A SYSTEMATIC REVIEW AND META-ANALYSIS ON WOMEN’S KNOWLEDGE OF PRECONCEPTION CARE

Zemenu Yohannes Kassa, MSc1, Nebiha Hadra, MSc1

ABSTRACT

BACKGROUND: Preconception care includes any intervention to optimise a woman’s health before pregnancy to improve maternal, newborn, and child health outcomes. It is vital for identifying risky behaviours before pregnancy and reducing the number of unintended pregnancies. This meta-analysis aimed to determine the pooled prevalence of women’s knowledge across the world.

METHOD: Published and unpublished research reports on women’s knowledge of preconception care were used. The databases used are PubMed, Medline, and Google Scholar. Unpublished articles were searched from different repository electronic libraries and through Google. Two independent authors (ZY and NH) searched articles by using the following key terms, “knowledge” OR “awareness”, “woman/women*” AND “preconception care”, “preconception care” OR “preconception health care”, “preconception care” AND “worldwide”. The critical appraisal was done using the Joana Briggs Institute (JBI) checklist for prevalence study, which has nine scores.

RESULTS: Four hundred twenty-eight published and unpublished articles were retrieved from different databases: PubMed, Medline, Google Scholar, Google, and Cochrane Library. Unpublished articles were searched from different repositories, electronic libraries, and Google. The pooled prevalence of women’s preconception care knowledge was 35.3% (95% CI: 24.5-47.8%).

CONCLUSION: This study showed that women’s knowledge of preconception care is low. This finding suggests that governmental and non-governmental organisations should pay attention to creating awareness and implementation to enhance preconception care.

KEY WORDS: Women’s knowledge, Preconception care, Meta-analysis, World

1 Department of Midwifery, College of Medicine and Health Sciences, Hawassa University, Hawassa
INTRODUCTION

Preconception health care improves maternal and unborn child outcomes by recognising and identifying risky behaviours before pregnancy and reducing the number of unintended pregnancies. It is crucial to prevent maternal and child morbidity and mortality, which is mainstreamed in the routine health care system. Preconception care (PCC) is defined as the provision of biomedical, behavioural, and social health interventions to women and couples before conception. It aims to improve their health status and reduce behaviours and individual and environmental factors that contribute to depriving maternal and child health outcomes.

Despite the international community’s priority agenda on maternal and child health care, maternal and neonatal mortality reduction is not at the expected level. Preconception care plays a crucial role in maternal and neonatal morbidity and deaths. It is evidence-based health promotion, disease prevention, and treating existing diseases before pregnancy to prevent adverse pregnancy outcomes. However, it is not routinely practised within the continuum of maternal and child health care in low and middle-income countries. Maternal and child health experts recommend that preconception health care is a crucial intervention to modify biomedical, behavioural, and social risks for better pregnancy and childbirth outcomes through risk assessment, health promotion, disease prevention, and care provision.

Preconception of health care is an old idea, but little attention has been given to maternal stakeholders and experts. At the same time, developing countries are not integrated with the continuum of care on maternal and child health care. It provides a window of opportunity to eliminate risks by focusing on the period before conception. Currently, care is focused on antenatal care, institutional delivery, postnatal care, and child health to reduce maternal and neonatal morbidity and mortality. However, as one of the key elements to tackle maternal and neonatal morbidity and mortality, preconception care is missing in the package.

Every day, 7000 neonates died globally in 2018, and 2.5 million neonates died in the first month of life. Neonatal mortality was estimated at 18 deaths per 1000 live births worldwide. Worldwide every year, 295,000 newborns die within 28 days of birth due to congenital anomalies. Besides, couples’ knowledge of preconception care is crucial to improving maternal and child health. Preconception healthcare guidelines have developed and integrated as a continuum of care in high and middle-high countries, while most low-income countries have not yet set guidelines. Knowledge of preconception care can be acquired through experience or education. Education can be attained from multiple sources (e.g., books, newspapers, radio channels, television, the internet or medical staff consultations, friends, and families). Studies have revealed that women who receive preconception care have more knowledge and often show more significant risk reduction behaviours.

