Men's Experiences of Surviving Testicular Cancer: an Integrated Literature Review

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Abstract

Purpose

To synthesize literature in order to elucidate the experiences of men who have survived testicular cancer and determine their quality of life following treatment.

Methods

An integrated review sought appropriate literature by utilising a keyword search across seven databases. Retrieved studies were appraised for quality, with two qualitative, twelve quantitative, and two mixed method studies deemed appropriate for this review. The data were extracted and aggregated into categories by way of a thematic analysis. The themes were: personal challenges and impact on health, psychological and emotive challenges, perception of reproduction and sexual changes, and outlook and support.

Results

Men experienced physical, emotional, and sexual difficulties. Some men believed they were infertile, despite evidence that fertility is not compromised in the long term. Psychological conditions can be exacerbated by cultural pressures to conceive and cultural expressions about male identity. Men who had undergone orchidectomy reported minimal impact on their mental health than the men who had chemotherapy or radiotherapy as part of their treatment modality. Sexual dysfunction caused by chemotherapy-associated side effects was detrimental to men’s quality of life. In addition, men who had a partner, who were employed, and who had children were able to adjust better after treatment than those who did not. Provision of clear and honest information post-treatment helped testicular cancer survivors return to their normal lives.

Conclusions

The evidence from the review suggests that the burden of disease for testicular cancer survivors is overall low. Men who had surgical intervention and were treated for testicular cancer experienced minimal impact on their mental health status than the men who had chemotherapy or radiotherapy as part of their treatment modality.

Implications for Cancer Survivors

There is a need to provide appropriate referrals to the relevant services, including psychosocial support, and the development of more adequate communication resources for men following treatment for testicular cancer.

Keywords *Testicular cancer, masculinity, men, quality of life, integrated review*

Introduction

Testicular cancer (TC) is a malignant tumour found in the cells within the testicles of men and this tumour can be broadly called testicular germ cell tumour (TGCT). There are two main types of TGCT, namely seminomas and non-seminomas [1]. Seminomas usually develop in the later stages of life, in the fourth and fifth decade, whereas nonseminomas occur among younger men between the second and third decades of life and are more aggressive [2]. TC will require treatment and the treatment options may involve chemotherapy, surgery, radiotherapy or close observation of men [1].

In the USA, the American Cancer Society estimated that there were 8,430 new cases in 2015 of which 380 men died from TC [3] while in Australia there have been 721 new cases of TC in 2013 and 23 deaths in 2014 [4]. It is estimated that 828 men will be diagnosed with TC in Australia in 2018 [4]. In Europe, TGCT is the most common cancer in young men, with over 18,000 new cases diagnosed annually [5]. Further estimations predict that there will be an increase of 25% of cases by 2025 across the industrialised countries [5]. Evidence suggests that the burden of disease of TC is low compared to other forms of cancer affecting young adults and men, however its fatality is higher than that of benign brain tumours [4].

TC has a five-year relative survival rate [6] and despite the high survival rate for TC it can still have an impact on men's lives. Such impact is characterised by social life changes, sexual performance issues, feelings of not being sexually attractive, fertility concerns, shame, uneasiness, social identity - especially within the family, erosion of masculinity, and challenges to their mental health and wellbeing [7-9]. Morman [10] conducted a study with a mean age of 21 years and found that losing a testicle to TC was rated very high and more humiliating than being teased about the size of the person's penis or being diagnosed as sterile. Clearly the evidence suggests that TC has a significant impact on men's sense of masculinity.

In a systematic review conducted by Soon et al [11], the quality of life [QoL] of men who had radical orchidectomy for TC was affected. Some men became suicidal, their cognitive ability was affected, and some became tired. Similarly, Eberhard [12] found that some men had lower sexual desire and erectile dysfunction 3 to 5 years following therapy completion. In a similar vein, Ryan and Hoyt [13] reported that men's adjustment following treatment for TC proved to be a challenge and therefore they found themselves unable to successfully navigate into adulthood and experienced greater functional challenges in later life. Such problems, including individual health, sexual relationships and work problems, were found by Schepisi *et al* [14] to affect several important aspects of survival and significantly influence the QoL of long-term survivors. The authors concluded that to better understand the impact of TC on QoL, sociocultural differences in sexuality, masculinity and fertility must be taken into consideration.

In view of this, the authors of this study will synthesize the literature with a view to addressing men's experiences of surviving TC and their QoL following treatment, whilst taking any underlying sociocultural considerations into context.

