



Losses and Gains of Psychosocial Resources: Effects on Stress Among Women Undergoing Infertility Treatments and Participating in Social Network Systems

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Abstract

This theory-driven study assessed the association between infertility-related stress and perceived losses of psycho-social resources; and the buffering effect of resource gains and type of infertility (primary/secondary) on this relationship, among women who participate in online infertility-related social network systems (SNS). Ninety women participating in infertility-related SNS completed online questionnaires assessing resource losses and gains and stress levels. Results: Resource loss significantly predicted stress ($\beta = .66, p < .001$). Resource loss and the number of children were correlated negatively ($r = -.22, p < .05$). Residency was significantly related to resource loss ($r = -.23, p < .05$) and perceived stress ($r = -.23, p < .05$). Israeli participants reported lesser resource loss and lesser perceived stress, compared to participants from other countries. Surprisingly, neither resource gains related to SNS participation nor infertility-type served as moderators in the relationship between resource loss and stress. The association between resource loss and stress supports COR theory formulation of stress etiology. However, while participants noted significant resource gains from use of SNS, these did not buffer the effects of resource loss on stress. Thus, although it may be enticing to turn to SNS for social support, individuals with infertility need to be encouraged to use face-to-face social support too.

Keywords Infertility · Stress · Online social network systems · Resource loss · Resource gains

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Introduction

Infertility (IF) has been proclaimed by the World Health Organization as a world-wide health problem [1] with one in every ten couples of reproductive age experiencing trouble attaining or maintaining pregnancy [2–4].

Empirical studies as well as anecdotal evidence of stress associated with IF portray a population at risk for high levels of distress and reduced quality of life. Most IF treatments are associated with a significant degree of stress-invoking and distress [5–9], be it hormonal changes, scheduled sex, awaiting outcomes and/or financial expenses, any and all of which may interplay and add to the already present physiological, emotional and psychological burden experienced by the infertile couple.

Existing studies tend to list a variety of factors that are considered as potential stressors. We propose that theory-driven research that formulates causes and correlates of IF distress may help healthcare providers offer professional support and aid in promoting higher quality of life for infertile couples. Thus, the first aim of the current research was to formulate IF and IF treatment stress through adopting a theoretical approach based on the Conservation of Resources Theory [10]. This theory-driven analysis suggests that IF-related stress results mainly from the loss of important psycho-social resources that women coping with IF experience. Specifically the study aimed to assess the extent to which perceived loss of a variety of psycho-social resources is associated with IF related stress.

Recent studies reveal that a significant proportion of Internet users utilize it for health-related issues, including infertility [11–14]. The use of Social Network Systems (SNS) helps women with IF meet their informational needs as well as emotional and social support needs [15]. Such findings suggest that participation in SNS is an important and accessible stress buffering coping activity. Therefore, using the same theoretical approach as above, the second aim of the research was to assess the moderating role of resources gained through participation in SNS, on the association between resource loss and stress among women in treated for IF.

The third aim of the current research was to explore the role of the type of IF (primary or secondary) as a moderator in the relationship between losses (due to IF) and stress.

Infertility and its Treatment - Background

Clinically, IF is defined as the failure to conceive or carry a pregnancy to full term after a 12-month period of regular and unprotected sexual intercourse [16]. The term infertility is broad and may be divided into sub-categories, namely primary and secondary IF; with primary IF applying to a case where no prior conception or full-term pregnancy has occurred and secondary IF being when IF ensues after a successful pregnancy has been achieved in the past [17]. IF may result from a wide gamut of causes that can be grossly divided into four main categories: (i) *female factor IF* (ii) *male factor IF* (iii) *combined factor IF* (iv) *unexplained IF*.

The particular cause of IF will dictate the most appropriate treatment. Treatments range from being relatively minor; to extremely invasive and disruptive of daily life. Typically, IF treatments divide into three main categories (i) medication (oral or intra-muscular injections), (ii) surgical treatment to restore fertility, and (iii) assisted reproductive therapy (ART), most commonly of IUI (intrauterine insemination) and IVF (in vitro fertilization).

