Association of β -hCG Surveillance with Emotional, Reproductive, and Sexual Health in Women Treated for Gestational Trophoblastic Neoplasia

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Abstract

Background: To assess the emotional, reproductive, sexual health, and relationship concerns of women treated for gestational trophoblastic neoplasia (GTN) and examine associations with β -hCG surveillance.

Methods: This institutional review board approved study surveyed GTN survivors ($n=51$) who received treatment from 1996 to 2008. Fifty-one women, including those actively followed or formerly treated, were surveyed. The survey consisted of background/medical information, the Reproductive Concerns Scale, the Female Sexual Function Index, an item from the Abbreviated Dyadic Adjustment Scale, the Center for Epidemiologic Studies–Depression scale, the Menopausal Symptom Checklist, the Impact of Life Events Scale, and exploratory items.

Results: Mean age at diagnosis was 37.1 years; 41.6 years at study enrollment. Twenty-seven patients (56%) expressed worry about treatment harm and 30 (60%) about recurrence. Twenty percent reported significant depressive symptomatology. Mild cancer-related distress, reproductive concerns, sexual dysfunction, and bothersome menopausal symptoms were noted. Nineteen patients (40%) rated their β -hCG surveillance worry as “high.” Among patients who attempted conception after treatment, 3 of 12 (25%) succeeded in the β -hCG high-worry group versus 13 of 19 (68%) in the β -hCG low-worry group. Survivors with high β -hCG worry had greater reproductive concerns than those with low worry ($p=0.002$) and reported less sexual desire ($p=0.025$). There was no difference in the number of low-worry versus high-worry participants in active surveillance ($p=0.09$).

Conclusion: Our study suggests that cancer-specific distress, sexual health, and reproductive concerns continue to impact women years after treatment. High worry about β -hCG surveillance is negatively associated with the emotional well-being of GTN survivors and possibly influences reproductive attempts and success.

Keywords: gestation trophoblastic neoplasia, β -hCG, reproductive concerns, sexuality, emotional function

Introduction

GESTATIONAL TROPHOBLASTIC DISEASE (GTD) is a heterogeneous group of interrelated tumors arising from the abnormal development of trophoblastic tissue. These

neoplasias represent a continuum that ranges from benign hydatidiform moles to malignant (gestational trophoblastic neoplasia [GTN]) or invasive moles, choriocarcinoma, and placental-site trophoblastic tumors. Women diagnosed with GTN face the mental and emotional shift from experiencing a

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possible pregnancy to the diagnosis of cancer,¹ which is a profound and unique element of this disease. Also unique to this disease is the very sensitive tumor marker β -hCG.

Women are counseled to abstain from pregnancy for at least 1 year during the "active surveillance" (monthly β -hCG checks) and to continue follow-up for an "extended surveillance" period of up to 5 years. During this time, blood β -hCG levels are followed, much like CA-125 in ovarian cancer or prostate-specific antigen (PSA) in prostate cancer. Tumor marker surveillance has been shown to cause significant depressive symptomology if there is a preoccupation with levels. We believe that emotional response to β -hCG levels in GTN patients will have similar findings to that seen in ovarian cancer patients (CA-125)² and prostate cancer patients (PSA).³ Confounding the use of the β -hCG marker is the conflicting meaning of β -hCG values during surveillance. Elevated levels can indicate a cancer recurrence or future healthy pregnancy, which also causes an expected rise in this level. Regardless, β -hCG elevations have the potential to cause significant anxiety for these women.

As survival from this disease is generally expected, psychosocial, fertility, and sexual health issues have a key role in the quality of life of survivors.^{4,5} While treatment outcomes from chemotherapy and surgery have been described, the psychosocial aspects and long-term health consequences have rarely been explored, and research assessing the anxiety related to β -hCG surveillance levels, which clinically appears to mimic PSA or CA-125, is lacking. Existing research typically combines populations of women with a diagnosis of GTD and GTN.⁶⁻⁹ This is a problem based on recent research indicating differences between GTN and benign GTD,^{8,9} although these study cohorts had short follow-ups (1-36 months) and small sample sizes of GTN patients ($n=8-17$).⁹ It is important to understand the impact of β -hCG monitoring in GTN survivors using a larger sample size and broader range of follow-up and examine how it relates to mental wellness to comprehend the meaning of survivorship for these women. Our cohort consists of women diagnosed with GTN and treated with chemotherapy at a cancer center. The study objectives were to examine emotional function (depression and distress), reproductive concerns, sexual health, and relationships in women diagnosed and treated for GTN and investigate the association of β -hCG laboratory surveillance with these outcomes.

