

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Can birth outcome inequality be reduced using targeted caseload midwifery in a deprived diverse inner-city population? A retrospective cohort study, London UK
AUTHORS	Hadebe, Ruth; Seed, Paul; Essien, Diana; Headen, Kyle; Mahmud, Saheel; Owasil, Salwa; Fernandez Turienzo, Cristina; Stanke, Carla; Sandall, Jane; Bruno, Mara; Khzaezadeh, Nina; Oteng-Ntim, Eugene

VERSION 1 – REVIEW

REVIEWER	O'Brien, Denise University College Dublin, Nursing Midwifery and Health Systems
REVIEW RETURNED	14-Apr-2021

GENERAL COMMENTS	<p>Comments on publication Review bmjopen-2021-049991 Addressing inequality at birth using caseload midwifery in a deprived diverse inner-city population: A cohort study Abstract Setting</p> <p>Four council wards most deprived quintiles (maybe explain council and quintiles for the international audience) maybe include some reference to socio-economic group / social deprivation etc.</p> <p>Introduction First sentence second paragraph could be edited for ease of understanding. The following sentence I would add more likely to die to complete the sentence.</p> <p>Third Paragraph first sentence add the word are, after outcomes so the sentence reads outcomes are associated with</p> <p>Final paragraphs add social before deprivation.</p> <p>Objectives I would remove our deprived population from the third objective and replace with deprived population cohort.</p> <p>Page 13 Paragraph four, second sentence replace there are more multifetal with there were more just for consistency.</p> <p>Discussion Principle Findings first sentence, replace deliver with birth so preterm birth and birth by caesarean section...</p> <p>Page 14</p>
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	<p>Final paragraph first sentence, replace on caseload midwifery with reporting outcomes of caseload midwifery.</p> <p>Page 15 second sentence define OR.... In the sentence however, found OR in preterm birth to be 0.57. final sentence in the same paragraph descriptive analysis of caseload midwifery.... This sentence could be edited for flow etc it's a bit awkward/ incomplete.</p> <p>Page 15 paragraph four second sentence ending and so must the solution be. I would edit this just to complete the sentence.</p> <p>Final paragraph third sentence I would suggest completed rather than done for the sentencereferral is done early....</p> <p>Page 16 Third paragraph, second sentence ending by caseload midwifery I would suggest changing this to associated with caseload midwifery. The following sentence also needs editing for ease of reading. Fourth paragraph first sentence I would add antenatal before appointments. Conclusion Replace delivery with birth throughout</p> <p>Table 5 Replace delivery with birth throughout especially normal vaginal delivery, this term is not really used anymore, birth is preferred</p>
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REVIEWER	Koshida, Shigeki Shiga University of Medical Science, Perinatal Center
REVIEW RETURNED	17-Apr-2021

GENERAL COMMENTS	<p>General comment</p> <p>The authors evaluated the impact of caseload midwifery on the outcomes of pregnant women and their neonates. They found that caseload midwifery intervention in deprived population improves perinatal outcomes compared with traditional care. This is well written, interesting, and useful contribution to the association between midwifery care for pregnant women and adverse perinatal outcomes.</p> <p>There are several comments on the manuscript.</p> <ul style="list-style-type: none"> • Major comments. <ol style="list-style-type: none"> 1. Results: (P11, L22) Is there a significant difference in the proportion of women with a previous Caesarean section between these two groups? CS is likely to be selected as the next delivery mode for these women. 2. Results: (P12-13) Do authors have data of neonatal Apgar score which is a very common outcome? They could add the data if they assessed. 3. Discussion: (P14, 51-) Authors compared the outcomes of the current study with other studies and described the difference between them. Authors should explain the reasons or factors that make a difference from the previous studies cited. • Minor comments
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	<p>1. Abstract:(P3, L30) You could describe "caseload" instead of CL and add "traditional care" after "11.2%".</p> <p>2. Abstract:(P3, L30-31, L33-36) The numbers seem to be different from the ones in Table 5 and Table 6. For example, risk ratio:0.45; confidence interval 0.21 to 0.96 in Abstract, risk ratio:0.41; confidence interval 0.18 to 0.86 in Table 6.</p> <p>3. Methods: (P7, L11) Authors could describe the criteria for the allocation of TC or CL by a screening team. As shown in Table 2, several important backgrounds in the CL group were fewer than the TC.</p> <p>4. Methods: (P7, L16) Authors could explain IMD quintile (scores) because it does not seem to be a common classification.</p> <p>5. Results: (P11, L22-24) The numbers seem to be different from the ones in Table 5.</p> <p>6. Results: (P11, L29-42) Authors could add the sub-analysis data of the BAME population in the table, as they are also important.</p> <p>7. Results: (P12, L41-42) The numbers seem to be different from the ones in Table 6.</p> <p>8. Results: (P12, L52-58) Authors could add the sub-analysis data of the BAME population in the table, as they are also important.</p> <p>9. Results: (P13, L42-43, L57-58) The numbers seem to be different from the ones in Table 6.</p> <p>10. Table 5: (P22) The author should spell out the abbreviations in Table 5.</p>
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VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Dr. Denise O'Brien, University College Dublin

Comments to the Author:

-Setting Four council wards (maybe explain council and quintiles for the international audience) maybe include some reference to socio-economic group / social deprivation etc.