Methodology

This integrated review aims to synthesize the literature on men's experiences of surviving TC and to determine their quality of life. Studies will consist of qualitative, quantitative, and mixed methods designs. The review will adopt the framework described by Whittemore and Knafl [15] as a guide. This methodological approach allows for the simultaneous synthesis of qualitative and quantitative data.

Data Acquisition

Qualitative, quantitative, and mixed methods studies were sought between the dates January 1990 and April 2019 across seven databases. This was to ensure as much valid data were collected on the subject. An initial search found little data from the 1990s and no data at all pre-1990.

The inclusion criteria sought to find studies that were qualitative, quantitative, or mixed methods in strategy, and concerned TC only. Papers must have been written in English. Participants were to have been diagnosed and treated for TC, with an examination into their QoL.

The exclusion criteria ruled out other reviews, grey literature, non-English language papers, studies that were pre-therapy, or incorporated other types of cancer, and studies that included partners.

Original academic articles were sourced using the following keyword search: (“testicular cancer” OR "testicular neoplasm*" OR "testis cancer" OR "testis neoplasm*") AND (experience*) AND (“quality of life” OR QoL). Figure 1 displays the overall process.

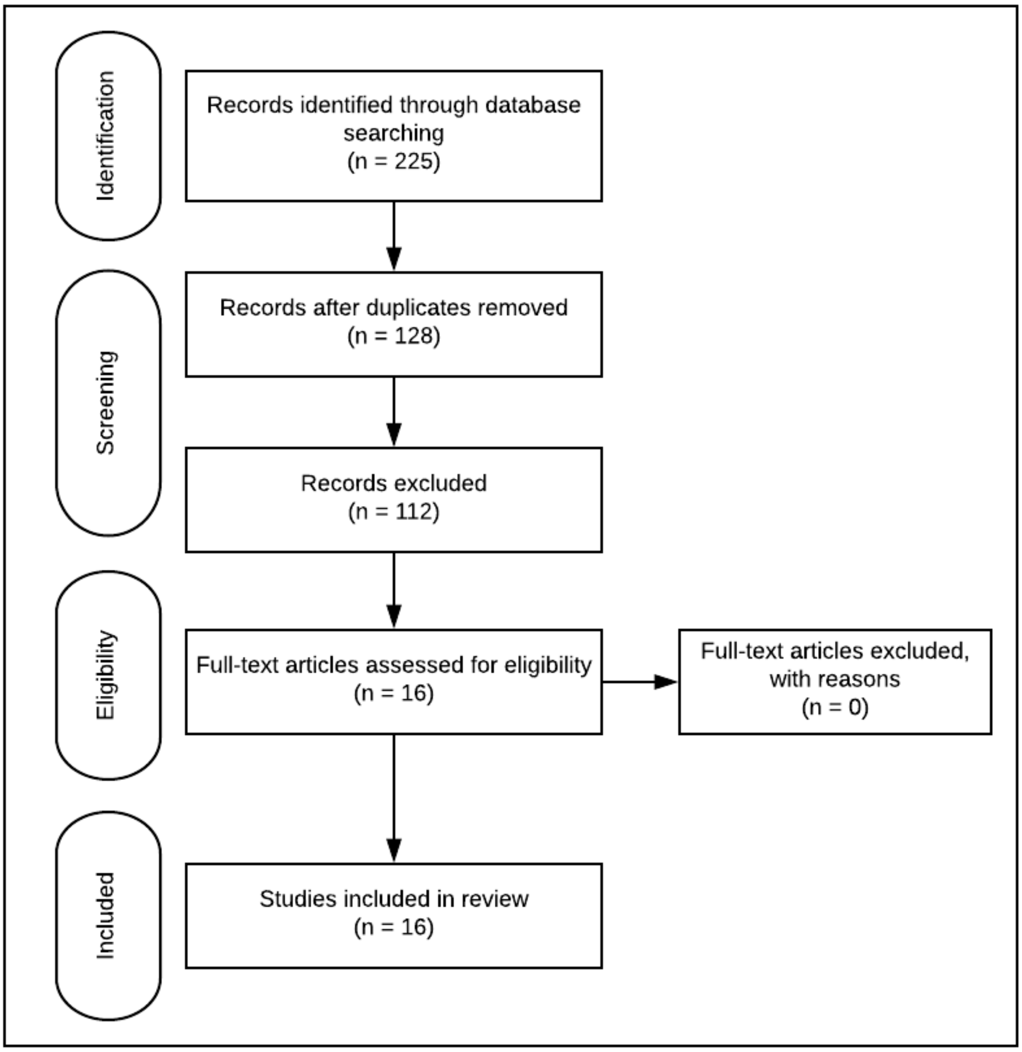

Figure 1 PRISMA flowchat of article search

Quality Appraisal

The Mixed Methods Appraisal Tool (MMAT) is a critical appraisal tool that is designed for the appraisal stage of systematic mixed studies reviews [16]. The MMAT is useful to assess the quality of empirical studies based on several criteria. Five different questions are posed to evaluate qualitative studies, quantitative descriptive studies, and mixed methods studies. The 16 studies in this review all scored high marks to ensure their inclusion in this review.

