obstet Gynecol. 2021;10(2):Article 3 [13 p.]. https://doi.org/10.17077/2154-4751.1507.

5. Institute of Medicine (US) Committee on Assuring the Health of the Public in the 21st Century. The Future of the Public's Health in the 21st Century. Washington (DC): National Academies Press (US); 2002. PMID: 25057638. https://www.ncbi.nlm.nih.gov/books/NBK221239/.

6. Hood CM, Gennuso KP, Swain GR, Catlin BB. County Health Rankings: Relationships Between Determinant Factors and Health Outcomes. Am J Prev Med. 2016 Feb;50(2):129-35. https://doi.org/10.1016/j.amepre.2015.08.024. Epub 2015 Oct 31. PMID: 26526164.

7. Definitions of Food Security. U.S. Department of Agriculture. Economic Research Service, 2020. [updated Sep 9, 2020; cited 2021 August 17].Available from: https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/definitions-of-food-security.

8. Food Insecurity: A Public Health Issue. Public Health Rep. 2016 Sep;131(5):655-657. https://doi.org/10.1177/0033354916664154. Epub 2016 Aug 24. PMID: 28123203; PMCID: PMC5230819.

9. Bruening M, Dinour LM, Chavez JBR. Food insecurity and emotional health in the USA: a systematic narrative review of longitudinal research. Public Health Nutr. 2017 Dec;20(17):3200-3208. https://doi.org/10.1017/S1368980017002221. Epub 2017 Sep 14. PMID: 28903785.

10. Housing instability. In: Healthy People, 2020. U.S. Department of Health and Human Services. Office of Disease Prevention and Health Promotion. [updated Aug 17, 2021; cited 2021 August 17]. https://wayback.archive-it.org/5774/20220414161055/https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-health/interventions-resources/housing-instability.

11. Barakat RR, Markman M, Randall M. Principles and practice of gynecologic oncology. 5th ed. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2009.

12. Ramondetta LM, Sun C, Hollier L, Jarrett L, Folloder J, Tortolero-Luna G, Hughes A, Jhingran A, Brown J. Advanced cervical cancer treatment in Harris County: pilot evaluation of factors that prevent optimal therapy. Gynecol Oncol. 2006 Nov;103(2):547-53. https://doi.org/10.1016/j.ygyno.2006.03.054. Epub 2006 May 30. PMID: 16730784.

13. Bouberhan S, Shea M, Kennedy A, Erlinger A, Stack-Dunnbier H, Buss MK, Moss L, Nolan K, Awtrey C, Dalrymple JL, Garrett L, Liu FW, Hacker MR, Esselen KM. Financial toxicity in gynecologic oncology. Gynecol Oncol. 2019 Jul;154(1):8-12. https://doi.org/10.1016/j.ygyno.2019.04.003. Epub 2019 Apr 30. PMID: 31053404; PMCID: PMC7001853.

14. Kale HP, Carroll NV. Self-reported financial burden of cancer care and its effect on physical and mental health-related quality of life among US cancer survivors. Cancer. 2016 Apr 15;122(8):283-9. https://doi.org/10.1002/cncr.29808. Epub 2016 Mar 14. PMID: 26991528.

15. Kutner M, Greenberg E, Jin Y, Paulsen C. The Health Literacy of America's Adults: Results From the 2003 National Assessment of Adult Literacy (NCES 2006–483). U.S. Department of Education. Washington, DC: National Center for Education Statistics; 2006. https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2006483

16. Whitaker KL, Scott SE, Wardle J. Applying symptom appraisal models to understand sociodemographic differences in responses to possible cancer symptoms: a research agenda. Br J Cancer. 2015 Mar 31;112 Suppl 1(Suppl 1):S27-34. https://doi.org/10.1038/bjc.2015.39. PMID: 25734385; PMCID: PMC4385973.

17. Weiss BD, Blanchard JS, McGee DL, Hart G, Warren B, Burgoon M, Smith KJ. Illiteracy among Medicaid recipients and its relationship to health care costs. J Health Care Poor Underserved. 1994;5(2):99-111. https://doi.org/10.1353/hpu.2010.0272. PMID: 8043732.

