



Research paper

Evaluating research information on practitioner websites describing the use of acupuncture as an adjunct to IVF

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Received 2 February 2015; received in revised form 7 July 2015; accepted 8 July 2015

Abstract

Introduction: Despite the advances in assisted reproductive technologies the live birth rate remains low. In response to the high rates of unsuccessful treatment, and stress arising from repeated IVF cycles, women seek out other forms of treatment, such as acupuncture, to optimise their chance of achieving a successful pregnancy, live birth and to manage their infertility related stress.

Method: An Internet search for Acupuncture and IVF websites from Sydney, New South Wales was undertaken and websites meeting the inclusion criteria were appraised using a modified assessment tool. The website was then evaluated.

Results: 137 sites were identified with forty-seven websites eligible for appraisal. The majority of acupuncture websites did not present accurate and quality information. Some acupuncture websites made unsubstantiated claims about the effectiveness of acupuncture resulting in the potential to mislead consumers about the benefits of acupuncture. This occurred in a number of ways such as not reporting full research findings or providing details on the clinical population, presenting incomplete data, omitting important data and claims of benefit with little research evidence or low levels of research evidence.

Conclusion: Our analysis of websites promoting acupuncture use for IVF showed that the information used on websites contains many inaccuracies. Improving the quality of IVF acupuncture websites to protect the consumer is needed, and this study highlights a continuing need to improve research literacy among acupuncturists.

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Keywords: IVF; Acupuncture

1. Background

Complementary and Alternative Medicines (CAM) are commonly used both in Australia and overseas [1,2] and usage is reported to be increasing [2]. Recent findings found 79% of a sample of Australians had used CAM in the last 12 months [2]. A small percentage of the 79% (17.6%) would try CAM therapies before using conventional medicine [2]. A systematic review of CAM use in the UK found the average one-year prevalence rate of CAM use was 41.1% [3] and the average in the U.S. was 33.2% [4]. CAM use is not often disclosed to medical practitioners [1,5] and thus the information about CAM therapy from healthcare professionals is limited. Information

about CAM therapies and health comes from various sources but increasingly via the Internet [6,7] and thus consumers are faced with the difficult task of appraising the quality, accuracy and currency of the content of websites [6,7].

CAM therapy use is also increasing for those wishing to conceive and those expecting [8,9] as well as those exploring its use for assisted reproduction. Despite the advances in assisted reproductive technologies the live birth rate remains low, with 17% of live births resulting from 70,000 treatment cycles [10]. In response to the high rates of unsuccessful treatment, and stress arising from repeated IVF cycles, women seek out other forms of treatment to optimise their chance of achieving a successful pregnancy, live birth and to manage their infertility related stress [11]. Use of complementary therapies such as acupuncture, and herbs, to reduce psychological distress, and provide adjunctive treatment to improve outcomes are increasingly common [11–14]. Whilst the clinical evidence of adjunctive acupuncture

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to improve live births currently suggests no benefit [15], a review of studies describing women's experiences of acupuncture for infertility found that women described acupuncture as empowering, and broader improvements to their well-being were reported [16].

Providing fertility support by acupuncture practitioners is common [17]. Australian and New Zealand acupuncturists frequently report treating general fertility conditions, biomedical fertility conditions, and addressing fertility related stress [17,18]. The majority of acupuncturist's receive frequent self-referral from their clients [17], and to promote their practice use various modes of promotional material including social media, paid advertising, and promotional talks in the community. Written information on practice websites is common and enables acupuncturists to communicate to patients the benefits and risks of treatment, and to facilitate informed decision making about their health options. This website information can shape patients expectations, and influence healing [19]. Advertising standards developed by the Chinese Medicine Board of Australia provide guidelines on acceptable advertising and emphasise the need for information to be based on the highest quality scientific evidence available, and that the quality of the evidence should be communicated accurately to the potential/existing patients [20].