A Conceptual Model for Analyzing Stress Related to IF and its Treatments

Conservation of Resources Theory is a model describing the etiology and essence of stress [10]. The premise of this theory is based on the fundamental tenet that people constantly strive to attain and protect that which they value i.e. their resources. People depend on, use and become considerably invested in these resources, and when these resources are threatened, lost, or cannot be replenished psychological stress occurs. Resources are valued entities that promote an individual's survival and well-being. COR defines four categories of resources: personality traits (e.g. self-confidence), objects (e.g. property), conditions (e.g. financial security or social support) and energies (e.g. time or knowledge). According to COR there are three circumstances in which stress can occur (i) if an individual loses his/her resources (ii) if an individual's resources are at risk of being lost (iii) if an individual has lost resources and fails to gain new ones [18]. COR is built on the tenet that the loss and gain (or lack of gain) of resources will determine the degree of stress experienced. Hobfoll emphasizes that it is both real and perceived loss of and failure, or expected failure of gain, of resources that causes stress.

Nevertheless, according to COR, the effects of resource loss on stress levels may be moderated by resource gains. In the present case, we focused on participation in social network systems (SNS) as a way of eliciting important psycho-social resources such as social support for coping with the challenges of IF and its treatments. Specifically we explored the moderating effects of infertility-related resource gains on the association between resource loss and stress, among women undergoing IF treatments and participating in social network systems.

Common Losses of Psycho-Social Resources Among Women with IF

Loss of Self-Esteem and Self-Image IF may have serious implications for self-esteem and self-image [19] by threatening gender-roles and identity and leaving individuals feeling incomplete and incompetent in their expected and much anticipated roles to establish families [20–23]. Assumptions, both self-imposed and societally implored, of one's ability to have children tend to form an integral part of one's gender identity and self-worth. When these assumptions are challenged it is common to experience loss of self-esteem and self-value [19–21, 23, 24].

Loss of Control and Sense of Certainty Couples facing IF often complain about loss of control and an overwhelming sense of uncertainty over their future. Many report a lack of control over their bodies, and even the sensation that they have been betrayed by their bodies [25]. Together with lack of control and helplessness over the medical procedures endured, couples report uncertainty due to lack of information explained to them by medical health professionals [26].

Loss of Mental Health/ Psychological Well-Being Couples battling with IF exhibit escalated measures of anxiety, depression and psychological distress, with markedly diminished well-being as compared to their fertile counterparts [7, 9, 20, 22, 27–33]. **Loss of hope:** After arduous failed treatments, long periods of waiting and/or a series of other factors (e.g. age, exposure to others who have had unsuccessful treatments, lack of financial means) one may lose hope in the possibility of bearing children [22]. The hope in fulfilling the dream and aspiration of having children, and a family life, at times seems to be crushed and this can be exceptionally challenging [34]. **Loss of social support:** Many women experiencing IF admit

to feelings of social isolation - whether self-inflicted or imposed by others [8, 12, 35, 36]. Staggering numbers of women claim that family members and close friends are insensitive to their pain and struggles, and report feelings of loneliness, both emotional and physical due to being excluded as well as their choosing not to participate in social events.

The negative sense of social difference or negative social deviance may result in feelings of inadequacy and devaluation [37]. A wealth of research reveals that stigmatization is directly related to fertility-related distress as well as lower perceived support [38].

Loss of Marital Satisfaction There are anecdotal findings on the impact of IF on marital satisfaction. For some the struggle of IF tends to draw the couple closer, for others the stress of IF leads to marital discord [28, 39, 40]. IF may deeply impact the way in which individuals view themselves and their marital relationships [39, 41–43]. When grappling with IF many experience a strain on their sexual life and satisfaction, difficulty in communication in the dyad that is the couple, emotional turmoil (experienced by each partner and the couple as a whole) due to the IF diagnosis and treatments, as such a loss of marital satisfaction is not uncommon among these couples.