18. Chou AF, Stewart SL, Wild RC, Bloom JR. Social support and survival in young women with breast carcinoma. Psychooncology. 2012 Feb;21(2):125-33. https://doi.org/10.1002/pon.1863. Epub 2010 Oct 20. PMID: 20967848; PMCID: PMC3036767.

19. Bélanger E, Ahmed T, Vafaei A, Curcio CL, Phillips SP, Zunzunegui MV. Sources of social support associated with health and quality of life: a cross-sectional study among Canadian and Latin American older adults. BMJ Open. 2016 Jun 28;6(6):e011503. https://doi.org/10.1136/bmjopen-2016-011503. PMID: 27354077; PMCID: PMC4932270.

20. Reynolds P, Boyd PT, Blacklow RS, Jackson JS, Greenberg RS, Austin DF, Chen VW, Edwards BK. The relationship between social ties and survival among black and white breast cancer patients. National Cancer Institute Black/White Cancer Survival Study Group. Cancer Epidemiol Biomarkers Prev. 1994 Apr-May;3(3):253-9. PMID: 8019376.

21. Rural-urban commuting area codes. U.S. Department of Agriculture. Economic Research Service, 2020. [cited 2022 Apr 10]. https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes.aspx

22. Larson S, Correa-de-Araujo R. Preventive health examinations: a comparison along the rural-urban continuum. Womens Health Issues. 2006 Mar-Apr;16(2):80-8. https://doi.org/10.1016/j.whi.2006.03.001. PMID: 16638524.

23. AHC Screening Tool and Guides. In: Accountable Health Communities Model. U.S. Centers for Medicare & Medicaid Services; 2017. [updated Aug 17, 2021; cited 2021 August 17]. https://innovation.cms.gov/innovation-models/ahcm.

24. Chew LD, Bradley KA, Boyko EJ. Brief questions to identify patients with inadequate health literacy. Fam Med. 2004 Sep;36(8):588-94. PMID: 15343421.

25. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)--a metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform. 2009 Apr;42(2):377-81. https://doi.org/10.1016/j.jbi.2008.08.010. Epub 2008 Sep 30. PMID: 18929686; PMCID: PMC2700030.

26. Microsoft Corporation. Microsoft Excel. 2018. Available from: https://office.microsoft.com/excel

27. IBM Corp. IBM SPSS Statistics for Windows. Armonk, NY: IBM Corp; 2020.

28. Jacobs I, Davies AP, Bridges J, Stabile I, Fay T, Lower A, Grudzinskas JG, Oram D. Prevalence screening for ovarian cancer in postmenopausal women by CA 125 measurement and ultrasonography. BMJ. 1993 Apr 17;306(6884):1030-4. https://doi.org/10.1136/bmj.306.6884.1030. PMID: 8490497; PMCID: PMC1677033.

29. Murayama H, Okubo R, Tabuchi T. Increase in Social Isolation during the COVID-19 Pandemic and Its Association with Mental Health: Findings from the JACSIS 2020 Study. Int J Environ Res Public Health. 2021 Aug 4;18(16):8238. https://doi.org/10.3390/ijerph18168238. PMID: 34443988; PMCID: PMC8394951.

30. Aapro M, Lyman GH, Bokemeyer C, Rapoport BL, Mathieson N, Koptelova N, Cornes P, Anderson R, Gascón P, Kuderer NM. Supportive care in patients with cancer during the COVID-19 pandemic. ESMO Open. 2021 Feb;6(1):100038. https://doi.org/10.1016/j.esmoop.2020.100038. Epub 2020 Dec 17. PMID: 33421735; PMCID: PMC7808078.

31. Nyakudarika NC, Holschneider CH, Sinno AK. Universal social needs assessment in gynecologic oncology: An important step toward more informed and targeted care in the public safety net. Cancer. 2021 Oct 15;127(20):3809-3816. https://doi.org/10.1002/cncr.33761. Epub 2021 Jul 12. PMID: 34250590.

32. Advancing health equity in chronic disease prevention and management. U.S. Department of Health & Human Services. CDC. National Center for Chronic Disease Prevention and Health Promotion; 2020. [cited 2021 August 17]. https://www.cdc.gov/chronicdisease/healthequity/index.htm