There is a disperse study that did not show the pooled prevalence of women’s knowledge of preconceptions. Therefore, this systematic review and meta-analysis of women’s preconception care knowledge are crucial to fill the gap. This study is used as an input for policymakers, relevant stakeholders, and clinicians to reduce the global maternal mortality ratio to less than 70 per 100,000 live births, to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births.

METHODS

Published and unpublished research reports on women’s knowledge of preconception care were used. The databases used are PubMed, Medline, and Google Scholar. Unpublished articles were searched from different repositories from electronic libraries and Google. Searching for the articles was conducted from September 10 to December 12, 2018. Two independent authors (ZY and NH) searched articles by using the following key terms, “knowledge” OR “awareness”, “woman/women
AND “preconception care”, “preconception care” OR “preconception health care”, “preconception care” AND “worldwide”

Inclusion
In this study, journal articles, masters’ theses, and dissertations are included. Study settings included are community-based or institutional-based crosssectional studies which report the level of women’s knowledge of preconception care.

Exclusion
Conference abstracts, proceeding abstracts, articles with incomplete information, have methodological problems, full text not available, systematic review, and meta-analysis and articles not publish in the English language are excluded. All records were managed in Endnote version X7 to remove duplicated studies.

Data screening and extraction
Data screening and extraction were done by two independent authors (ZY and NH) using Preferred Reporting Items for Systematic reviews and MetaAnalyses (PRISMA) guidelines. The critical appraisal was done using the Joana Brigg’s Institute (JBI) checklist for prevalence study by two independent assessors (ZY and NH) using nine checklist items. Nine checklist items are the sample frame appropriate to address the target population; study participants sampled appropriately, the sample size adequate, the study subjects and the setting described in detail, the data analysis conducted with sufficient coverage of the identified sample, valid methods used for the identification of the condition, the condition measured in a standard, reliable way for all participants, appropriate statistical analysis and the response rate adequate, and if not, was the low response rate managed appropriately. Scoring problems during the critical appraisal were solved through discussion and consensus reviewing the articles together. During the critical appraisal articles score, ≥five are included in this systematic review and meta-analysis.

Statistical analysis
Data entry was done using Microsoft Excel and exported to a comprehensive meta-analysis (version 3.1) for analysis. The pooled prevalence of women’s knowledge on preconception care with 95% CI was done using the random effect model, due to the possibility of heterogeneity among the studies.

Heterogeneity and publication bias
Heterogeneity was assessed using I2 and Cochran’s Q test (P-value >0.10). I2 test statistics results of 25%, 50%, and 75% were declared as low, moderate, and high heterogeneity respectively. The publication bias was assessed using Egger’s test objectively and funnel plot subjectively. Any asymmetry of a funnel plot and statistically significant p-value less than 0.05 was suggestive of publication bias.

RESULTS
Four hundred twenty-eight published and unpublished articles were retrieved from different databases: PubMed, Medline, and Google Scholar. Unpublished articles searched from different repositories from electronic libraries and Google. Articles were screened and extracted using the PRISMA guideline. Three hundred eighty articles were excluded due to duplication, 48 articles were reviewing full articles, and 34 articles were excluded after full article review due to unreported prevalence. Finally, 14 studies were included in the meta-analysis (Figure 1). The heterogeneity test revealed that I2=98.53 %, the p-value is 0.000, and publication bias (Egger’s test p-value is 0.18).
Study characteristics
The total study population that participated in this systematic review and meta-analysis was 5,208. Four hundred twenty-two participated in community based studies, 3,802 have participated in hospitals based studies, and 984 were health institution based studies. The sample size varied from 100 to 660 (table 1) 23-36.