Materials and Methods

Study design

This was an institutional review board approved study questionnaire surveying GTN survivors who received or completed treatment at Memorial Sloan Kettering Cancer Center (MSK, New York, NY) from 1996 to 2008. Fifty-one women were enrolled on study.

Recruitment

Potential research subjects were identified by a member of the patient's medical team, the protocol investigator, or a research team member at MSK. Between 1996 and 2008, 81 women were treated for GTN at MSK. Potential subjects were sent an introductory letter describing the study and introducing the study staff, which was signed by their treating

physician. Four to six weeks after mailing the introductory letter, eligible women were contacted (by telephone or in the clinic) to provide greater detail about the study and to request their participation. Upon obtaining consent, the participants were mailed or given a one-time self-administered study.

Study survey

Background information form. This form collected general medical information, including new medical conditions since cancer treatment, current medications such as hormone replacement therapy, marital/partner relationship status, whether or not conception was attempted, and number of pregnancies and outcomes since treatment.

Exploratory items. Worry about β -hCG surveillance values and recurrence was assessed on scales from 0 ("none") to 10 ("very").

Reproductive concerns scale. The reproductive concerns scale (RCS) is a 14-item measure designed by Wenzel et al. to assess the female cancer survivor's concern after her reproductive ability has been impaired by cancer treatment; the measure has strong internal consistency (0.91) and is based on a scale of 0 ("not at all bothered") to 4 ("very relevant"). A total RCS score is produced by summing responses of all 14 items (range 0-56), such that a high score represents more reproductive concerns. There are no clinical cutoff scores for the RCS.¹⁰

Female sexual function index. The female sexual function index (FSFI) measures self-reported female sexual function. It contains 19 multiple-choice items assessing six domains of sexual function: (1) desire, (2) subjective arousal, (3) lubrication, (4) orgasm, (5) satisfaction, and (6) pain/discomfort. This scale has excellent internal consistency (0.89-0.97) and test-retest reliability (0.79-0.88) for each subscale¹¹ and has been validated for use with cancer survivors.¹² Scores ≤ 26.55 indicate clinically significant sexual dysfunction.¹¹

Abbreviated Dyadic Adjustment Scale. The Dyadic Adjustment Scale (DAS) is a general measure of satisfaction in relationships.¹³ The item from the abbreviated DAS (ADAS) measure designed by Sharpley and Rogers was used in this study.¹⁴ Participants were asked to rate their "degree of happiness, all things considered, in their relationship" on a scale of 0 to 6 (0 "extremely unhappy," 1 "fairly happy," 2 "a little happy," 3 "happy," 4 "very happy," 5 "extremely happy," or 6 "perfect"), with higher scores indicating greater relationship satisfaction and dyadic adjustment.

Center for Epidemiologic Studies-Depression. The Center for Epidemiologic Studies-Depression (CES-D) is a measure widely used to assess clinical and nonclinical depression levels. It has excellent internal consistency reliability (alpha coefficient=0.85) and has been shown to correlate with depression severity. Scores ≥ 16 suggest clinically significant depression.¹⁵

The Menopausal Symptom Checklist. The Menopausal Symptom Checklist (MSCL) was devised by the National

Surgical Adjuvant Breast Project for use in the P-1 and P-2 breast cancer chemoprevention trials. It contains 36 items querying physical and psychological symptoms associated with estrogen deprivation over the past 4 weeks (0 “not at all bothered” to 4 “very bothered”). There are no clinical cutoff scores for the MSCL; however, the more the symptoms indicated, the more symptomatic the patient is.¹⁶

Impact of Life Events Scale. The Impact of Life Events Scale (IES) is a measure focusing on intrusive thoughts and avoidance associated with a stressor, in this case cancer-related distress.¹⁷ The IES has been used extensively in cancer patient populations. It yields two subscales, avoidance and intrusive thoughts, and a total score. Total score clinical cutoffs are: subclinical (0–8), mild (9–25), moderate (26–43), and severe (44+) levels of distress.

Data analyses

Descriptive statistics was calculated for the total sample. Of the 51 study participants, 48 had evaluable data specific to β-hCG worry. Comparisons between a low worry (0–4) and high worry (5–10) scoring group were performed using independent sample *t*-tests for continuous variables and Fisher’s exact tests for categorical variables.