With the increasing use of acupuncture to support and treat fertility related conditions, and mixed research findings describing the clinical outcome of acupuncture as an adjunct to IVF, we were interested to examine how this was communicated to patients. The aim of this study was to examine the quality and accuracy of research information communicating the effects of acupuncture as an adjunct to IVF on practice websites.

2. Method

2.1. Study population and setting

In June 2014, 4271 practitioners (in all categories of Chinese Medicine) were registered with the Chinese Medicine Registration Board of Australia [21]. The sample for this study was selected from the Australian state with the largest number of acupuncture practitioners (including registration in acupuncture and other e.g. Chinese Herbal dispenser). New South Wales met these criteria and we refined the sample further to focus on the major metropolitan city, Sydney.

Acupuncture websites were identified from an Internet search using the 'Google' browser. The search terms 'acupuncture' and 'IVF' and 'Sydney' with limits on country (Australia only) and time (within the past 12 months) was run. The search was run over a two-week period in June 2014. Sites underwent an initial screening by SF. Practice websites were screened for (1) acupuncture treatment provided for infertility/fertility support as a major focus, and (2) detailed information presented on the website describing a role of acupuncture to help women seeking fertility support and treatment. Websites that included information on other conditions acupuncturists treat were included however websites that mention fertility or IVF in passing only i.e. as one of many conditions acupuncturists could benefit such as pain, fertility, headaches, etc. were excluded. For sites

that were identified as partially meeting the inclusion criteria further review was undertaken by SF and CS, and the material discussed to reach a consensus.

2.2. The assessment tool

Websites that met the inclusion criteria had the content of their website analysed using a modified assessment tool [22]. A copy of the modified tool can be seen in Appendix 1. The assessment tool was modified to make it specific to IVF and the use of research on websites. Some questions from the original tool, which were not relevant, were deleted. The focus of this instrument was to appraise how research was used and interpreted. The purpose of the appraisal criteria was to assess the robustness of the research used on the website, the statistical content, the usefulness of the research/information presented and how well the research related to the readers. Scoring for the criteria used the responses: yes, no or partially. No numerical value was allocated to yes, no or partially responses. There were a total of 21 items. The scoring for this assessment tool can be interpreted qualitatively and or through content analysis and frequency counts.

2.3. Data extraction and analysis

Each website was assigned a unique identifying number. The website was then evaluated using the modified criteria of appraisal tool for the presentation of research findings [22]. For trials meeting the screening criteria further data was extracted from the website and then appraised. In addition the claims that each website made about the effects of acupuncture were also extracted and recorded including which effects were supported by evidence and which effects were not backed up by evidence. The researchers then descriptively summarised the data in relation to each of the criteria.

3. Results

During the two-week period a total of 137 sites were identified (Fig. 1). Twenty-five websites appeared in the 'Google' search multiple times and these duplicates were removed. Further screening of 112 sites was undertaken. Fifteen sites were excluded because IVF/fertility acupuncture was not the main focus of clinical practice reported on the websites, and there was no mention of research or statements relating to acupuncture fertility/IVF. Forty-seven websites were eligible for appraisal.

Following a review of the 32 websites only one website met the majority of the appraisal criteria (19 items met the 'yes' criteria out of a possible total of 21). This website was clearly superior to the other websites in its robustness and usefulness of the research reported on the website. The site listed and summarised IVF/fertility research including research that had positive, negative or no difference in the clinical outcomes, it identified key findings from systematic reviews for IVF and acupuncture, identified the benefits for acupuncture (for IVF/fertility) and provided references to the research cited. The website also included information that may help potential users build on their existing

