

PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Intermittent pneumatic compression for venous thromboembolism prevention: a systematic review on factors affecting adherence
AUTHORS	Greenall, Richard; Davis, Rachel

VERSION 1 – REVIEW

REVIEWER	Kristofer Bjerså Department of Surgery Sahlgrenska Academy University of Gothenburg Sweden
REVIEW RETURNED	27-Feb-2020

GENERAL COMMENTS	<p>Thank you for having the honor to review this well aimed study that covers a great need within clinical practice and especially within implementation of pneumatic compression interventions. In general, the authors have made a good work on this manuscript and my suggestions for revision may be perceived as minor. As I do not have English as first language, I do not have the competence to review formulations concerning choice of words. However, as I teach in written academical presentation and anatomy of the article paper, I have made suggestions for improvements.</p> <p>In summary, I strongly suggest this paper to be published after revisions.</p> <p>BACKGROUND</p> <ul style="list-style-type: none">• Well presented with a nice flow from VTE towards health economics• It is good that the authors correlate previous studies to their own country, but for the generalizability of the article as well as acceptance from international audiences, more inclusion of a European perspective could benefit. As an example, start out with the current global trend/frequency, progress towards the European figures and then end up with the British situation as this is the most important scope for this journal. Or vice-a-versa, as currently presented very nicely in paragraph three.• Beneficial to the introduction text would be to show the reader that the authors are aware of current correlating research concerning graduated compression stockings by adding a reference, e.g. R Wade, F Paton, N Woolacott. Systematic review of patient preference and adherence to the correct use of graduated compression stockings to prevent deep vein thrombosis in surgical patients. Journal of advanced nursing 2017; 73 (2): 336-348.• Further, also develop the text with an additional sentence on the compression physiology, as the current last sentence in paragraph four is very vague and not strengthen by a reference.• Page 5, row 17: "individually" may be changed to "separately" to
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better describe interventions. Same sentence: I suggest that pure results from the referred study concerning effect of IPC are made more generalizable or “easy to read” then just copy and paste from the original article. Hence, exclude RR, CI, etc. and instead describe it by your own words.

METHOD

- Strictly presented with a good flow-chart. One could argue that Cinahl is missing as database search, which comprise many of the allied health articles aiming to investigate and explore perceptions, experiences, etc. However, nowadays Pubmed grasp almost all of these articles anyway so I personally don't see a point in adding this to the article.
- No standardized quality assessment was performed, but as I perceive it a good argumentation for this choice is included in the method section. Of course, this may be seen as a weakness, but then there must be value of performing such assessment and I agree with the authors that this was not beneficial in the current study.
- No presentation of ethical considerations or approval of the included studies is currently included in the method section. This may be included last in the method section in just a few sentences in order to keep the strict demand on ethical research throughout the research process including this summarizing level as this study.

RESULTS

- In the beginning of the results of this manuscript the authors have chosen to present the majority of the traditional method section text. As I perceive it, there is nothing wrong with this allocation of text as the content is correctly presented. However, this might not correspond to the journal's guidelines. This is a decision for the editor.
- Abbreviation of Intensive Care Unit, ICU, is not explained as it appears the first time in the text, but instead later on. Please revise to explain at the naïve part of the text.
- In most academic texts, numbers below 11 are written in words in the text (e.g. 4 becomes four). This is lacking throughout this manuscript.
- It is not clearly state on HOW the factors of the results were retrieved. I do think it would benefit the study to explain this in more detail, as a suggestion in the beginning of the results or under an analysis heading in the method section. This text could answer questions as “Was the text of each article guiding towards the factor in choice of word?” and “Was the context important from the beginning?”. It is important to have transparency in how the study was performed. Concerning data retrieval, this is very clear to the reader. But when It comes to analysis and result structure it is currently very vague. Form a readers point of view, this may be perceived as data have not been fully processed which often is the case in bachelor or master thesis text. However, in a research article this need to be as clear as possible.
- Table 2 present factors within each article. However, it would be more logical to present the factors categorized and show which article that supports which factor. As currently, it is hard for a reader to summarize each factor.
- In the beginning of each factor text, the number of articles supporting this factor is stated. This is correct. However, in systematic research reviews as well as in other forms of summative research, it is the authors job/duty to process and package the main finding within that specific text section. Not only make a “copy-and-

