Peer review file
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Reviewer A

This is a well written systematic review. The topic is timely. The methodology used is sound and the conclusions reflect the analysis. Well done, I believe it merits publication. I do not have any revisions to offer.

Reviewer B:

Comment 1: Line 70: The Author's generalization of all gender affirming therapies (broadly, fall into categories, of hormone therapy, facial surgeries, chest surgeries, genital surgeries, voice surgeries, dermatologic therapies [e.g. permanent hair removal]) – is confusing, as not all are equally available/unavailable throughout the USA, not all cost the same, and not all have the same likelihood of being covered or not covered by commercial versus MediCaid versus Medicare health insurance.
Also, not all lend themselves equally to Decision Aids, as not all have alternatives (outside of not undergoing the specific type of treatment).

I STRONGLY recommend that the authors not generalize and refer to specific classes of "therapies" (medical, surgical-facia surgical chest, and surgical-genital), for example.

Reply 1: Thank you for your comment. We have changed the sentence to be clearer and have incorporated the reviewer's language in the sentence.

Changes made: …the unknown long-term outcomes of hormonal and high-risk surgical interventions, the lack of provider understanding (7), and, in the case of the US, not all gender affirming therapies are available in each state, and variation exists regarding insurance coverage for various options ~~the high cost of gender affirming therapies~~ (8). (Line 70-72)

Comment 2: Line 77: It is simply not accurate to say that "out of pocket fees are substantial". Fees for WHICH SPECIFIC therapies? Also, whether there is out of pocket costs varies significantly state by state. Medicare covers gender affirming therapies nationally; Medicaid covers surgery and hormone therapy in many states; commercial insurance companies cover different treatments in may states. So, it is not correct, and misleading, to generalize with the statements made in Lines 77-79. The authors should use more specific language, and, more citations! (the one citation included is for ObGyn services).

Reply 2: Thank you for your comment. We modified the sentence to include the reviewer's language and have added an example and reference to a recent study that provides evidence of the variability in insurance coverage in the US for top surgeries. This

example and reference addresses the specificity the reviewer is looking for.

Changes made: In the US, the out-of-pocket fees can be ~~are also~~ substantial depending on where the individual is seeking care, and their insurance coverage. For example, a recent study showed that fewer insurance policies cover feminizing breast surgery in comparison to masculinizing chest surgery. Further, not all insurers cover nipple reconstruction procedures for those who choose masculinizing chest surgery (11). ~~A recent survey found that up to "half of transgender patients who sought insurance coverage for gender-affirming surgery were denied, as were a quarter who sought hormones".~~ (Line 80-84)

(11) Ngaage LM, Knighton BJ, McGlone KL, et al. Health insurance coverage of gender-affirming top surgery in the United States. Plast Reconstr Surg 2019;144:824-33.

Comment 3: Line 96-98: The statement made here does not reflect the message from the paper the Authors cite. While there is no doubt that decision aids would b more useful than less useful, this paragraph has a somewhat exaggerated tone/message. Recommend against quoting others work verbatim, as out of context, such text can be misquoted (for example, is there actual data that even close to half of respondents would forego ANY trans therapy (including hormones??)

Reply 3: Thank you for your comment. The paragraph you are referring to does not mention decision aids. The purpose of the paragraph is to highlight the decisional conflict experienced by individuals who go through the gender affirming journey. Our belief that decision aids would help reduce the decisional conflict comes later in the introduction. To address the comment, we have made 3 key changes to the paragraph: (i) removed the verbatim message, (ii) swapped reference 17 for the more appropriate reference 1; and (iii) modified the conclusion of the paragraph.

Changes made: Given the complex and preference-sensitive ~~emotionally loaded~~ nature of decisions around gender affirming therapies, it follows that transgender persons would have a high degree of decisional conflict (17). This may be due to the task of selecting treatment options that involve immediate and long-term risks ~~may "involve risk, regret, and challenge to personal life values"~~ (19). A ~~The~~ 2015 ~~U.S.~~ Transgender Survey highlighted the psychological distress reported by ~~revealed that up to half of~~ respondents who identify as TGD (18). It follows that this distress may be related, in part, to the uncertainty regarding which gender affirming therapy best aligns with the individual's preferences ~~were unsure of whether they would undergo gender affirming therapies (17).~~ (Line 106-110)

Comment 4: Line 130: What do the authors mean by "brief online search"?? (how "brief" is brief?)

Reply 4: Thank you for your comment. To avoid confusion, we have removed the word "brief" from the sentence. The online search details can be read in the methods section.

Changes made: We conducted a systematic review to identify studies that describe the development or evaluation of patient decision aids, and an ~~brief~~ online search of Google and relevant conferences to find any tools that have not been published in the academic literature. (Line 168)

Comment 5: Lines 167-173: The authors approach to searching for "decision aids" relies too heavily on items that are called "decision aids"… and which have the word "decision" in their name. For example, literature about the pros and cons of different treatment options could be called "decision aids" – but would never be captured by the author's methodology. This is not to say that their search for "decision aids" is wrong – it is just in and of itself limiting…. And this limitation should be more readily acknowledged in the discussion section.

Reply 5: Thank you for your comment. We have inserted this limitation in the discussion section of the manuscript to address the reviewer's comment.

Changes made: In regard to limitations of our review, many studies do not provide sufficient details on the patient decision aid. Thus, it is challenging to determine patient decision aid eligibility for inclusion in our systematic review. Second, it is possible that we did not capture all the possible search terms for the concept of 'decision aids'. The lack of description to enable us to determine patient decision aid eligibility and the possibility that the list of search terms for the decision aid concept was not comprehensive makes it possible that we omitted some studies that otherwise would meet our inclusion criteria. (Line 318-321)

Comment 6: Line 302: The full citation for "Garcia 2019, unpublished data" is:
Sexual Function after Vaginoplasty: Challenges, Clinical Findings, and Strategies for Improvement-- Urologic Perspectives; Garcia; Clin Plastic Surg 45 (April 17, 2018) 437–446 http://sci-hub.tw/10.1016/j.cps.2018.04.002

It contains the decision tool in question, and discussion. Would be useful to readers of this manuscript to have the full reference.