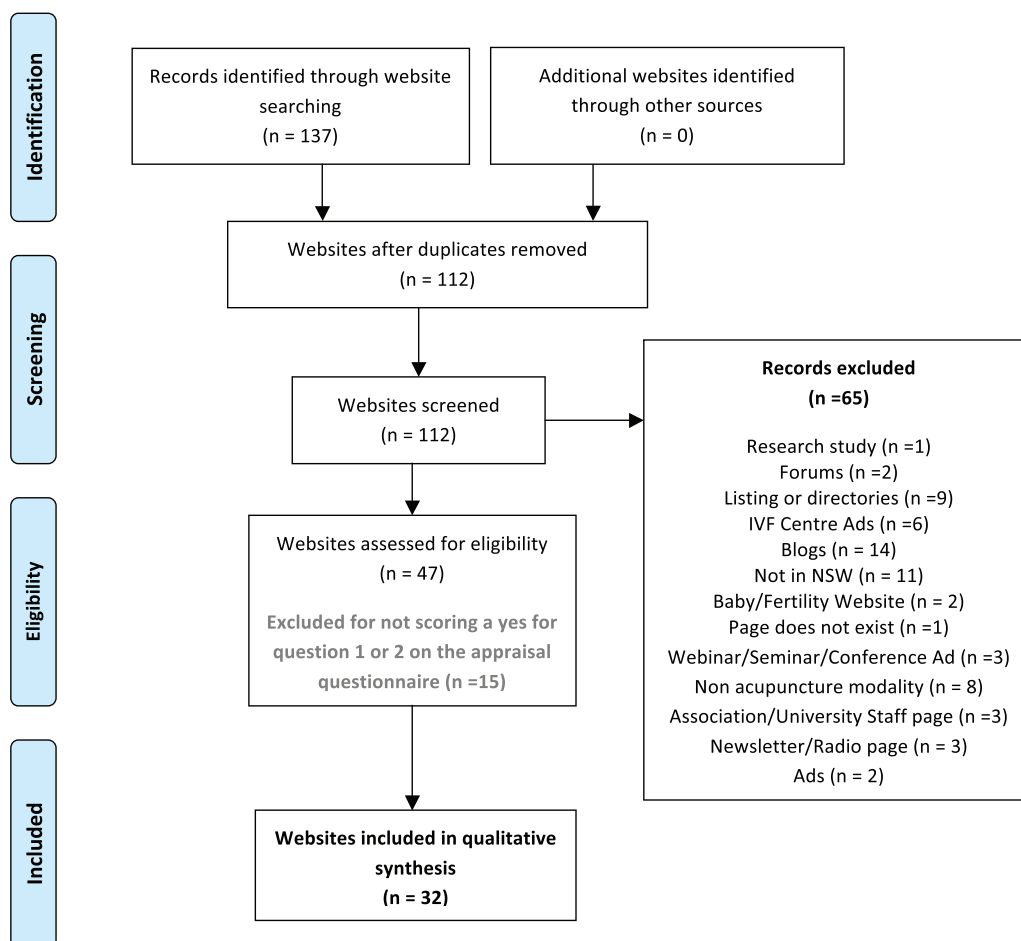


Fig. 1. Search results.

knowledge through the presentation of technical data in a way that help readers understand, provide information on how the research impact on practice, and included a clear description of what treatment is required/recommended.

The 31 other websites included information that was less comprehensive and inconsistent with the reporting of IVF and acupuncture research results. These 31 websites did not meet the majority of the appraisal criteria (websites had range of 0–7 items that met the ‘yes’ criteria out of a possible total of 21). Many websites attempted to provide information which lead to partially fulfilling the appraisal criteria (websites had a range of 9–17 partially responses). The common areas where the websites did not meet the appraisal criteria are listed in Table 1.

Table 1
 List of areas that the websites did not meet the appraisal criteria.

Areas not meeting appraisal criteria
Unreferenced benefits (including benefits that have been researched and those that have no research evidence)
Mention of research but not referenced
Unsupported treatment recommendations
Technical data presented in a way that was not intelligible to non-specialist readers
Out of date research presented
Presentation of misleading research evidence

3.1. Unreferenced benefits

The majority of websites (26/32 (81%)) did not support their claims/assertions about the potential effects of acupuncture for IVF/assisted fertility (Table 2). Two websites were assessed as partially supporting their assertions and four supported their assertions.