paste” from the included articles, as this can be made by each reader themselves. The real job for the author/researcher of the results in a systematic review is to package the data (e.i. Results text from the included articles), process this and make a summative text that serves the reader with “easy-to-grasp” sentences. I suggest that this is made to this result, in the text of each factor. I suggest as follows within each factor paragraph/text section: First sentence on origin in numbers of articles (as currently presented). Next, the general findings from within this factor presented by 1-3 sentences. This is the real analysis of the data and answer the question “what is the main essence within this factor?”. Then, 1-3 sentences on variations of this general finding, still on a generalized level. This could be mixed and continued with attaching sentences from the different articles very much like that of the current text of each article, but in much more compact presentation. Finally, contradictions from within the factor is presented, and also attached to the included articles. Why this suggestion of revision? Current results of the factors are not research, just copies of the results from each article. Not research. More like book or film reviews in a newspaper. Boring text to read for researchers, devastating towards the possibility to make clinicians read and understand the message. I advise the authors to really consider this suggestion, and if there is questioning concerning the truth of the statements given above, please consult the literature of academical text presentation in systematic reviews.

- Quality assessment is included in the results, despite that the authors have stated that there would be no such. I believe that this section is good and really provides an additional depth to the future article. However, I’ll have to remind the authors that this is still a section of the Results and hence it need to be fully objective in its presentation. As currently, subjective values are made by the authors (e.g. “...which could have been subject to recall bias.” , “It is difficult to determine...”) and must be rewritten to a more objective stand, or excluded. However, I do strongly suggest that this section remain in the final version.

DISCUSSION

- The second paragraph of the Discussion must be seen as the Limitation section of this manuscript. I suggest that this is given a separate heading within the discussion section, preferably later or last in the discussion section.

- In general, the discussion section is acceptable. I miss discussion on person centeredness as this is the current perspective that modern medicine and healthcare should be performed and adjusted for. This may be included, and I suggest the authors to browse the work done by Professor Brandan McCormack at Edinburg University. Further, the desire for control and safety is also lacking in the discussion. Within the nursing community in Europe as well as within the UK, safety is one of the main core competences for good and proper care. Similar competence requirements are stated within my own, medical profession. Several references can be referred to, e.g.

T Mako, P Svanäng, K Bjerså. Patients' perceptions of the meaning of good care in surgical care: a grounded theory study. BMC nursing, 2016

Swedberg, L., Hammar Chiriac, E., Törnkvist, L. & Hylander, I. Patients in 24-hour home care striving for control and safety. BMC Nursing 2012

- The conclusion is also acceptable to the present manuscript.

	<p>Finally, I like the authors to consider the following references for suitability in this manuscript, preferably the discussion section. Please know, that none of these have any connection to the current reviewer. They are merely suggestions for potential improvements of the manuscript by using some core references:</p> <p>Parry, K., Sadeghi, A.-H., van der Horst, D., Westerink, J., Ruurda, J.P. & van Hillegersberg, R. Intermittent pneumatic compression in combination with low-molecular weight heparin in the prevention of venous thromboembolic events in esophageal cancer surgery. <i>Journal of Surgical Oncology</i> 2017</p> <p>Martin, J. L., Clark, D. J., Morgan, S. P., Crowe, J. A. & Murphy, E. A user-centred approach to requirements elicitation in medical device development: A case study from an industry perspective. <i>Applied Ergonomics</i> 2012</p> <p>Lurie, F., Scott, V., Yoon, H.C. & Kistner R.L. On the mechanism of action of pneumatic compression devices: Combined magnetic resonance imaging and duplex ultrasound investigation. <i>Journal of Vascular Surgery</i> 2008</p> <p>Lindberg, C., Fagerström, C., Willman, A. & Sivberg, B. Befriending Everyday Life When Bringing Technology Into the Private Sphere. <i>Qualitative Health Research</i> 2017</p> <p>Kakkos, S.K., Caprini, J.A., Geroulakos, G., Nicolaidis, A.N., Stansby, G., Reddy, D.J. & Ntouvas, I. Combined intermittent pneumatic leg compression and pharmacological prophylaxis for prevention of venous thromboembolism. <i>Cochrane Database of Systematic Reviews</i> 2016</p> <p>Ho, K., M. & Tan, A. J. Stratified Meta-Analysis of Intermittent Pneumatic Compression to the Lower Limbs to Prevent Venous Thromboembolism in Hospitalized Patients. <i>Circulation</i> 2012</p> <p>Wishing you the best of luck on the revisions and really encourage you the get this manuscript published. Thank you once again for having the honor to review this manuscript!</p>
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REVIEWER	Cristhiam M. Rojas-Hernandez The University of Texas MD Anderson Cancer Center USA
REVIEW RETURNED	27-Apr-2020