Data Extraction and Synthesis

Out of the 16 studies selected for this integrative review, 12 were quantitative, 2 used a qualitative approach, and 2 were of a mixed methods design. A breakdown of the methodology, sample size, and results can be found in Tables 1, 2, and 3. Data were extracted from the papers and coded using the software NVivo. This method enabled the authors to find common meanings, similarities, and differences amongst the data, as described by Pfaff et al [17]. Subsequently, the authors were able to discern a number of categories emerging from the codes. These categories were subsequently aggregated and organised under themes. Figure 2 presents an overview of the themes and subthemes which form the basis of the findings.

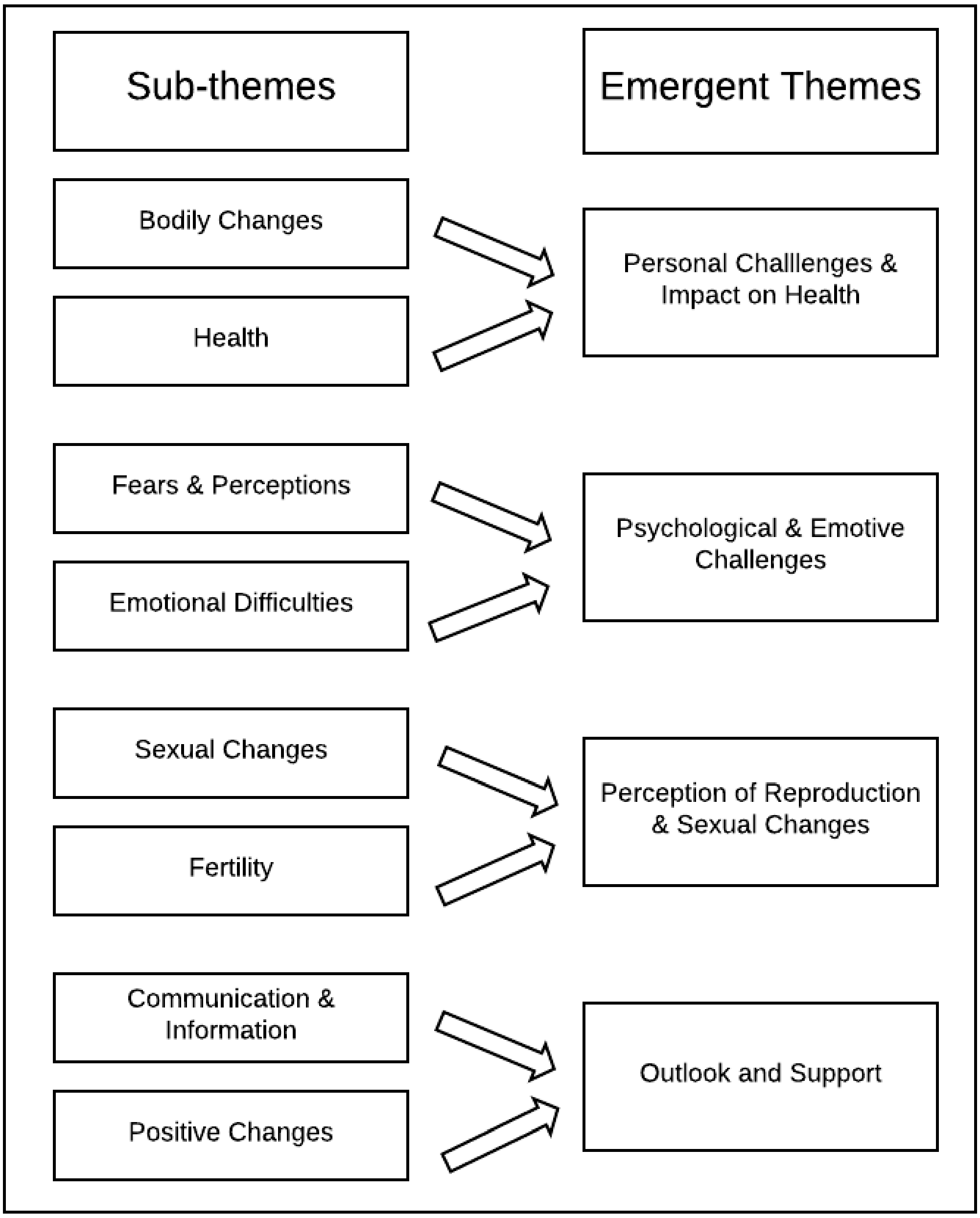

Figure 2 Themes Development

Methodological quality criteria	**Responses**	**Responses**
Is the qualitative approach appropriate to the research question?	Yes	Yes
Are the qualitative data collection methods adequate to address the research question?	Yes	Yes
Are the findings adequately derived from the data?	Yes	Yes
Is the interpretation of results sufficiently substantiated by data?	Yes	Yes
Is there coherence between qualitative data sources, collection, analysis and interpretation?	Yes	Yes
	Kristjanson et al 2006	Saab et al 2014

Table 1 – Qualitative studies appraisal

Methodological quality criteria	**Responses**	**Responses**
Is there an adequate rationale for using a mixed methods design to address the research question?	Yes	Yes
Are the different components of the study effectively integrated to answer the research question?	Yes	Yes
Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	Yes	Yes
Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	Yes	Yes
Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	Yes	Yes
	Fleer et al 2006c	Shen et al 2016

Table 2 – Mixed methods study appraisal

Methodological quality criteria	**Responses**	**Responses**	**Responses**	**Responses**	**Responses**	**Responses**	**Responses**	**Responses**	**Responses**	**Responses**	**Responses**	**Responses**
Is the sampling strategy relevant to address the research question?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Is the sample representative of the target population?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Are the measurements appropriate?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Is the risk of nonresponse bias low?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Is the statistical analysis appropriate to answer the research question?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Bender et al 2011	Bumbasirevic et al 2013	Caffo & Amichetti 1999	Fleer at al 2006a	Fleer et al 2006b	Kim et al 2010	Kim et al 2012	Rudberg et al 2002	Rudberg et al 2008	Skoogh et al 2013	Smith et al 2016	Vidrine et al 2010

Table 3 – Quantitative studies appraisal

Findings