Results

Total sample

Of the 81 women treated for GTN at MSK between 1996 and 2008, 51 women (60%) with a diagnosis of GTN were surveyed. This included women being followed in active surveillance and formerly treated patients identified from the MSK database. The majority of the patients were Caucasian (84%, *n*=43), married/cohabiting (84%, *n*=43), and had children (82%, *n*=42) (Table 1). Mean age at diagnosis was 37.1 years (range 18–52 years) and 41.6 years (median 41.3 years; range 22.6–57.2 years) at study enrollment. The mean number of years since diagnosis was 4.5 years (median 3.7 years; range 3 months–12 years). While no patients were

TABLE 1. PATIENT CHARACTERISTICS AND DEMOGRAPHICS

Characteristic	No. of patients (N = 51)	SD
Age at diagnosis	37.1	7.5
Age at study enrollment	41.6	7.9
Time since diagnosis, years	4.54	3.14
Marital status, <i>n</i> (%)		
Single	2 (4)	
Married/partner	43 (84)	
Divorced/separated	6 (12)	
Children, <i>n</i> (%)		
Yes	42 (82)	
No	9 (18)	
Race, <i>n</i> (%)		
White	43 (84)	
Black	4 (8)	
Asian	2 (4)	
Unknown	2 (4)	

SD, standard deviation.

receiving active chemotherapy during the time of the survey, 23 survivors were undergoing active β-hCG surveillance with monthly β-hCG level monitoring.

Table 2 presents the medical characteristics and recurrence concerns of the total sample. Five GTN patients (10%) reported a recurrence consisting of choriocarcinoma (1), a complete mole (2), a new partial mole, or unspecified (1). Sixty-five percent (*n*=32/49) of the women had attempted conception after treatment. Sixteen of 32 women had successful pregnancies posttreatment: 10 women (30%) reported at least 1 pregnancy; 5 (15%) reported 2 pregnancies; and 1 (3%) reported 3 pregnancies. Participants were queried about any “worry about recurrence with other pregnancies”; 60% (*n*=24/40) stated they were; however, 50% indicated that “they worried less about recurrence with pregnancy over time.”

Fifty-six percent (*n*=27) expressed worry about harm to their body from their GTN treatment. Thirty women (60%) indicated that they were worried about disease recurrence. On a scale from 0 (“none”) to 10 (“most worried”), 18 women (38%) rated their worry as 5 or higher.

Table 3 presents the means for the main outcomes of our sample of GTN patients. Emotional function was evaluated

TABLE 2. MEDICAL CHARACTERISTICS AND CONCERNS (N=51)

Variable	No. of patients (%)
Cancer history	
GTN recurrence	
Yes	5 (10)
No	44 (90)
Reproductive history	
Attempted conception after GTN treatment	
Yes	32 (65)
No	17 (35)
Number of successful pregnancies	
One pregnancy	10 (30)
Two pregnancies	5 (15)
Three or more pregnancies	1 (3)
Reproductive concerns	
Worry about GTN recurrence with other pregnancies	
Yes	24 (60)
No	16 (40)
Cancer concerns	
Worry about medical harm from GTN treatment	
Yes	27 (56)
No	21 (44)
Worry about GTN recurrence	
Yes	30 (60)
No	20 (40)
Degree of worry about GTN recurrence (0 “none” to 10 “most worried”)	
0–4	30 (63)
≥5	18 (38)

GTN, gestational trophoblastic neoplasia.

TABLE 3. PATIENT-REPORTED OUTCOMES

<i>Study outcomes</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Min.</i>	<i>Max.</i>
Center for Epidemiologic Studies–Depression total score	51	10.5	8.86	0	33
Impact of Life Events Scale: intrusive subscale score	50	8.0	7.53	0	25
Impact of Life Events Scale: avoidance subscale score	50	8.8	8.83	0	29
Impact of Life Events Scale: total score	50	16.8	14.33	0	47
Menopausal Symptom Checklist total score	50	19.3	15.13	0	62
Reproductive Concerns Scale total score	49	15.0	11.28	0	39
Female Sexual Function Index total score	48	20.2	11.14	1.8	33.9
Abbreviated Dyadic Adjustment Scale item	36	3.67	1.49	3	5

with measures of depression (CES-D), distress (IES), and reproductive concerns (RCS). The mean CES-D total score was 10.5, falling below the clinical cutoff (16+), with only 20% of the sample scoring in the range suggestive of depression. The IES total mean score was 16.8, indicating a mild level of distress (9–25). Reproductive concerns were also prevalent, with a mean score of 15.00.