Loss of Physical Functioning Treatments may include side effects such as pain, discomfort, loss of energy, emotional instability, headaches, weight gain (e.g. due to hormonal treatment) [28]. These physical effects may be viewed as loss of normative physical functioning or feeling for the individual.

Expenses IF treatments may involve substantial financial investment which may often exceed the couple's financial means and leads to a sense of insecurity.

Failure to Acquire New Resources Failure to conceive or maintain a full-term pregnancy, also implies failure to acquire new resources i.e. children or family life [34]. This abyss in the ability to accrue (the resource of) children has several implications: it impedes the ability to acquire elevated self-esteem, hope, new and extended social support (e.g. developing or strengthening relationships with other parents), belonging, peace of mind (which is often unsettled when/if one fears one may not be able to have children), enhanced marital satisfaction (both from embarking on the role of parenthood together and in the case of IF, having the strain of IF worries and treatment-related problems removed), religious fulfillment (this resource pertains to observant individuals).

Resource Gains

In accord with COR theory, when faced with a loss of resources, one will strive to gain other resources [10]. Personal discussions with infertile individuals and anecdotal evidence sometimes reveal themes of resource gains. Some comment that their struggle with infertility has been a humbling spiritual and religious experience, allowing them to be more appreciative of the “blessings” they have in their lives (which prior to the ordeal with IF, would most likely be taken for granted), led to improved marital relationships and social support (from “real friends” and family). IF treatment may invoke similar resource gains and may also offer improved physical comfort (e.g. hormonal treatment such as Metformin for PCOS may help lower cholesterol and reduce coronary heart disease [44]; weight-loss to help promote fertility may cause individual to feel healthier unrelated to infertility issues [45]).

Psycho-Social Resources Gained through Participation in Online IF Networks

Women undergoing infertility treatment have both high informational needs as well as emotional, social and psychological support needs. These are increasingly met by joining social network systems [15] that may serve as a highly valued resource or a pool of resources.

An expanding body of literature explores the benefits, and uniqueness, of SNS. Malik and Coulson [26] list prominent benefits that are unique to the online social support. For example, the convenience and constant availability of online forums was viewed as appealing to participants. These aspects were described as having an advantage over regular face-to-face communication and social support. Furthermore, participants in online infertility forums expressed the notion that having a community of others who were also experiencing the trials and tribulations of infertility was both comforting and allowed them the freedom to express their (negative) feelings, something which they felt they could not do with people who could not relate to their IF struggles. Additionally, participation in online IF networks functioned to diminish the sense of social isolation experienced by many who were coping with IF through a sense of belonging, camaraderie and a means of normalizing their (difficult) emotions. Many participants claimed that the empathy received was unmatched by that from others who were not themselves experiencing IF. Another benefit of SNS mentioned was as a source of information and learning from others' experiences and opinions. This information gained further helped them approach their medical health professionals with knowledge of their condition and options, thereby empowering them and affording them a sense of control over their circumstances.

Another advantage of SNS listed was improved marital relationships. Many women experience social isolation as an innate consequence of IF. A prominent portion of these women felt they could only disclose their hardships to their partners; the partner thus became the only confidant and single source of social support [26]. This phenomenon caused tension, placing strain on the partners and on the relationship. When SNS become a source of social support and resource with which to share their hardships, a marked improvement was noted in the relationships with their partners [26, 46].

Type of Infertility

The term IF refers to a spectrum of types and intensities of IF, each with its own prognosis, treatments and stigmas. IF is typically considered either primary or secondary. Secondary IF is often perceived as less severe as parenthood has already been achieved and some of the series of losses that accompany the struggle with IF are no longer relevant or watered down. Secondary IF has by and large been neglected in the research, yet it presents its own challenges, losses and stressors and warrants sufficient attention and empathy [47]. The type of IF experienced (primary or secondary and furthermore male, female, unknown, combined factors) and its etiology (genetic, life-style, acquired) can greatly influence the impact(s) of IF [14, 48].