Data analysis of the findings yielded the following main themes, personal challenges and impact on health, psychological and emotive challenges, perception of reproduction and sexual changes, and outlook and support. Each theme is explored in detail using the data extracted from the studies and supported by quotations where necessary.

Personal challenges and impact on health

This theme will examine how TC challenged men personally. The two subthemes are bodily changes and health.

Bodily changes

Most of the participants in one study did not report changes in their body image after orchidectomy [18]. Another study also confirmed that orchidectomy had little impact on the body image of participants [19]. However, six participants in the same study considered that their body image had worsened after therapy [19]. In the study by Smith et al [20] a further 15 % of TC survivors reported feeling less masculine as a result of TC and its treatment. In the study by Bender et al [21] nearly half of the respondents reported that they needed help to adjust to the way they felt about their bodies. Similarly, Bumbasirevic et al [22] also found that there were feelings of a distorted body image and feelings of loss of attractiveness in TC survivors.

Health

Fleer et al [23] reported significant changes in the daily lives of TC survivors, and anxiety about future medical problems. One study [22] found that financial difficulties and insomnia were the most important effects that made worse their health-related quality of life (HRQOL). Another study reported that TC survivors often felt cold and numbness in the feet or toes [24]. Men who received adjuvant chemotherapy for non-seminoma germ cell tumours in the study by Vidrine et al [25] experienced a decrease in HRQOL in the period soon after the completion of treatment, whilst men treated with chemotherapy experienced a significant, but temporary drop in HRQOL. Cancer treatment and its side effects prevented some men in returning to work in one study, with a participant experiencing an emotional breakdown and taking time off work [26]. Saab et al [18] found that there was a tendency toward fatigue and physical exhaustion, but that the physical tiredness from cancer and its treatment was temporary. These did not prevent any of the participants from continuing with their work schedule. Similarly, one study found that the most common symptom was fatigue [22]. Although the aforementioned study found that men were affected by TC, one study [27] reported that survivors of TC experienced as good as or even better health than the general population did, with nearly three-fourths of the men reporting that their health was excellent, and 81% reporting that they were totally pain free [27]. TC survivors also reported a better physical functioning and less bodily pain in another study [28]. Men who had undergone an orchiectomy, followed by surveillance only or by adjuvant radiotherapy, reported more favourable health [27].

Psychological & emotive challenges

This theme will look at the psychological aspects that participants faced, specifically their fears and perceptions as well as the emotional difficulties that they experienced.