In regards to sexual function, 71% ($n=34$) reported being sexually active, but the mean FSFI total score was 19.8 and 58% scored in the range indicating sexual dysfunction (≤ 26.55). The mean MSCL score was 19.3, indicating that our GTN survivors had bothersome menopausal symptoms. Participants had a mean score of 3.67 on the ADAS, suggesting that the GTN survivors were “happy” to “very happy” in their relationships.

Group comparisons by low β -hCG surveillance worry versus high β -hCG surveillance worry

In this cohort of survivors, 29 patients (60%) rated their β -hCG surveillance concern as low (0–4), and 19 (40%) rated their β -hCG surveillance concern as high (5–10) (Table 4). Mean age at diagnosis was 37.1 years for the β -hCG low-worry group and 35.5 years for the β -hCG high-worry group ($p=0.43$). Over 85% (41/48) of the patients were married or living with a partner (β -hCG anxiety low 86% [25/48] and β -hCG anxiety high 84% [16/48]; $p=0.99$). There were no statistical differences between patients based on their medical condition (β -hCG at diagnosis, recurrence, and years since diagnosis), histology of GTN, chemotherapy regimen received, or completion of active surveillance. The median range since diagnosis for the low-worry group was 4.7 years (range 1.1–12.1) and 2.9 years for the high-worry group (range 3 months–9.3 years). Some of these participants fell into the period of time during which they should have abstained from pregnancy, as they were within the 1-year period of active surveillance after diagnosis.

Thirty-one GTN survivors reported trying to conceive (70% [$n=19$] in the β -hCG low-worry group and 63% [$n=12$] in the β -hCG high-worry group). Of these women attempting conception, only 3 of 12 (25%) succeeded in the β -hCG high-worry group versus 13 of 19 (68%) in the β -hCG low-worry group ($p=0.029$). Survivors with high β -hCG worry had greater reproductive concerns (RCS mean score 21.1) than those with low β -hCG worry (RCS mean score 10.6) ($p=0.002$). The FSFI sexual desire score was lower in the β -hCG high-worry group compared with the β -hCG low-worry group (mean 3.1 vs. 2.3; $p=0.025$).

Women with higher β -hCG surveillance worry described more symptoms of cancer-related distress, with IES total mean scores of 23.6 versus 12.9 in the β -hCG low-worry group ($p=0.02$); the groups differed on the IES intrusive thoughts subscale ($p=0.002$) but not on the IES avoidant subscale ($p=0.287$). Thirty-seven percent of survivors with a high-worry level about their β -hCG value were classified as depressed by the CES-D compared to 10.3% of patients with a low-worry rating ($p=0.036$). Worry about β -hCG also persisted for these women over time. Ninety-four percent of the women with high β -hCG worry reported concern about recurrence and new malignancies. More patients in the higher scoring group accepted professional counseling referrals.

Discussion

GTN survivors are a unique group of cancer patients in that they are young, of reproductive age, and have a high chance for cure. Overall, the results from our sample of GTN patients are consistent with the findings seen in other GTD and GTN populations, as well as in other gynecologic cancer survivors for sexual function and issues of mood. Our sample's mean FSFI score of 19.8 was comparable to gynecologic cancer survivors with cancer-related infertility (22.09),¹⁸ cervical cancer survivors treated with fertility-preserving surgery (21.97),¹⁹ and GTD survivors (23.60).⁶ The same was seen for measurement of mood (CES-D), with average mean scores ranging from 10 to 11 (gynecologic cancer survivors 11.32; cervical cancer fertility-preservation group 10.04; and GTD 10.0), below the clinical cutoff suggestive of depression, consistent with prevalence rates of depression in cancer patients (15%–28%). However, in the high-worry group, 37% met the clinical cutoff for depression. Di Mattei et al. also found higher depression in GTN patients (compared to GTD patients) in their sample of early surveillance (1–36 months).²⁰

Not surprising, reproductive concerns and menopausal symptoms in our GTN sample were prevalent (mean = 15.04 and mean = 19.26, respectively), but less in comparison to gynecologic cancer survivors with cancer-related infertility (mean = 26.80 and mean = 24.88, respectively). The level of distress was greater in our GTN patients (IES total score mean = 16.76) than in other GTD patients (mean = 9.52) and in a cervical cancer fertility-preservation group (mean = 24.88). Infertility-related distress has been noted in young GTD patients during surveillance.²⁰

The specific tumor marker (β -hCG) followed in GTD/GTN patients as surveillance for their disease could be contributing