There were generally two types of claims made:

- claims of benefits that have some research evidence but the evidence was not referenced,
- claims of benefits that have no supporting research evidence or poor supporting research

3.2. Claims of benefits that have some research evidence but the evidence was not referenced

Claims of benefit with some research evidence were made but the evidence was not referenced on the majority of websites for the following benefits: reduction of stress and or anxiety [12,23–27], egg quality (however benefit has only been found for women with PCOS undergoing IVF not with any other cause of infertility) [28,29], increased blood flow to the uterus [30,31],

Table 2
Summary of the assertions/claims made about the effect of acupuncture (both referenced and unreferenced).

Cycle Regulate menstrual cycle
Follicles Ovarian follicles – promote or help you grow healthy, mature follicles, improve development of follicles (which improves egg quality), increases number of follicles
Endometrial lining Endometrial lining (strengthens, healthy, increases blood flow, improves quality and thickness)
Uterus Uterus (Increases blood flow, get uterus ready for transfer/more receptive to implantation, increases response of women’s uterus, enriches uterine lining, supports, prevents uterus from contracting, increases lining to reduce chance of miscarriage)
Ovaries Helps ovaries recover from egg collection, improves ovarian blood flow, improves function (which can produce better quality eggs)
Egg quality Aids in producing good quality eggs/improves egg quality, supports developing embryo, increasing egg viability
Emotional Stress – calms the mind, decreases stress levels Anxiety – reduced
Implantation May help ensure fertilised egg not rejected (due to aiding the immune system and reducing stress hormones) Supports developing embryo Reduces miscarriage
Semen Improves quality (which produces better quality and quantity of embryos) and production (morphology, motility and count)
Other Improves circulation and endocrine system Improves fertile mucus Reduce IVF side effects Stabilises/regulates hormone levels Aids implantation Aids with sleep/improves sleep patterns Improves environment to ensure no blockages are present

increased blood flow to the ovaries [32,33] and implantation rates in animals for those with implantation failure [34–36].

3.3. Claims of benefits that have no supporting research evidence or poor supporting research

The claims of benefit with little research evidence or low levels of research evidence included; improved egg quantity, miscarriage, endometrial thickening, stimulating follicle development, supporting the fertilised egg and improving semen quality (see Supplementary file).

3.4. Mentioned research but unreferenced

Twelve of the thirty-two websites made claims about IVF and acupuncture research but did so without referencing the

Table 3
List of some of the claims made about research, which were unreferenced.

Unreferenced research claims
“Modern clinical trials have shown acupuncture, in conjunction with IVF, to significantly improve the chances of a successful pregnancy”
“Acupuncture on the day of IVF transfer increases the rate of successful live birth by nearly 50%”
“Recent studies (none listed) have demonstrated a higher percentage of successful pregnancies when acupuncture is used in conjunction with any reproductive technique, including IVF, ICSI, FET, IUI, PGD and stimulated cycles”
“Almost double your IVF success rate with acupuncture”
“Research shows 40–55% more pregnancy’s than IVF cycles that have not had acupuncture as part of the support treatments”
One site summarised the research but did not reference any of the research and mentioned, “if 10 IVF patients received acupuncture that an extra one would fall pregnant”

Table 4
Examples of unsupported treatment recommendations.

Unsupported treatment recommendations
Treatment a week after transfer to improve the implantation of the embryo and establish a strong pregnancy
“50% or more success rate when acupuncture is administered at the time of egg transfer (in this case the link on the site takes you to a blank page)”
Treatment post embryo transfer. . . “increases implantation success and reduces the chance of miscarriage”
Recommending a protocol based on scientifically proven evidence based treatments with clinical experience (involving a course of acupuncture treatment in preparation of an IVF cycle approx 2–3 months prior to IVF then acupuncture commencing on first day of menstrual cycle involving two treatments a week in addition to acupuncture before and after transfer) but no clarify about which aspects of this treatment protocol are base on evidence based and what aspects are based on clinical experience

research. See Table 3 for a list of some of the claims including quotes.