Reply 6: Thank you for your comment. We have included the reference as requested by the reviewer.

Changes made: Although some decision support interventions are emerging, such as a pre-surgery "counseling aid" for transgender women to decide on their preferred type

of vaginoplasty (~~Garcia M, 2019, unpublished data~~44) (Line 360)

(44) Sexual Function after Vaginoplasty: Challenges, Clinical Findings, and Strategies for Improvement-- Urologic Perspectives; Garcia; Clin Plastic Surg 45 (April 17, 2018) 437–446 http://sci-hub.tw/10.1016/j.cps.2018.04.002

Comment 7: The three important weaknesses, which the authors SHOULD address in their discussion section, are:
1. Gender transition related "therapies" vary widely, and so does their compatibility with decision aids (compare hormone therapy options with masculinizing surgery options, for example). Hence, the authors should clarify this when they refer often to "therapies".

Reply 7: Thank you for your comment. We address this comment, by adding an important sentence to the opening paragraph of the manuscript to be clear about what we mean when we say 'therapies'.

Changes made: For the purposes of this review, gender affirming therapies refers to the broad range of options (both surgical and hormonal) that are available to TGD persons. (Line 72-73)

Comment 8: While there is no doubt that patients benefit from help with decision making, how do w know for sure that surgeons, for example, are not already taking this on during their pre-surgery discussion with patients? (I would believe many do not, but how many do and do not is not really known).

Reply 8: We address this comment by adding that decision support can occur in the absence of a patient decision aid prior to the visit. We also state that we do not know how many use or do not use patient decision aids with their TGD patients.

Changes made: Patient decision aids may help TGD persons understand the risks involved for each gender affirming therapy, so they can make informed decisions. Although decision support can occur in the absence of a patient decision aid, these ~~These~~ tools can facilitate better communication with clinicians by providing the most current, evidence-based information, so that TGD persons can share their goals and concerns to help avoid decisional regret. To date, it is unknown if any clinics who treat TGD persons during their gender affirming journey use patient decision aids. Although some decision support interventions are emerging, such as a pre-surgery "counseling aid" for transgender women to decide on their preferred type of vaginoplasty… (Line 355-360)

Comment 9: The authors should address this question: what is the difference between

a “decision aid”, and “decision making tools” (whether these be pictures and text that some doctors may share with patients in office, to help patients with decision making?) In other words, I’m not sure it is fair or accurate to say that help with decision making is not occurring now only because everyone is not using something called a “decision aid” which has been published and shared? Hence, the authors should state that while a published decision aid would be helpful, help with decision making during pre-treatment discussion CAN still happen.

Reply 9: The reviewer makes a good point, and we clarify this in the discussion section.

Changes made: Patient decision aids may help TGD persons understand the risks involved for each gender affirming therapy, so they can make informed decisions. Although decision support can occur in the absence of a patient decision aid, these ~~These~~ tools can facilitate better communication with clinicians by providing the most current, evidence-based information, so that TGD persons can share their goals and concerns to help avoid decisional regret. (Line 355-356)

Comment 10: I think that the authors, some of whom are experts in the field of decision making, should weigh in on whether it is the right thing to exclude data about outcomes with decision aids… as the Ozer et al group did. Yes, the data on outcomes may be widely variable, but here I think that providers should be cite the best data that they have from their own center re. risks of each treatment, at a minimum, and ideally, include what general data can be culled from the literature. Otherwise, it is a circular argument to say that we are justified in making decision aids without outcomes data, because the published data is variable. Besides, it is hard to believe that these same providers do not discuss outcomes data re. different treatment options with patients behind closed doors.

Reply 10: Ozer et al did not include outcomes/probability data as they did not feel they had adequate long-term data from their center. This is certainly a limitation of this work. This is a field that continue to evolve and requires more long-term outcomes data. We discuss the absence of outcome data in this area of research throughout the manuscript. We raise this issue to prime the reader in the introduction:

“…the unknown long-term outcomes of hormonal and high-risk surgical interventions, the lack of provider understanding (7)…” (Introduction, Line 69-70)

“Each procedure, performed at different stages over time, carries functional and subsequent emotional risks, which have not been clearly defined by medical experts (10).” (Introduction, Line 78-80)

Further, the authors of the patient decision aid included in our review explicitly state why they could not include numerical risk data. We include this in the results section:

"The lack of outcome probabilities in the patient decision aid impacted the quality criteria score." (Results, Line 288)

"Numerical risk data was omitted from the patient decision aid due to the lack of quality, reliable evidence." (Results, Line 275-276)

We raise this issue of outcomes data again in the Discussion section of our manuscript. We add that in the absence of reliable data a good tool will be honest enough to say that there is insufficient information and more research is needed:

"Furthermore, a key element of decision aids is the provision of risk information, so the absence of long-term psychological and physical outcomes for hormonal and surgical interventions for TGD in the medical literature has implications for potential developers and users of these tools (1-3). For instance, Ozer et al. cited insufficient evidence for not including numerical data on outcomes in the transmasculine genital GAS decision aid (37). However, in the absence of reliable data, a quality patient decision aid should state that insufficient evidence exists, and that more research is needed. The lack of long-term risk information makes it challenging for clinicians to counsel adolescents, young adults and their families." (Line 345-356)