Hypotheses

- (1) Loss of resources will be positively associated with stress among study participants.
- (2) Resource gains, as provided through participation in SNS, will moderate the relationship between resource loss and stress.

- (3) The relationship between resource losses and stress will be moderated by the type of IF experienced.

Methods

Participants and Procedures

The study included a total of anonymous 90 participants. The inclusion criteria were women of fertility age (20s–40s) facing IF and participating in SNS related to IF. Exclusion criteria were women not of fertility age and not facing IF. Initially the participants were members of a variety of English online Jewish IF forums namely Facebook groups called *IIs (Israel Infertility Support)*, *PIF (Primary Infertility)*, *EPIFS (Expecting- Primary Infertility Support)*, *Frumcysters* and an online forum called *Yesh Tikva*. As the initial efforts (i.e. Jewish SNS) did not yield the required number of participants, additional participants from English-speaking SNS and not specifically Jewish forums were included. These SNS were Facebook groups, namely *Childless not by Choice*, *TTC [Trying to Conceive] after Miscarriage and Loss*, *Secondary Infertility*, *The Infertility Journey*, *First Time Moms Real Talk* and *Infertility Talk*. Later, the research questionnaire was translated into Hebrew and posted on a Hebrew IF group, namely ‘*Trufot Poriyut-Mosrot b’Ahava*’. The final composition of the sample is described in the results chapter.

The study was approved by the Institutional Review Board (Ethical Committee) of the university. A brief description of the research was posted on the relevant SNS forums describing the aim of the research as well as a request for members of the SNS to participate anonymously in the research. When participants clicked the link they were directed to a webpage describing the aims and process of the current research. The participants were informed that by clicking on the “continue” button they gave their consent to participate in the research.

The demographic questionnaire, Perceived Stress and Psychological Resources questionnaires appeared on-line and participants were asked to select their appropriate answer by clicking the appropriate boxes.

Measures

Demographic Questionnaire

This questionnaire included items relating to nationality, age, level of religiosity, marital status, level of education, number of children, type of IF (i.e. primary or secondary; male factor, female factor, combined or unexplained), duration of time trying to conceive, current or past fertility treatments.

Perceived Stress Scale

Cohen’s (1988) Perceived Stress Scale (PSS) is the scale most widely used to measure stress perception. It contains 10 items and aims to measure the extent to which situations in one’s life are viewed as stressful in the past month, using a scale of 0–4 (0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often). For example, “In the last

month, how often have you felt that you were unable to control the important things in your life?” Scoring of PSS is obtained by reversing four positively stated items and then summing across all of the scale items.

Psychological Resources Loss and Gain Lists

Two separate lists were compiled for the present study to assess the extent of resources that are either lost or gained through the process of IF, IF treatments and SNS participation (See [Appendix](#)). The lists were collected through survey of the relevant literature on IF and its treatments, analysis of content on various IF SNS platforms, as well as personal and anecdotal experience of the researcher and peers. Participants are asked to rate the extent to which they have experienced loss of 21 psycho-social resources, over the past 6 months, on a scale from 0 to 4 (0 = not at all/not applicable – 4 = to a great degree). For example: “Feeling that I have control over my body”. Similarly, participants are asked to rate the extent to which they have experienced gains, through participation in SNS, of 21 resources over the past 6 months, on a scale from 0 to 4 (0 = not at all/not applicable 4 = to a great extent). For example: “A sense of belonging and community”.

Type of Infertility

Participants recorded in the demographic questionnaire whether their infertility is primary or secondary.

Statistical Analysis

Univariate analyses of possible relations between stress and each of the independent variables were performed. Multivariate regression models were constructed and generalized linear model (GLM) was used to assess the contribution of the research variables to stress level. Independent variables found significant in the univariate analyses were included in the models. In addition, the moderating/modifying effect of gains of resources and type of infertility on the association between loss of resources and stress were checked.