3.5. Unsupported treatment recommendations

The unsupported treatment recommendations included statements with no references. See Table 4 for examples of unsupported treatment recommendations including quotes.

3.6. Presentation of statistical data to non-specialist readers

Examples of websites who interpreted and reported research findings in a way that misrepresented the statistics include a number of websites who reported the group receiving acupuncture as having a “50% higher pregnancy success rate”. These websites reported this statistic only and did not report the success rates for the ‘control’ group e.g. acupuncture group had a 43% success rate compared to 26% in the control group. These websites were reporting on one of the first RCTs to evaluate the role of acupuncture as an adjunct to IVF [37].

Table 5
Examples of websites that presented misleading research.

Presentation of research that may mislead
Omitting important research outcomes: presenting data on three women (of 6) who fell pregnant with acupuncture but failing to mention only one continued their pregnancy past the first trimester [26]
Reporting inaccurate findings of a study: Website reported the findings of the 2006 Smith et al. study as “using acupuncture can double fertility rates” however that was not the main outcome of the study [30]. The link on the above-mentioned website does take the reader to a media release that states there are increased fertility rates with acupuncture. Whilst it appears the website is not intentionally misleading the information presented about Smith et al.’s 2006 study, they have not used the direct source [30].
Some websites reported research figures from a paper where such figures did not exist. A website which mentions a systematic review by Zheng 2012 and quotes the figures “41% women fell pregnant (who had acupuncture) compared to 25 women in control groups” however these figures are not in the review [31]
A number of websites that reported increased fertility rates, improvements in outcomes or an increase in IVF success with acupuncture but do not describe what the ‘normal/baseline’ rate is, or what success is measured as. E.g. “acupuncture on the day of IVF transfer increases the rate of successful live birth by nearly 50% or almost double your IVF success rate with acupuncture”. Nor do they state whether success is measured as a positive pregnancy test or a live birth or other
Most websites that mentioned research did not present the population of the group of women for whom the improved success rates occurred in.
One website referenced a 2008 review article [32] to describe the effectiveness of acupuncture for IVF and then refers to one of the articles used in the review analysis (meta-analysis) to back up the claims made [33]

3.7. Keeping websites up to date

Only two websites reported on the most recent systematic review [38] (at the time of undertaking the search) which suggests no overall effects of adjunctive IVF for acupuncture. We found a focus of websites referring to older studies and systematic reviews by Manheimer et al. in 2007 [39], yet no reference to more recent papers and reviews which provide an update and different interpretation of the evidence.

3.8. Presentation of misleading research evidence

Not reporting full research findings or details on the clinical population has the potential to mislead the public about the effectiveness of acupuncture. See Table 5 for examples of websites that presented misleading research including quotes.

4. Discussion

Our study found that the majority of acupuncture websites did not present accurate and quality information. We found some acupuncture websites that made unsubstantiated claims about the effectiveness of acupuncture resulting in the potential to mislead consumers about the benefits of acupuncture. This occurred in a number of ways such as not reporting full research findings or providing details on the clinical population, presenting incomplete data, omitting important data and claims

of benefit with little research evidence or low levels of research evidence.

The standards for social media and advertising for acupuncture (Australian Health Practitioner Regulation Agency – AHPRA) include presenting information in an unbiased, evidence-based context, using factual information and not making unsubstantiated or misleading claims [20]. It is important that all consumers should have access to honest, accurate and complete information in a form they can understand especially for consumers at ‘risk’ or vulnerable such as IVF patients [40]. Our study found that websites claimed acupuncture benefits with little research evidence or low levels of research evidence. This included improving egg quantity, miscarriage rates, endometrial thickening, stimulating follicle development, supporting the fertilised egg and improving semen quality. The websites that list these benefits of acupuncture appear not to be presenting the highest standard of clear, honest, factual information about the use of acupuncture with IVF and may be creating an unreasonable expectation of beneficial treatment. Our findings are similar to a 2013 study by Bishop and Salmon which investigated the content and function of acupuncture leaflets and found that the leaflets were broadly consistent with the evidence for acupuncture but that there were some inconsistent claims [41].