Fears & Perceptions

Fleer et al [23] reported that the surgical removal of the testicle and waiting for X-ray results caused intense fear, whilst illness resulting from chemotherapy caused feelings of helplessness. Men in one study [29] described a fear of the unknown, a fear of the future, and a fear of dying. The authors also reported that men were embarrassed about a loss of maleness and expressed fears about how to hold onto their self-esteem [29]. Many participants expressed their fear of cancer recurrence and linked cancer to death and suffering [18, 21]. Kristjanson et al [29] also found that men talked about carrying with them a background fear that the disease could re-occur. One study [23] reported that men were significantly more anxious about future medical problems. In another study, men also described economic fears and concerns about their abilities to work and feelings of insecurity about possible job loss [29]. Some participants in one study expressed a certain degree of distress because of the way people perceived them, leading some not to tell anyone about their diagnosis [18].

Emotional difficulties

Various authors [20, 22-24, 26, 27, 29, 30, 31] found that TC survivors experienced moderate to high levels of stress, depression, and anxiety. In the study by Shen et al [26], focus group participants discussed how they struggled with the emotional fallout of their disease, with one participant expressing sadness and frustration at not being able to maintain the "strong" role in his relationship with his girlfriend. Participants in another study [29] described feelings of intense sorrow and, in some instances, referred to themselves as depressed, expressed feelings of sadness, was persistently crying, had persistent negative thoughts and required antidepressants. Similarly, Smith et al's study [20] reported significantly poorer overall mental health for TC survivors and a higher prevalence of moderate to extremely severe anxiety and depression compared to the general population. Rudberg et al [24] found that men suffering from cold white fingers had significantly more emotional symptoms, such as exhaustion and impaired concentration. Fleer et al [23] reported that some men had shame about having TC. Another study [27] found the main problems for men were understanding and expressing emotional feelings, nervousness, tension, sadness, restlessness, and sleep problems. Men also described a sense of bewilderment in one study [29] and a feeling of being shocked by the unexpected news of the diagnosis. The authors reported that a number of men described feelings of anger in response to the illness and directed their anger at their current situations [29]. In the study by Skoogh et al [31], the researchers found that the vast majority of the Swedish TC survivors experienced some kind of crisis in connection with their illness, suggesting most men experienced this as a traumatic event.

One study reported that the combination of not being employed for wages and having a chronic disease had a particularly negative effect on the QoL for TC survivors [28]. Bender et al [21] also found that men who were unemployed had significantly more unmet needs than those who were employed. Additionally, Fleer et al [23] reported that singles, those with less education, and those who were not employed had higher levels of cancer-related stress symptoms. In contrast, according to one study participants who had a partner, who were employed for wages, who had children and who did not have a chronic disease reported better mental health than their counterparts [30]. The authors discovered that marital status, employment status, chronic disease and negative life events correlated significantly with psychological well-being [30]. However, Bumbasirevic et al [22] did not find that employment and marital status had significantly influenced their participants' QoL, with age being the only significant risk factor for depression, while marital status showed no association with depressive status. Fleer et al [23] reported that TC survivors with clinically elevated levels of cancer-related stress symptoms were more upset by the effects of their illnesses, that the illness had caused more changes in their daily lives, and that they were more anxious about the possibility of additional medical problems in the future. Additionally, one study found that men treated with chemotherapy reported lower emotional well-being than men with other treatment modalities did, but the difference was not significant [27].

Perception of Reproduction and Sexual Changes

TC impacted on the way men see themselves sexually. Therefore, the subthemes will identify issues to do with sexual changes and fertility.

Sexual changes

Evidence from some studies reported a decrease in sexual function, erectile dysfunction, and a loss of desire [22, 24, 27, 32]. According to Rudberg, Nilsson, & Wikblad [27], the men in their study who reported impaired sexual functioning were older and were more often living alone, however the sexual functioning of the survivors as a group was as good as it was in the representative population. Bumbasirevic et al [22] found that sexual problems seriously affected all QoL domains in TC survivors. Rudberg et al [24] reported 14% of men in their study had deteriorated sexual functioning, and as a consequence experienced significantly more distress symptoms. Another study also found that less frequent sexual activity was significantly related to greater stress [20]. In one study [19], six participants thought that the quality of the relationship with their partner had been changed as a result of the disease. Similarly, only a few participants in another study reported lack of sexual contact with their partner at the time of diagnosis and during treatment [18]. In Rudberg et al's study [24], men who believed their attractiveness had decreased after treatment experienced significantly more symptoms of distress than those who believed they were equally or more attractive than before treatment.