Results

Sample

The sample consisted of 90 women, with ages ranging from 23 to 48 (mean age 32.2), most of whom (96%) were married or in a committed relationship. The participants were residents of Israel (48%) and US (42%), and the rest (10%) were from other countries. 42% of the sample described themselves as Jewish, 17% as Christian, but many did not report their religion (38%). Nevertheless, 76% reported the degree of their religious identity: 46% were modern orthodox or orthodox while the others reported being conservative, traditional or secular (approximately 10% in each category).

Fifty four percent of the women had at least one child and most of the participants (89%) had previously been pregnant (2.43 pregnancies on average). The average period trying to conceive was more than 6 years. Regarding infertility type, 58% reported primary infertility

and 42% reported secondary infertility. Most of the women in the sample have undergone an infertility treatment in the past (71%) and 44% are currently undergoing infertility treatment.

The full distributions of the demographic and pregnancy related variables are displayed in Table 1.

Descriptive Statistics

The Appendix shows the means and standard deviations of the losses and gains reported by the participants. The top six losses listed by the participants were: “Energy and vitality”, “Hope regarding my fertility situation”, “Feeling I have control over my body”, “Feeling I have control over my life”, “Participation in social activities”, “Quality of Life”.

The top five resource gains listed by the participants were: “Feeling that I am normal”, “Freedom of expression including negative emotions”, “Information about infertility and

Table 1 Distributions of demographic and pregnancy related variables

Variable	M	SD
Age	32.19	5.76
Number of children	.92	1.25
Number of pregnancies	2.43	2.92
Years of trying to conceive	6.26	7.53
Years of participating in infertility forums	2.83	4.53
Variables	N	(%)
Country of current residency		
Israel	44	48%
USA	38	42%
Other	9	10%
Religion		
Jewish	38	42%
Christian	15	17%
Atheist\ No religion	3	3%
Missing	35	38%
Religious identity		
Orthodox	12	13%
Modern orthodox	30	33%
Conservative	9	10%
Traditional	9	10%
Secular	9	10%
Other	22	24%
Marital Status		
Married\ committed relationship	87	96%
Single	4	4%
Type of infertility		
Primary	53	58%
Secondary	38	42%
Undergoing infertility treatment?		
Yes	40	44%
No	51	56%
Undergone an infertility treatment in the past?		
Yes	65	71%
No	26	29%
Ever had psychotherapy for the IF condition?		
Yes	25	28%
No	66	72%

related medical procedures”, “Constant availability of peers and people who can relate to me”, “Sharing my problems with people who are like myself” (See [Appendix](#)).

Table 2 presents the intercorrelations between the research and background variables.

Highly significant correlations were found between resource loss and stress ($r = .62$, $p < 0.001$), in accord with the first hypothesis. As to the background variables, a significant negative correlation was found between resource losses and the number of children ($r = -.22$, $p < .05$). Residency was significantly related to resource loss ($r = -.23$, $p < .05$) and perceived stress ($r = -.23$, $p < .05$) indicating that participants from Israel reported lesser resource loss and lesser perceived stress, compared to participants from other countries. No significant correlations were found between IF type and the main research variables.

To test hypothesis 2 that resource gains will moderate the relationship between resource loss and stress, we conducted a hierarchical regression analysis predicting perceived stress. All continuous variables were transformed to standard scores before being entered in to the equation. As the correlations between IF type and the other research variables were found to be close to zero, IF was used only as a control variable. In this analysis, control variables were entered in the first step – the background variables with highest and significant correlations with other research variables (number of children and number of pregnancies, having undergone an IF treatment in the past or currently and residency) and IF type (1 = primary, 2 = secondary). The independent variable resource loss was entered in step 2, the moderator resource gain in step 3 and the two-way interaction term resource losses X resource gains was entered in step 4. The results of the analysis are presented in Table 3.