GENERAL COMMENTS	<p>I thank the authors for taking up on the task of reviewing such an important topic.</p> <p>Minor comments:</p> <p>1. In the Strengths and limitations-section, the authors state that this is the first systematic review on the topic of factors affecting adherence to pneumatic compression devices for VTE. In fact, there has been at least one systematic review that included adherence and ease-of-use as outcomes of interest (reference # 17). While this current systematic review provides a more detailed insight in the topic, the previous analysis above referenced is worth mentioning.</p> <p>2. Quality assessment section: I suggest to describe the risk of bias of the selected studies using the Cochrane assessment tool or similar.</p>
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VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

BACKGROUND

It is good that the authors correlate previous studies to their own country, but for the generalizability of the article as well as acceptance from international audiences, more inclusion of a European perspective could benefit. As an example, start out with the current global trend/frequency, progress towards the European figures and then end up with the British situation as this is the most important scope for this journal. Or vice-a-versa, as currently presented very nicely in paragraph three.

- We thank the reviewer for this comment. We do agree that it is important to consider national, European and global perspectives and we have included these in the introductory section. However, in one of our initial drafts of this manuscript we had the data organised in the way the reviewer suggests but after discussions we felt that this was better organised the way it is now so we have left this as it is.

Beneficial to the introduction text would be to show the reader that the authors are aware of current correlating research concerning graduated compression stockings by adding a reference, e.g. R Wade, F Paton, N Woolacott. Systematic review of patient preference and adherence to the correct use of graduated compression stockings to prevent deep vein thrombosis in surgical patients. Journal of advanced nursing 2017; 73 (2): 336-348.

- Thank you for this suggestion and reference. This has been incorporated into the first paragraph in the discussion about the implications of the review.

Further, also develop the text with an additional sentence on the compression physiology, as the current last sentence in paragraph four is very vague and not strengthened by a reference.

- Thank you for this suggestion. This has been incorporated into the introduction.

Page 5, row 17: "individually" may be changed to "separately" to better describe interventions.

- Thank you for this, we agree this would 'read' better and we have made the change as suggested.

Same sentence: I suggest that pure results from the referred study concerning effect of IPC are made more generalizable or "easy to read" then just copy and paste from the original article. Hence, exclude RR, CI, etc. and instead describe it by your own words.

- Thank you, we agree and made the suggested revision.

METHOD

One could argue that Cinahl is missing as database search, which comprise many of the allied health articles aiming to investigate and explore perceptions, experiences, etc. However, nowadays Pubmed grasp almost all of these articles anyway so I personally don't see a point in adding this to the article.

- Thank you for this comment. We agree that the use of CINAHL would not add anything to our review. Our initial scoping of literature where we investigated which databases the majority of relevant articles were retrieved from also supported this.

No standardized quality assessment was performed, but as I perceive it a good argumentation for this choice is included in the method section. Of course, this may be seen as a weakness, but then there must be value of performing such assessment and I agree with the authors that this was not beneficial in the current study.

- Thank you for this comment. We agree.

No presentation of ethical considerations or approval of the included studies is currently included in the method section. This may be included last in the method section in just a few sentences in order to keep the strict demand on ethical research throughout the research process including this summarizing level as this study.

- We agree that ethical considerations are very important within all research. However, as part of the publishing process authors of research papers should have shown that they have gone through the relevant ethical approvals (if and when applicable); they therefore, tend not to provide specifics in the papers on the ethical processes they went through. Based on the current content of the included articles in terms of what is discussed regarding ethics we do not feel we would be able to add anything meaningful to the results.

RESULTS

In the beginning of the results of this manuscript the authors have chosen to present the majority of the traditional method section text. As I perceive it, there is nothing wrong with this allocation of text as the content is correctly presented. However, this might not correspond to the journal's guidelines. This is a decision for the editor.

- The results section begins with a presentation of the number of articles retrieved which is a standard way of presenting results. Therefore, no changes have been made.

Abbreviation of Intensive Care Unit, ICU, is not explained as it appears the first time in the text, but instead later on. Please revise to explain at the naïve part of the text.

- As suggested, this has been changed.

In most academic texts, numbers below 11 are written in words in the text (e.g. 4 becomes four). This is lacking throughout this manuscript.

- As suggested, this has been changed.