In one study, all but one participant claimed to have been sexually active before treatment, whereas after therapy an erection was considered to be more difficult to achieve and maintain and orgasm was reached less intensely and less frequently [27]. In contrast, participants in another study denied a decline in their sexual performance [18]. In the case-control study by Kim et al [32], survivors experienced greater impairment and/or dysfunction compared with controls, with sexual dysfunction varied by treatment modality. The authors found that combined chemotherapy and surgery treatment showed a greater risk of decreased libido or ejaculatory dysfunction, while a combination of radiation and surgery treatment was more closely associated with erectile dysfunction [32].

Fertility

In their study [29], Kristjanson et al discerned that the information men received about long term fertility issues confronted them in a sudden and serious way. Another study [18] reported that fertility served as a determinant of their participants' sense of identity as men and partners, with one participant, being the only son in the family, felt pressured to marry. Another participant voiced concerns about being rejected: "If I want to propose to a girl and she knows that I have only one testicle, she might reject me" [18]. In their case-control study, Kim et al [33] found that TC survivors expressed more concern about fertility than men who did not have TC, with non-seminoma survivors expressing greater overall fertility distress and difficulty in fathering children. However, the study reported that TC survivors were more likely to report fertility distress and being tested for infertility, but no less likely to father children. Despite this, a participant in another study [18] related chemotherapy to his inability to conceive, whilst 19.5% of men in another study reported that they were convinced that they were sterile [24]. One study found that being fertile, having children, and living with a partner were deemed to be important aspects of good health-related QoL [27]. Additionally, Rudberg et al [24] reported that men who perceived themselves as being as attractive as before treatment had fathered children significantly more often than those assessing themselves as less attractive than prior to treatment.

Outlook and Support

Study participants spoke of what support they received and their overall disposition. The subthemes to this theme are communication and information, and positive changes.

Communication and information

Participants in one study described not being provided with comprehensive information on what to expect posttreatment, with many being told to simply “adapt” and return to their “normal” lives [26]. The authors reported that many felt ill-informed and unprepared to cope with the after effects of TC and its treatment and experienced side effects that were much worse than they had anticipated. Similarly, in another study most survivors reported that they wish they had received information about common stress and crisis reactions as well as been offered professional counselling [31]. Instead, Shen et al [26] found that the onus was on the men to access information. In one study [29], it was discerned that in some instances men reacted by becoming passive and trusting, accepting all medical decisions without questions and trusting health care professionals to provide necessary information and direction. However, many of the men in one study felt that their oncologists did not have enough time to provide information and reassurance about these issues which resulted in men expressing frustration about not being able to have the right conversations even when they tried to initiate them [26]. One of the most common unmet needs reported in another study concerned men’s identities as cancer survivors, suggesting a lack of psychosocial and practical support [21]. One study [29] reported that the communication tone used by health professionals was deemed extremely important and included sensitive use of language, a positive helpful approach, a respectful manner, and the use of humour to normalise the illness. In addition, men consistently reported that receiving honest, straightforward information was helpful [29].

Positive changes

One study found that survivors quickly adapted to the circumstances created by the experience of cancer treatment [28]. For some participants in one study, cancer was seen as an opportunity to make positive changes in their lives with all participants stating that their lives were good and they were currently in good health [18]. Another study found that a positive perception helped give men a sense of hope and optimism [29], and participants in one study reported that their outlook on life had become more positive [30]. Rudberg, Nilsson, & Wikblad [27] found that men who were employed full time and men who were living with a partner reported more positive effects. One study reported that the most frequently mentioned changes were of more appreciation of life, enjoying life more, a more conscious experience and appreciation of the here and now, seeing things in a different perspective, a re-evaluation of priorities and reprioritization of what is important in life [30].

Discussion

This integrated review aimed to synthesize the literature on men's experiences of surviving TC and to determine their QoL. Seven databases were searched, with the synthesized data aggregated under four themes and eight subthemes. The review found that men who had undergone orchidectomy were less affected mentally than men who were undergoing chemotherapy with surveillance or adjuvant radiotherapy. In addition, men who had a partner, who were employed, and who had children were able to adjust better after treatment. There were fears expressed that TC caused infertility, with nonseminoma survivors expressing greater overall distress about their inability to father children.