As can be seen in Table 3, the regression equation in the last step accounted for 50.9% of the variance in perceived stress ($F_{(9, 89)} = 9.23$, $p < .001$). Inspection of the specific β values of the last step indicates a positive significant relation between resource loss and perceived stress ($\beta = .66$, $p < .001$) supporting **hypothesis 1**. Resource gains did not predict stress. Entering the two-way interaction resource losses X resource gains in the last step did not significantly increase the percentage of the explained variance in perceived stress ($\Delta R^2 = .02$, $F_{(1, 80)} = 2.45$, $p = .12$). Thus, resource gains did not moderate the resource loss – stress association and the second hypothesis was rejected.

Table 2 Intercorrelations among the research variables and important background variables

	1	2	3	4
1. Resource losses	–			
2. Resource gains	.21*	–		
3. Stress	.62***	.10		
4. Age	.05	-.03	.05	.15
5. Number of children	-.22*	-.16	-.14	.14
6. Number of pregnancies	-.19	-.06	.08	-.04
7. Years of trying to conceive	-.02	-.08	-.04	-.04
8. Years of participating in infertility forums	.03	-.09	.03	-.04
9. IF type ^a	.03	-.04	.04	-.01
10. Religious identity ^b	-.10	-.05	-.01	-.07
11. Undergoing an infertility treatment ^c	.19	.13	.08	-.07
12. Undergone an infertility treatment in the past ^c	-.20	-.07	-.05	.09
13. Had psychotherapy for the IF condition ^c	.04	-.05	.02	-.13
14. Residency ^d	-.23*	-.03	-.23*	.19

* - $p < 0.5$, *** - $p < 0.001$; ^a - 1 = primary 2 = secondary; ^b - 1 = orthodox \ modern orthodox 0 = other; ^c - 1 = yes, 2 = no; ^d - 1 = Israel 0 = other

Table 3 Summary of hierarchical regression analysis predicting perceived stress (β values)

	Model			
	Model 1	Model 2	Model 3	Model 4
Number of children	-.34*	-.26*	-.27*	-.26*
Number of pregnancies	.28*	.34**	.34**	.34**
Current infertility treatment (1 = yes 0 = no)	.07	-.05	-.05	-.04
Past infertility treatment (1 = yes 0 = no)	.02	.10	.10	.09
Residency (1 = Israel 0 = other)	-.24*	-.10	-.10	-.11
IF type (1 = primary, 2 = secondary)	.04	.04	.04	.04
Resource losses	–	.65***	.66***	.66***
Resource gains	–	–	-.04	-.07
Resource losses X Resource gains	–	–	–	-.13
R^2	.130	.493***	.494***	.509***

* - $p < .05$, ** - $p < .01$, *** - $p < .001$

As to the background variables, it can be seen that significant negative relations were found between perceived stress and the number of children ($\beta = -.26$, $p < .05$) and positive relations with the number of pregnancies ($\beta = .34$, $p < .01$) meaning that participants who had fewer children and more pregnancies reported greater perceived stress.

Lastly, since IF Type was not found to be significantly related to any of the other variables, it was decided not to test hypothesis 3 i.e. that IF Type would moderate the relationship between resource loss and stress.

Discussion

The uniqueness of the current study stems from its theory-driven approach using the theoretical framework of the Conservation of Resources (COR) model of stress etiology [10]. We had hoped that using this theoretical approach would provide better understanding into the etiology of IF related stress and alongside this, how best to buffer stress for women struggling with IF and IF-treatments.

Consistent with the first hypothesis, psycho-social resource loss was found to be the most robust predictor of perceived stress. This finding supports the very basis of COR theory that posits that valued resources which are lost, threatened or lost without having additional resources gained result in stress. The list of losses that we compiled based on the literature review of IF topics outlines a plethora of valued resources which are compromised when having to cope with IF and IF treatments. The top issues concerned loss of energy and vitality and loss of “hope regarding my fertility situation”.