TABLE 4. COMPARISON OF PATIENTS WITH LOW VERSUS HIGH WORRY SURROUNDING SS-hCG SURVEILLANCE

Variable	<i>β</i> -hCG worry low (<5) (n = 29)	<i>β</i> -hCG worry high (≥5) (N = 19)	p	N
Starting β-hCG value at diagnosis, mean (SD)	35,030 (71,704)	52,063 (113,265)	0.57	46
Diagnosed with GTN within last 5 years, n (%)			0.47	47
No	13 (46)	6 (32)		
Yes	15 (54)	13 (68)		
Years since diagnosis, mean (median; range)	5.19 (4.7; 1.1–12.1)	3.73 (2.9; 3 months–9.3 years)	0.12	47
Experienced recurrence of GTN, n (%)				46
No	23 (85)	18 (95)	0.39	
Yes	4 (15)	1 (5)		
Attempted conception, n (%)				46
No	8 (30)	7 (37)	0.85	
Yes	19 (70)	12 (63)		
Number of successful pregnancies after GTN treatment, n (%)			0.04	48
0	6 (32)	10 (77)		
1	7 (37)	3 (23)		
2	5 (27)	0 (0)		
3	1 (5)	0 (0)		
Symptom checklist, mean (SD)	18.4 (16.4)	21.3 (13.7)	0.51	47
Reproductive concerns score, mean (SD)	10.6 (8.85)	21.1 (11.1)	0.002	47
Female sexual function index				
FSFI total score, mean (SD)	21.7 (11.8)	19.1 (10.7)	0.24	45
Desire	3.09 (1.30)	2.27 (1.09)	0.03	47
Arousal	3.41 (2.33)	2.61 (1.97)	0.21	47
Lubrication	3.62 (2.43)	3.19 (2.46)	0.56	46
Orgasm	3.48 (2.36)	3.16 (2.35)	0.66	45
Satisfaction	3.62 (2.00)	3.30 (1.74)	0.57	44
Pain	3.98 (2.56)	3.22 (2.65)	0.34	45
Sexually active, n (%)	20 (69)	13 (68)	0.99	48
Scoring below clinical cutoff (26.6)—sexual dysfunction, n (%)	12 (46)	14 (74)	0.12	45
Center for epidemiologic studies—depression				
CES-D total score, mean (SD)	8.5 (7.7)	14.3 (9.96)	0.039	48
Scoring below clinical cutoff (16+)—depression, n (%)	3 (10)	7 (37)	0.036	48
Impact of life events scale				
IES total score, mean (SD)	12.9 (11.8)	23.6 (16.2)	0.02	47
Intrusive thoughts subscale, mean (SD)	5.04 (5.3)	12.7 (8.6)	0.002	
Avoidant behavior subscale, mean (SD)	7.9 (8.04)	10.9 (10.1)	0.287	
Abbreviated Dyadic Adjustment Scale, mean (SD)	3.9 (1.7)	3.31 (1.3)	0.267	33
Concerned about medical harm from GTN treatment, n (%)				38
Yes	14 (50)	13 (72)	0.235	
No	14 (50)	5 (28)		
Concerned about GTN recurrence, n (%)				47
Yes	12 (41)	17 (94)	0.001	
No	17 (59)	1 (6)		
Concerned about developing new cancer, mean (SD)	3.25 (2.6)	6.39 (2.6)	0.001	48
Active surveillance during survey, n (%)				37
Yes	8 (38)	5 (31)	0.09	
No	13 (62)	11 (69)		
Feelings about β-hCG surveillance have changed over time, n (%)				47
Yes	27 (93)	8 (44)	0.001	
No	2 (7)	10 (56)		
Counseling was offered, n (%)				48
Yes	17 (65)	12 (63)	0.99	
No	9 (35)	7 (37)		
Counseling was accepted, n (%)				48
Yes	4 (14)	10 (53)	0.013	
No	24 (86)	9 (47)		

p Values for group differences in continuous variables are from independent sample *t*-tests. *p* Values for group differences in categorical variables are from Fisher's exact tests.