Survivors were found to quickly adapt to their new circumstances [28] and reported good health [18], confirming the evidence that the burden of the disease is low compared to other forms of cancer [4]. Despite this, being left infertile as a result of treatment was cited as a major cause of distress [33]. However, evidence shows that TC survivors are no less likely to father children [33]. Another review determined that although sperm counts were initially lower in TC survivors, counts had normalised when reassessed 5 years later [11]. Despite the evidence establishing that fertility was not compromised in the long-term, men did express fears at being able to conceive. The study concerning Lebanese men [18] exuded a sense of cultural pressure around fathering children and being considered a man, with one participant explicitly stating that, being the only son in his family, he felt pressured to marry, whilst another stated he might be rejected by a potential suitor if he was unable to copulate. This exemplifies how culture underpins men's conceptions about manhood. Rudberg, Nilsson, & Wikblad [27] found that being fertile and/or having children were important aspects of good HRQOL. Survivors of TC can be assured that their chances of fathering children will not be permanently diminished posttreatment, especially as this can impact on their psychological wellbeing. Although long term health effects are fairly rare, the authors of one study found that TC survivors were at risk of hypercholesterolemia, infertility, and orchitis five years after treatment [34]. Obesity was found to be a determinant of these late effects, and thus lifestyle behaviours, such as smoking, drinking, and low physicality, may be linked to long term health conditions posttreatment. Hence, culture may play a part in the long term health of TC survivors.

Kim et al [32] found that survivors experienced greater sexual dysfunction depending on their treatment modality, with combined chemotherapy and surgery marking a decrease in libido and ejaculation, whereas combined radiation and surgery was more closely associated with erectile dysfunction. Other studies have also found that treatments involving surgery, chemotherapy and radiotherapy can inflict damage on reproductive organs and peripheral nerves, thereby causing sexual dysfunction [35, 36]. Chemotherapy-associated side effects are increasingly found to deteriorate sexual life, whilst intercourse and overall sexual satisfaction are known to be significantly impaired after surgery [37]. Major findings in one study confirm that there is a significant incurred burden of neurological toxicity caused by contemporary cisplatin-based chemotherapy regimens [38]. In addition, significantly reduced libido, lower intensity of orgasm, and difficulties in maintaining erections has been reported in seminoma patients treated with radiotherapy [39], corroborating the findings in this review.

Some studies found that men reported a lessening of masculinity concerning their body image [20] and decreased sexual functioning [22]. Central to men's sexuality and gender identity are their notions of masculinity [7]. Men have been found to suffer psychologically if they cannot meet the standard of masculinity set by prevalent cultural narratives [40]. When adolescent men project a tough and emotionless persona, they can face poorer health outcomes especially in sensitive cases such as with their genitals [41]. Moore & Higgins [7] argue that within wider society, masculine scripts frequently describe men as stoic, in control, non-emotional, rational, invincible beings. These dominant norms can become internalised by men and violating them can be interpreted as a loss of manliness [42]. Perceived social constraints to emotional disclosure might interact with restrictive emotionality norms to detrimentally affect men's adjustment to cancer [43]. All the participants in the study by Saab et al [18] denied a decline in their sexual performance, whilst a participant in another study [26] was frustrated at not being able to maintain the role of a strongman in his relationship, exemplifying the need for some men to continue to display a notion of sexual prowess and stoicism. This, however, is not the case for all men, with a study determining that men do display feelings of sensitivity, modesty, curiosity, and vulnerability when affected by cancer [44]. The same study found that male patients are stereotypically characterized by clinicians as disinterested, impatient, and stoic. It is important for clinicians to not cast all men in the same light.

With TC and its treatment came psychological distress, depression, and other emotional conditions. Some authors discovered that those who were single reported higher levels of cancer-related stress symptoms [23], whilst one study found that marital status had no overall effect on depressive status [22]. Again, this could be due to cultural differences, although no reason is forthcoming in the literature. Other studies have found that married patients or those in a stable relationship cope better with cancer than unmarried patients or those who are single, with these differences possibly being related to the cultural norms of that society [45, 46]. The study by Bumbasirevic et al [22] did report that age was a significant risk factor for depression, where the mean age for patients was 35.5 years. Age is confirmed as being associated with depressive symptoms in another study where younger cancer survivors reported greater depressive symptoms compared to older cancer survivors [43]. Occupational exposure to PVC, nonionizing radiation, heavy metals, heat, environmental exposure to PCBs, agricultural work and the long term use of marijuana may be associated with TC. However, caution must be exercised as the evidence is weak and therefore further studies are required to determine whether those aforementioned risk factors are associated with males developing TC [47]. Some studies have highlighted that males are susceptible to developing depression and anxiety [20, 22, 48, 49] and have an increased risk of developing chronic fatigue syndrome and a lower QoL. The use of cognitive behavioural therapy and educational programmes could be used to manage and reduce fatigue [48] in TC survivors.