However, despite the fact that alongside the losses the study participants who were members of SNS groups also reported achieving gains in various resources (such as “Freedom of expression including negative emotions” and “Information about infertility and related medical procedures”), these gains were not associated with stress level. Moreover, in contrast to the second hypothesis the extent of these gains was not found to moderate/buffer the relationship between resource loss and stress. Moreover, none of the study variables were correlated with the resource gain score, in contrast with the highly significant correlations found throughout the study with the resource loss score.

It could be that the perceived amount of resource gains was insufficient to moderate the resource loss-stress relationships. Alternatively, it might be that the pool of specific resource gains studied in this study was not substantially relevant to affect stress level. These results suggest that for the women in our study sample who expected perhaps to gain supportive resources from participating in SNS these forums may not have been a sufficient means of relieving stress.

Another possible explanation is that while these forums do provide social support as well as other resources, the potential effect of the accrued gains was offset by negative aspects innate to the very nature of these forums. For example, while these forums offer a supportive social network, a unique sisterhood, they could simultaneously compound and even reinforce feelings of isolation from other social support mediums (namely, family and friends) and general face-to-face social interactions [12, 13]. It could be that the more one connects to and relies on these virtual social networks, the less one engages in preserving and strengthening social support outside of these SNS.

Other negative aspects of online infertility forums which may offset the benefits include a pervading preoccupation with IF. Whilst SNS offers an unparalleled accessibility and convenience which is often viewed as positive, there may also be detrimental residual effects. Being part of these active infertility forums may impose a constant reminder of one's own condition, compounding one's preoccupation with the subject. The frequent messages, notifications, posts and "upward comparisons" (with the women who became pregnant) could easily pervade one's daily routine, continually redirecting focus to IF. The addictive nature of SNS is another drawback, which may act to counterbalance the gains.

Lastly, our questionnaire asked participants to rate their gains, from use of SNS, in the last 6 months. Perhaps, the gains received from participation in these mediums would be more recognizable after a longer period. Perhaps, after 1 year, one may look back and note other gains as a result of participation in these forums, while after 6 months such gains are insignificant.

Further studies may uncover additional or more important resource gains that may have a significant role in stress buffering among women with IF who participate in SNS.

Regarding the role of IF type, it is somewhat an under-researched field, with the current literature focusing on primary IF and a distinct lack of focus on secondary IF, as well as a lack of focus on the comparison between the types. We felt, in accord with several recent studies on this topic, that there could be significant differences between participants with primary and secondary IF in terms of resource losses, gains and stress. In the current sample, IF Type was reasonably distributed, with 58% of the respondents having primary IF and 42% exhibiting secondary IF. However, the results indicated that IF Type did not produce any significant correlations with any of the main research variables, nor did it yield any significant correlations with any of the socio-demographic and background variables. It was therefore decided not to test the hypothesis that IF Type will moderate the resource loss-stress association.

There may be several possible explanations why the current research failed to produce significant If Type effects. First, it could be that indeed, for the present sample, IF Type was irrelevant as far as the specific research questions we posed such that at any stage, infertility is highly stressful regardless of the IF Type. While other studies report differences between the two groups (i.e. primary versus secondary IF) in other psychological measures, such as depression [14] when dealing with the resource losses-stress association, no such differences are apparent. Another possibility is the restricted sample

size. Perhaps a larger sample would indeed have yielded a moderating effect of IF-Type. Yet another possibility that was not considered in the present study was that primary and secondary IF may impose different resource losses. For example, primary IF may be associated with loss of certainty of one's ability to birth a child; whereas secondary IF may pose a threat of having an only child (which for some might imply a lonely or a selfish child) [49].

Unexpected Finding

The extent of resource loss was found to be significantly associated with country of residence. Specifically, participants from Israel reported less resource loss and less perceived stress, compared to participants from other countries. The attenuated sense of resource loss and perceived stress among Israeli participants may be innately related to cultural and societal elements of Israel i.e. Israel is a renowned pro-natalist state. The widespread availability, accessibility and affordability of IF treatments and support structures appears to reduce resource losses and perceived stress.