It is not clearly state on HOW the factors of the results were retrieved. I do think it would benefit the study to explain this in more detail, as a suggestion in the beginning of the results or under an analysis heading in the method section. This text could answer questions as “Was the text of each article guiding towards the factor in choice of word?” and “Was the context important from the beginning?”. It is important to have transparency in how the study was performed. Concerning data retrieval, this is very clear to the reader. But when it comes to analysis and result structure it is currently very vague. Form a readers point of view, this may be perceived as data have not been fully processed which often is the case in bachelor or master thesis text. However, in a research article this need to be as clear as possible.

- Thank you for your comment. Additional text has been added under the study selection and data extraction section.

Table 2 present factors within each article. However, it would be more logical to present the factors categorized and show which article that supports which factor. As currently, it is hard for a reader to summarize each factor.

- Thank you for your suggestion. The presentation of results in tables went through several iterations before the included version. The included version avoids repetition and wasted space which was distracting the reader and not as suitable for publishing. Therefore we are not making any changes. We initially tried to present the findings as you suggest but this became very repetitive and not appropriate for publication – please see appendix 1 below for an example of this.

In the beginning of each factor text, the number of articles supporting this factor is stated. This is correct. However, in systematic research reviews as well as in other forms of summative research, it is the authors job/duty to process and package the main finding within that specific text section. Not only make a “copy-and-paste” from the included articles, as this can be made by each reader

themselves. The real job for the author/researcher of the results in a systematic review is to package the data (e.i. Results text from the included articles), process this and make a summative text that serves the reader with “easy-to-grasp” sentences. I suggest that this is made to this result, in the text of each factor. I suggest as follows within each factor paragraph/text section: First sentence on origin in numbers of articles (as currently presented). Next, the general findings from within this factor presented by 1-3 sentences. This is the real analysis of the data and answer the question “what is the main essence within this factor?”. Then, 1-3 sentences on variations of this general finding, still on a generalized level. This could be mixed and continued with attaching sentences from the different articles very much like that of the current text of each article, but in much more compact presentation. Finally, contradictions from within the factor is presented, and also attached to the included articles. Why this suggestion of revision? Current results of the factors are not research, just copies of the results from each article. Not research. More like book or film reviews in a newspaper. Boring text to read for researchers, devastating towards the possibility to make clinicians read and understand the message. I advise the authors to really consider this suggestion, and if there is questioning concerning the truth of the statements given above, please consult the literature of academical text presentation in systematic reviews.

- Thank you for your comment. Upon reviewing this, both authors were not entirely clear on the changes that were being suggested but would make the following response: 1) we had several discussions before writing the results section on the best way to present the results, and this then went through numerous iterations before the final version; 2) we have taken the results from each paper and synthesised these findings along with the findings from other papers included in the review, rather than just pulling out the results (i.e. copy and pasting); 3) after discussing this at some length and reviewing previous iterations of our results section (i.e. pre-submission) we do not feel we could improve on this section further, in terms of providing a clearer or more objective synthesis of the findings.

Quality assessment is included in the results, despite that the authors have stated that there would be no such. I believe that this section is good and really provides an additional depth to the future article. However, I'll have to remind the authors that this is still a section of the Results and hence it need to be fully objective in its presentation. As currently, subjective values are made by the authors (e.g. “...which could have been subject to recall bias.” “It is difficult to determine...”) and must be rewritten to a more objective stand, or excluded. However, I do strongly suggest that this section remain in the final version.

- Thank you for this comment. However, we would like to point out that we did not state that we would not perform any quality assessment; rather we said we would not use a quality assessment scale. Using a quality assessment scale would not have been suitable and we have provided our justification for this in the Methods section.

DISCUSSION

The second paragraph of the Discussion must be seen as the Limitation section of this manuscript. I suggest that this is given a separate heading within the discussion section, preferably later or last in the discussion section.

- The structure of the paragraphs has been changed to accommodate this suggestion and we have added a sub-heading entitled 'strengths and limitations' at the end of the discussion.

In general, the discussion section is acceptable. I miss discussion on person centeredness as this is the current perspective that modern medicine and healthcare should be performed and adjusted for. This may be included, and I suggest the authors to browse the work done by Professor Brandan McCormack at Edinburg University. Further, the desire for control and safety is also lacking in the discussion. Within the nursing community in Europe as well as within the UK, safety is one of the main core competences for good and proper care. Similar competence requirements are stated within my own, medical profession. Several references can be referred to, e.g.