A key factor in preventing worsening mental health was to continue working in a job. There was insecurity over potentially losing a job over the illness, with those who were unemployed reporting increased stress and unmet needs [21, 29]. Maintaining a job was an indicator of continued psychological well-being [30], with participants in one study not taking time off work despite the health effects caused by treatment [18]. In a comparative study, it was found that cancer survivors did not experience reduced paid work activities compared to those individuals without cancer [50]. Although the study was not explicit to TC, 37% of the respondents had been treated for TC. However, it is noteworthy to state that absenteeism may be one of the ways to measure work engagement following treatment for TC. Presenteeism is a concept that some authors [51, 52] found interesting among cancer survivors. In a systematic review by Soejima & Kamibeppu [51], the authors found that cancer survivors diagnosed within five years registered absenteeism more than those without cancers, but there was no difference among survivors diagnosed/treated for five years or more. While presenteeism is a challenge for TC survivors and their employers, adequate support for TC survivors can alleviate these issues.

In their study, Ryan & Hoyt [13] found that TC survivors with a stronger adult self-image reported better social and emotional well-being, in part, via the psychological resources of agency and meaning. Having a job gave these men meaning, and losing their ability to work caused increased psychological stress. Kahn [42] argues that the fault lies with cultures that put men against each other for sustainable incomes, creating difficulties for them since they rely so much on these connections for sources of identity. Furthermore, evidence from the literature suggests that participants who reported decreased attractiveness after treatment experienced significantly more stress-related symptoms [24]. Ryan & Hoyt [13] argue that adulthood, in part, involves engagement in social and job roles and the authors found some support for a positive relationship between TC survivors' adult self-image and their social and emotional well-being as well as job problems, corroborating the evidence found in this review.

A problem cited by men in some studies [26, 31] was the lack of information they received about the effects of TC surgery, and an inability from oncologists to provide enough time to have the right conversations. These findings echo the feelings of participants in a study about prostate cancer survivors who felt oncologists were not forthcoming about the sexual and physical effects of prostate cancer treatment [53]. Some participants reported being ill-prepared and felt that their identities as cancer survivors were not taken into consideration by health professionals [21]. Distinctly, there is a reported lack of psychosocial support that must be addressed. Kristjanson et al [29] found that communication and straightforward information was deemed extremely important and therefore, it should not only focus on the TC survivors but on their families and care givers thus, taking into account cultural differences, age and socioeconomic status [54] during the communication episodes. The aforementioned approach may be welcomed by recipients in the sharing of information related to TC and its treatment.

Kristjanson et al's study [29] reported that in some instances men reacted by becoming passive and trusting, accepting all medical decisions without questions and trusting health care professionals to provide necessary information and direction. The study by Dube et al [44] similarly found that for cancer screening decisions, men expressed a desire to understand the relevant issues and participate in the decision-making process. However, when faced with complicated or ambiguous cancer screening decisions, some men did not feel competent to make such decisions alone and preferred to defer to a trusted physician [44]. Thus, men placed great trust in their physician, and it is important for medical professionals to be straightforward and honest about all treatments and their outcomes. Given that TC has an impact on male lives, it is therefore prudent that men are supported throughout the trajectory. Using Kanker Nazorg Wijzer intervention could be an invaluable theory-based, wide-ranging web resource for providing support to cancer survivors, including those men surviving TC [55]. Other resources that TC survivors could use include physicians and cancer support nurses. These professionals are invaluable in helping survivors to cope with the treatment effect of TC.

Limitations

This review drew on papers written in English and including articles in different languages could have further strengthened the study. The authors limited the setting to diagnosis and treatment of testicular cancer only and studies that considered the QoL for the men. While the methodological quality of eight of the studies in this review were significant, the other four studies had limited generalizability due to small sample sizes. Although this study has multiple limitations, it has provided some fresh insights into the experiences and QoL for men with testicular cancer. Lastly, this review excluded grey literature. Inclusion could have resulted in a more comprehensive review.

Conclusion

The evidence from the review suggests that the burden of disease for TC survivors is overall low. The actual QoL experienced by the men who survived TC did not only vary from one survivor to another, but also by their treating medical interventions and evaluations. Cultural pressures to conceive can exacerbate psychological conditions. This review suggests men who had surgical intervention and were treated for TC experienced minimal impact on their mental health status than the men who had chemotherapy or radiotherapy as part of their treatment modality.

Implication for Cancer Survivors

Survivors of TC who received chemotherapy, radiotherapy and surgery reported sexual dysfunction which suggests there is a need to provide appropriate referrals to the relevant services, including psychosocial support, and development of more adequate communication resources. Both of these methods will be of benefit in helping men overcome some of the challenges associated with TC treatment.

Declaration of Conflicting Interests

The Authors declare that there is no conflict of interest.

Compliance with Ethical Standards

This article does not contain any studies with human participants or animals performed by any of the authors.

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

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