Table 1: women's knowledge on preconception care (23-36)

<table>
<thead>
<tr>
<th>Author</th>
<th>Year of publication</th>
<th>Country</th>
<th>Study design</th>
<th>Study population</th>
<th>Sample size</th>
<th>No. knowledgeable</th>
<th>Response rate</th>
<th>Prev.(%)</th>
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<tr>
<td>Ayalew et al.(23)</td>
<td>2017</td>
<td>Ethiopia</td>
<td>CS</td>
<td>Community</td>
<td>422</td>
<td>116</td>
<td>100</td>
<td>27.5</td>
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<td>Kassa and Yohannes (24)</td>
<td>2018</td>
<td>Ethiopia</td>
<td>CS</td>
<td>Hospital</td>
<td>580</td>
<td>116</td>
<td>100</td>
<td>20</td>
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<td>Andualem et al,(25)</td>
<td>2016 UP</td>
<td>Ethiopia</td>
<td>CS</td>
<td>Hospital</td>
<td>634</td>
<td>402</td>
<td>100</td>
<td>63.4</td>
</tr>
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<td>Zemenu et al.,(26)</td>
<td>2017 UP</td>
<td>Ethiopia</td>
<td>CS</td>
<td>Hospital</td>
<td>270</td>
<td>143</td>
<td>99</td>
<td>53</td>
</tr>
<tr>
<td>Ahmed K et al(27)</td>
<td>2015</td>
<td>Sudan</td>
<td>CS</td>
<td>Hospital</td>
<td>100</td>
<td>11</td>
<td>11</td>
<td>11</td>
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<td>P. Paudel et al.(28)</td>
<td>2012</td>
<td>Nepal</td>
<td>CS</td>
<td>Hospital</td>
<td>400</td>
<td>65</td>
<td>100</td>
<td>16.3</td>
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<td>Nepal</td>
<td>CS</td>
<td>Hospital</td>
<td>227</td>
<td>35</td>
<td>100</td>
<td>84.58</td>
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<td>Moura et al(30)</td>
<td>2012</td>
<td>Brazil</td>
<td>CS</td>
<td>Hospital</td>
<td>106</td>
<td>44</td>
<td>100</td>
<td>41.5</td>
</tr>
<tr>
<td>Coonrod (31)</td>
<td>2009</td>
<td>USA</td>
<td>CS</td>
<td>Hospital</td>
<td>305</td>
<td>232</td>
<td>100</td>
<td>76</td>
</tr>
<tr>
<td>Gjergja et al.(32)</td>
<td>2006</td>
<td>Croatia</td>
<td>CS</td>
<td>Hospital</td>
<td>569</td>
<td>408</td>
<td>100</td>
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<tr>
<td>N. N. EKEM et al(33)</td>
<td>2018</td>
<td>Nigeria</td>
<td>CS</td>
<td>Hospital</td>
<td>450</td>
<td>143</td>
<td>99.3</td>
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<td>Al-Darzi et al(34)</td>
<td>2014</td>
<td>Egypt</td>
<td>CS</td>
<td>Hospital</td>
<td>660</td>
<td>259</td>
<td>98.2</td>
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<td>Malaysia</td>
<td>Hospital</td>
<td></td>
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<td>70</td>
<td>100</td>
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<td>2014</td>
<td>Iran</td>
<td>CS</td>
<td>health</td>
<td>350</td>
<td>36</td>
<td>100</td>
<td>10.4</td>
</tr>
</tbody>
</table>

Figure 1: PRISMA Flow diagram
Meta-analysis
The pooled prevalence of women’s preconception care knowledge was 35.3% (95% CI: 24.5-47.8%). The Cochran’s Q and I² statistics for women’s knowledge of preconception care were 884.61 and 98.53% (fig. 2).