CES-D, Center for Epidemiologic Studies—Depression; FSFI, female sexual function index; IES, Impact of Life Events Scale; *N*, overall number of patients in analysis; *n*, number of patients in subgroup.

to some of the observed distress. We assessed if the concern surrounding β -hCG surveillance was similar to the concern seen in other cancer types.^{2,3} Despite no difference between β -hCG values at diagnosis in the low- and high-worry groups, in this study, a surprisingly large number (40%) of patients had high worry around β -hCG surveillance. Greater β -hCG worry was associated with depression and intrusive cancer-related thoughts, especially concerns about recurrence and development of new cancers. Twenty percent of our sample also demonstrated signs and symptoms of depression, consistent with the cancer literature.^{4,21–23} Wenzel et al. reported that greater than 30% of GTD survivors surveyed mourned their pregnancy loss.²¹ In addition to depression symptoms, reproductive concerns were also expressed by our sample, with over half indicating worry about recurrence with a future pregnancy that persisted over time for half of the sample. The high level of β -hCG worry was also associated with the fear of developing new cancer, supporting the findings of previous studies noting severe anxiety in GTD survivors surveyed.⁴ This was particularly concerning since most women surveyed were more than 3 years from treatment and well into a category of likely cure.

Sexual dysfunction independent of time from diagnosis, age, children, or chemotherapy requirement⁴ has also been noted in the literature. Our study used a validated measure of sexual function and was consistent with these findings, showing that higher β -hCG surveillance worry was also associated with poorer sexual functioning and elevated future reproductive concerns. This information is important, as researchers have shown that issues concerning future fertility and pregnancy outcomes, as well as overall sexual health, have a key role in the quality of life of survivors.²¹

Research has shown that patients reporting the highest quality of life scores had less disease-specific distress, greater social support, and were more likely to have had children following their treatment.²¹ In our study of reproductive-aged women, reproductive outcomes differed between low and high β -hCG anxiety, with fewer pregnancies and greater reproductive concerns seen in the β -hCG high-worry group. Anxiety surrounding β -hCG laboratory testing may negatively impact emotional wellness, but in high β -hCG worriers, it may also limit their reproductive attempts and influence conception success. Out of the 31 women who reported attempts at conception, only 3 of 12 in the β -hCG high-worry group conceived. The relationship between stress and conception has been investigated in the field of reproductive medicine. Researchers have shown that stress reduces probability of conception,²⁴ and relaxation interventions can improve pregnancy rates.^{25,26} It appears that GTN patients may be an ideal group to target for this type of intervention or referral for counseling. Consistent with the literature, Wenzel et al. found that 75% of GTD survivors indicated that if a counseling program or support group were available following their diagnosis, they would have participated, and greater than 50% would have enrolled in such a program 5–10 years after their diagnosis and cure.²¹ A multidisciplinary approach providing education and support has been recommended for both GTD and GTN patients.^{8,9,20} Our sample of GTN survivors, with high levels of anxiety surrounding their β -hCG surveillance, was more in favor of professional counseling than our low-worry group.

Although this is one of the largest studies with GTN patients, the small sample size is a limitation of this article. The

rarity of GTN creates research challenges of sample size, recruitment, and ultimately, concerns about generalizability and ability to detect subtle differences within subgroups. For example, the median time since diagnosis differed between the low- and high-worry groups; however, we were unable to detect a significant difference, which may have been associated with small sample sizes within these subgroups.

In addition, our study design was retrospective, and ideally, the preferred design would have been a prospective study investigating the outcomes presented in this article. We were unable to track specific time points of conception and pregnancies for participants, as we only inquired about rates and frequency.

We were pleased to see that the women most in need of support were receptive to it. Unfortunately, specific information about access and engagement of services was beyond the scope of this study. Future studies should prospectively follow patients over time with multiple assessments to determine the potential impact of education, support, conception, and time of live birth on level of worry after chemotherapy treatment in GTN survivors.

Conclusions

The strengths of this study are its approach, by screening and including GTN patients only, and assessment years after treatment. The majority of the studies in the literature have combined benign (GTD) and malignant forms (GTN). Our findings provide evidence that cancer-specific distress, sexual health, and reproductive concerns continue to impact women years after the completion of treatment. It also emphasizes that there is an important role for support groups and counseling services in these young patients to reduce distress and depression surrounding their high worry about β -hCG both during and after surveillance, as well as possibly to enhance attempts and success in building a future family. Future studies may consider investigating the impact of GTN on partners and prospectively following the impact of providing supportive/educational services to women coping with GTN to determine the psychological and reproductive outcomes over time. This study also highlights the need for future longitudinal research that tracks an individual's worry about β -hCG surveillance and fertility-related issues over time. The present study assessed worry at one point in time, and therefore, the sample was dichotomized into two groups; however, future research could consider tracking trends in β -hCG surveillance worry over time.

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