T Mako, P Svanäng, K Bjerså. Patients' perceptions of the meaning of good care in surgical care: a grounded theory study. BMC nursing, 2016

Swedberg, L., Hammar Chiriac, E., Törnkvist, L. & Hylander, I. Patients in 24-hour home care striving for control and safety. BMC Nursing 2012

- Thank you for your suggestion and references. Your provided reference below (A user-centred approach to requirements elicitation in medical device development) has been incorporated into the discussion about the second paragraph in the discussion relating to discomfort.

Finally, I like the authors to consider the following references for suitability in this manuscript, preferably the discussion section. Please know, that none of these have any connection to the current reviewer. They are merely suggestions for potential improvements of the manuscript by using some core references:

Parry, K., Sadeghi, A.-H., van der Horst, D., Westerink, J., Ruurda, J.P. & van Hillegersberg, R. Intermittent pneumatic compression in combination with low-molecular weight heparin in the prevention of venous thromboembolic events in esophageal cancer surgery. Journal of Surgical Oncology 2017

Martin, J. L., Clark, D. J., Morgan, S. P., Crowe, J. A. & Murphy, E. A user-centred approach to requirements elicitation in medical device development: A case study from an industry perspective. Applied Ergonomics 2012

Lurie, F., Scott, V., Yoon, H.C. & Kistner R.L. On the mechanism of action of pneumatic compression devices: Combined magnetic resonance imaging and duplex ultrasound investigation. Journal of Vascular Surgery 2008

Lindberg, C., Fagerström, C., Willman, A. & Sivberg, B. Befriending Everyday Life When Bringing Technology Into the Private Sphere. Qualitative Health Research 2017

Kakkos, S.K., Caprini, J.A., Geroulakos, G., Nicolaidis, A.N., Stansby, G., Reddy, D.J. & Ntouvass, I. Combined intermittent pneumatic leg compression and pharmacological prophylaxis for prevention of venous thromboembolism. Cochrane Database of Systematic Reviews 2016

Ho, K., M. & Tan, A. J. Stratified Meta-Analysis of Intermittent Pneumatic Compression to the Lower Limbs to Prevent Venous Thromboembolism in Hospitalized Patients. Circulation 2012

- Thank you for these references. We have incorporated 'A user-centred approach to requirements elicitation in medical device development' as stated above, and 'Combined intermittent pneumatic leg compression and pharmacological prophylaxis for prevention of venous thromboembolism' in the introduction as this is very relevant background. Studies not included and reasons were; Parry - we have used systematic reviews for this subject, Lurie – not required due to alternative evidence used, Lindberg – not applicable to our review of in hospital care, Ho – a more up to date review on the same subject was already included.

Reviewer: 2

Minor comments:

1. In the Strengths and limitations-section, the authors state that this is the first systematic review on the topic of factors affecting adherence to pneumatic compression devices for VTE. In fact, there has been at least one systematic review that included adherence and ease-of-use as outcomes of interest (reference # 17). While this current systematic review provides a more detailed insight in the topic, the previous analysis above referenced is worth mentioning.

- Thank you for highlighting this. As you state, this review is more detailed, but an addition has been made to the last paragraph in the introduction and within the strengths section to clarify this.

2. Quality assessment section: I suggest to describe the risk of bias of the selected studies using the Cochrane assessment tool or similar.

- Thank you for this suggestion. We have provided an explanation within the methods, quality assessment section about why we feel this would not be appropriate.

VERSION 2 – REVIEW

REVIEWER	Kristofer Bjerså Department of Surgery, Clinical Sciences, Sahlgrenska Academy, University of Gothenburg, Gothenburg, SWEDEN
REVIEW RETURNED	15-Jul-2020

GENERAL COMMENTS	Thank you for giving me the opportunity to review this important systematic review manuscript once again. In general, I would like to congratulate the authors on made revisions and argumentations in their response letter. From my point of view, the manuscript is acceptable for publication in BMJ Open, despite that none of the more comprehensive suggested revisions of the results section was made which still give the impression of “bachelor/master” thesis text than an a research article. However, these skills may be developed in the future by the authors and I do think that this manuscript need to be published as soon as possible as these findings are frequently discussed in both clinical surgery as well as in surgical research.
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REVIEWER	Cristhiam M. Rojas-Hernandez The University of Texas MD Anderson Cancer Center USA
REVIEW RETURNED	17-Jun-2020

GENERAL COMMENTS	I have reviewed a previous version of the manuscript. The current one has incorporated adequate changes and I have no additional comments.
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