<table>
<thead>
<tr>
<th>Model</th>
<th>Study name</th>
<th>Statistics for each study</th>
<th>Events/Total</th>
<th>Event rate and 95% CI</th>
<th>Weight (Random)</th>
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<tr>
<td></td>
<td></td>
<td>Event rate</td>
<td>Lower limit</td>
<td>Upper limit</td>
<td>Total</td>
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<td></td>
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<td>0.234</td>
<td>0.320</td>
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<td>Kassa and Yohannes (24)</td>
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<td>0.169</td>
<td>0.235</td>
<td>116/580</td>
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<td></td>
<td>Andualem et al. (25)</td>
<td>0.434</td>
<td>0.396</td>
<td>0.470</td>
<td>402/634</td>
</tr>
<tr>
<td></td>
<td>Zemenu et al. (26)</td>
<td>0.530</td>
<td>0.470</td>
<td>0.589</td>
<td>143/270</td>
</tr>
<tr>
<td></td>
<td>Khalid et al. (27)</td>
<td>0.110</td>
<td>0.062</td>
<td>0.188</td>
<td>11/100</td>
</tr>
<tr>
<td></td>
<td>Paudel et al. (28)</td>
<td>0.163</td>
<td>0.130</td>
<td>0.202</td>
<td>65/400</td>
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<tr>
<td></td>
<td>Prashansa et al. (29)</td>
<td>0.154</td>
<td>0.113</td>
<td>0.207</td>
<td>35/227</td>
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<tr>
<td></td>
<td>Escolastica. (30)</td>
<td>0.415</td>
<td>0.325</td>
<td>0.511</td>
<td>44/106</td>
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<td></td>
<td>Coonrod. (31)</td>
<td>0.760</td>
<td>0.709</td>
<td>0.805</td>
<td>232/305</td>
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<tr>
<td></td>
<td>R. Ojgera et al. (32)</td>
<td>0.717</td>
<td>0.679</td>
<td>0.753</td>
<td>408/589</td>
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<tr>
<td></td>
<td>EKEM et al. (33)</td>
<td>0.317</td>
<td>0.276</td>
<td>0.361</td>
<td>143/450</td>
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<tr>
<td></td>
<td>W. Al-Darzi et al. (34)</td>
<td>0.392</td>
<td>0.355</td>
<td>0.430</td>
<td>259/660</td>
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<td></td>
<td>Rosani et al. (35)</td>
<td>0.519</td>
<td>0.435</td>
<td>0.602</td>
<td>70/135</td>
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<td></td>
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<td>0.104</td>
<td>0.076</td>
<td>0.141</td>
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</table>

Figure 2: Women’s level of knowledge on preconception care

DISCUSSION
Preconception care implementation and provision is a window of opportunity to alter or eliminate risky behaviours by focusing on the period before conception. It is a cheap, simple strategy that can significantly decrease adverse pregnancy outcomes 10, 11, 37. The purpose of this meta-analysis was to assess women’s knowledge of preconception care. Fourteen studies were included in this metaanalysis. The pooled estimated prevalence of women’s level of knowledge on preconception care was 35.3%. This finding showed that women’s level of knowledge of preconception care is low compared to the ideal of preconception care launched in 1960, whereas preconception care has not given attention until 2005 8. Women’s knowledge of preconception care is quite different from country to country; some countries have preconception care guidelines and routinely practice preconception care while others do not have a guideline. Women’s level of knowledge on preconception care is vital for the alleviation of adverse pregnancy outcomes and to decrease maternal and child morbidity and mortality 38, 39. Women who have adequate knowledge of preconception care can check their health status before conception to cease risky behaviours’. A meta-analysis showed that preconception care is effective to reduce congenital malformation 40. The implication of this study is to synthesise information on women’s level of knowledge on preconception care.

This meta-analysis is an input for relevant stakeholders and policymakers to achieve sustainable development goal 3.1 to reduce maternal mortality.
ratio to less than 70 per 100,000 live birth by 2030 and 3.2 to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births by 2030.

CONCLUSION AND RECOMMENDATION
This study revealed that women’s knowledge of preconception care is low. This finding suggests that governmental and non-governmental organisations should give attention to the creation of awareness and implementation to enhance preconception care.

LIMITATION
The potential limitation of this study is method difference to measure knowledge on preconception care within the studies and the use of various scales. This can affect the level of knowledge of preconception care. Another limitation is the way of defining women’s knowledge of preconception care differently and the use of different variables. An important limitation is most of the studies were institutional based, which misses the community-based study.

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AUTHORS’ CONTRIBUTIONS
ZY generated the idea and design for the study, collected, entered, analysed, interpreted the data, and prepared the manuscript. NH contributed to data analysis, interpretation and drafted the manuscript. All authors read and approved the final manuscript.

DISCLOSURE STATEMENT
The authors declare there are no competing interests.

ETHICS AND CONSENT
Not applicable
REFERENCES


25. Zemenu et al. Levels and correlates of knowledge and attitude on preconception care at public hospitals in Wolayita Zone, South Ethiopia unpublished