Methodological Limitations of the Current Study

The current study was based exclusively on self-report measures. It is advisable for future studies to include peer-reported and/or objective measures in addition to the self-report questionnaires.

A larger sample size and more heterogeneous population are recommended to augment the findings of the current study.

The losses and gains measures were compiled specifically for the present study. Although these are reliable, they have not yet been systematically validated. A substantially larger sample size will allow for investigating and confirming the questionnaires' factor structure.

Conclusions and Implications

The current study pioneered the application of the COR theoretical model to conceptualize the sources of stress faced by women dealing with IF and IF-treatments. For the first time, to the best of the researchers' knowledge, the current literature on IF was condensed to delineate the many stressors of IF and IF-related treatments in accord with COR, labelling them as resource losses. In accord with an expansive literature review it was found that these resource losses were strongly associated with stress levels. Such a conceptualization has obvious theoretical advantages but also clinical importance. If we are to understand better what causes stress among women coping with IF and alternatively, what factors may compound or moderate these relationships, we are empowered to help guide those dealing with IF and those supporting them, thereby enabling them higher levels of quality of life.

The advent of IF-related SNS is attracting significant numbers globally. Members report that they have certain advantages over face-to-face (FtF) social support (e.g. a sense of belonging and normalization of the IF status). Nevertheless, our findings reveal that the gains, while present, were not related to stress level nor were they compelling enough to buffer the

effects of resource losses. These results must be recognized and addressed. It could be that these findings resonate with the warning that use of the SNS may compound the sense of isolation felt from others [12].

The benefits of support from group therapies are well chronicled, yet many still exhibit a stark hesitation towards them (be it for financial reasons, or stigma). The ease and accessibility of SNS is fast replacing that medium. The therapeutic and social support benefits of SNS exist, but again, in accord with the current findings they may not be sufficient. We may suggest that the use of SNS should supplement, and not come in the stead of, other social support mediums such as regular interpersonal relationships and/or face-to-face support groups.

Compliance with Ethical Standards

Conflict of Interest The authors have no potential conflicts of interest.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Ethical Approval All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Appendix

Extent of Loss of Psycho-social Resources – descending order

Resource	Mean	Std. Deviation
Energy vitality	1.82	1.287
Hope regarding my fertility situation	1.69	1.396
Feeling I have control over my body	1.54	1.311
Feeling I have control over my life	1.52	1.303
Participation in social activities	1.52	1.417
Quality of life	1.51	1.369
Good routine	1.46	1.336
Being able to fulfill the religious obligation to procreate	1.36	1.683
My health	1.33	1.174
Hope regarding a positive outcome from treatments	1.31	1.427
Positive feelings about myself	1.27	1.399
Adequate time for leisure	1.27	1.292
Financial security	1.20	1.310
Feeling of being a valued member in my community	1.11	1.402
Support from friends	1.04	1.429
Support from family	0.98	1.406
Marital satisfaction	0.87	1.301
Support from online forum members	0.86	1.338
Support from my partner	0.81	1.324

Extent of Gains of Psycho-social Resources

Resource	Mean	Std. Deviation
Sharing my problems with people who are like myself	2.66	1.485
Feeling that I am normal	2.62	1.373
Freedom of expression including negative emotions	2.59	1.406
Information about infertility and related medical procedures	2.56	1.470
Constant availability of peers and people who can relate to me	2.56	1.400
A sense of belonging and community	2.52	1.456
Support from forum members	2.46	1.409
Convenient peer group	2.44	1.416
Important information about treatment	2.32	1.460
Feeling empowered	2.29	1.401
Hope regarding a positive outcome from treatments	2.14	1.387
Appreciation of my situation	2.12	1.397
Hope regarding my infertility situation	2.08	1.293
Humility	2.02	1.453
Positive feelings about myself	1.87	1.258
Marital satisfaction	1.82	1.553
Support from medical staff	1.71	1.455
Physical comfort	1.53	1.393
Spirituality	1.45	1.507
Break from infertility preoccupation	1.31	1.404
Energy vitality	1.31	1.372

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