Recent evidence highlights the increasing trend of Internet users to access the Web to collect medical information [6,7] and use this information to affect their choice of treatment [42]. IVF patients have high information needs [43] and rely heavily on the Internet for fertility information [44]. This remains a concern with research findings indicating that online information about infertility is often incomplete, misleading or inaccurate [43]. The findings from our study support these findings from Zillien et al. (2011) [43]. Incomplete or misleading information has the potential to unduly influence the choices women make about their acupuncture treatment and add distress and burden to the already stressful IVF process. IVF treatment is a significant economic burden to patients [45] and additional treatments such as acupuncture may add a further financial burden and undesired pregnancy outcomes; women who worry about financial concerns have been shown to have a reduction in pregnancy outcomes and an increase in miscarriages [46]. For women who cannot afford to engage in acupuncture treatment they may feel distress at not doing all they can to fall pregnant. Providing more detailed guidelines or rules on how acupuncture and research information should be presented is recommend and should include the following points:

- Information about acupuncture success must include baseline rates (not including baseline rates can appear to inflate acupuncture success rates and the words ‘double’ or the figure ‘50%’ can imply substantial improvements).
- Information about the population the research was conducted on should be reported. Reporting results without mentioning the population implies the benefits are applicable to the whole population rather than certain populations and may unduly influence decisions about undertaking acupuncture treatment.
- Complete reporting of study findings is required. In-complete reporting of study findings may imply that acupuncture is

better than other treatments or create an unreasonable exception of benefit.

The findings of our study indicate that not all websites promoting acupuncture use for IVF, present information and or research, according to the AHPRA social media and advertising guidelines. Thus these sites present information that is incomplete, misleading and or inaccurate which may lead to the public/consumer being misinformed about the success of acupuncture and or the applicability of the results. Infertility sufferers use the Internet for information, emotional, social and psychological support, self-help and decision-making which has the following benefits for infertility patient's: feeling better informed, facilitating decision making, reducing social concerns, a source of emotional support and helping the patient feel more in control [43]. Acupuncture and IVF websites should aim to provide the same benefits via the Internet to consumers and as such set a high standard that ensures that Internet browsers are provided with honest, accurate, evidence-based information about acupuncture use in conjunction with IVF. This is particularly important as one of the biggest problems of online information is the difficulty for consumers to evaluate the quality of information being presented by the website [43]. Our observations may be explained by acupuncturists not being fully aware of the AHPRA guidelines; this can be addressed by educational seminars or webinars on understanding the AHPRA guidelines, evaluating and reporting of IVF research.

There are several limitations of our study. The sample of websites assessed in this study was from one large metropolitan city only, and our findings may not represent the websites in other states/territories in Australia. The poor quality and accuracy of websites may be influenced by a number of factors including a lack of access to current, full-text research papers, practitioners lacking critical thinking and appraisal skills required to summarise and present research findings, a lack of awareness to recent changes to advertising guidelines, practitioners/clinics not fully understanding the potential consumers vulnerability and needs, a lack of access to examples of high standard presentation of research via websites and or the purpose of the website (e.g. to sell the product and services versus presenting well balanced research evidence). Further investigation into the reasons and motivations for presenting IVF and acupuncture research via websites would be valuable. The sampling strategy used focused primarily on those clinics specialising in acupuncture IVF support, thus this study offers insights into the way that practitioners present research information on websites. However practitioners may also provided research information on acupuncture and IVF during consultations and these also require investigation.

5. Conclusion

Our analysis of websites promoting acupuncture use for IVF has shown that the information used on websites contains many inaccuracies. Improving the quality of IVF acupuncture websites to protect the consumer is needed, and this study highlights a continuing need to improve research literacy among

acupuncturists. More detailed guidelines on how acupuncture and research information should be presented is recommend.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.eujim.2015.07.025>.

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