In Abstract: Four council wards (electoral districts) in inner-city London,
 Have now put in introduction: English Index of Multiple Deprivation (IMD) (a tool which comparatively ranks areas according to markers of socioeconomic deprivation using domains of income, employment, education, skills and training, health and disability, crime, barriers to housing services, and living environment).

-Introduction First sentence second paragraph could be edited for ease of understanding.

Maternal mortality doubles when comparing women in the least deprived IMD quintiles to women in the most deprived (5 to 12 per 100,000).

-The following sentence I would add more likely to die to complete the sentence.

Black women are 5 times more likely to die as a result of pregnancy than White women (38 compared

with 7 per 100,000), women of mixed ethnicity 3 times, and women of Asian ethnicity 2 times more likely to die.⁷

-Third Paragraph first sentence add the word are, after outcomes so the sentence reads outcomes are associated with

Considering that several causal determinants of adverse infant outcomes that are associated with low socioeconomic status are potentially avoidable, strategies that promise even modest improvements warrant serious consideration.

-Final paragraphs add social before deprivation.

We aim to investigate caseload midwifery antenatal intervention and its potential for improving pregnancy outcomes in areas of social deprivation in inner-city London.

-Objectives I would remove our deprived population from the third objective and replace with deprived population cohort.

We hypothesise that in a deprived population cohort, outcomes will be poorer than in the general population.

Page 13 Paragraph four, second sentence replace there are more multifetal with there were more just for consistency.

There were more multifetal pregnancies in the traditional care group, however the trend reduction in those allocated to caseload midwifery was comparable in singleton (risk ratio 0.49) and multifetal pregnancies (risk ratio 0.21).

-Discussion Principle Findings first sentence, replace deliver with birth so preterm birth and birth by caesarean section...

This study shows that caseload midwifery implemented in a deprived inner-city community improves outcomes by significantly reducing preterm births and birth by caesarean section, without increasing neonatal unit admission or stillbirth.

I have replaced delivery with birth in rest of paper

-Page 14 Final paragraph first sentence, replace on caseload midwifery with reporting outcomes of caseload midwifery.

This study is the first study to our knowledge focused on targeting vulnerable women based on IMD score and ethnicity, and so is not directly comparable to other studies reporting outcomes of caseload midwifery.

-Page 15 second sentence define OR.... In the sentence however, found OR in preterm birth to be 0.57.

A prospective cohort study comparing caseload midwifery to standard care in an Aboriginal population in Australia however, found the odds ratio (OR) of preterm birth to be 0.57.²⁸

-final sentence in the same paragraph descriptive analysis of caseload midwifery.... This sentence could be edited for flow etc it's a bit awkward/ incomplete.

A previous descriptive analysis of caseload midwifery care in a London population (who were ethnically diverse with high levels of social deprivation), also found low caesarean birth rates of 16%

-Page 15 paragraph four second sentence ending and so must the solution be. I would edit this just to complete the sentence.

This is testament to the heterogeneity of preterm labour aetiology²², and so the solution must also be multifaceted and patient centred

-Final paragraph third sentence I would suggest completed rather than done for the sentencereferral is done early....

If a multi-agency referral is completed early, from the first trimester, the potential burden of anxiety around visa status, housing, finances etc (that may be heightened by the impending addition of a new child) may be lightened.

-Page 16 Third paragraph, second sentence ending by caseload midwifery I would suggest changing

this to associated with caseload midwifery.

A systematic review has not reported lower caesarean rate to be associated with caseload midwifery¹⁴.

-The following sentence also needs editing for ease of reading.

However, deprivation is associated with unplanned CS. Our cohort population, diverse and socioeconomically deprived, are vulnerable to lack of clear communication and failed engagement with services⁴⁹.

-Fourth paragraph first sentence I would add antenatal before appointments.

It could be anticipated that more and longer antenatal appointments, with continuity of the health care professional may have more impact.

-Conclusion Replace delivery with birth throughout Table 5 Replace delivery with birth throughout especially normal vaginal delivery, this term is not really used anymore, birth is preferred

I have not included here all the text as extensive, but have replaced all as requested

Reviewer: 2

Dr. Shigeki Koshida, Shiga University of Medical Science

Comments to the Author:

• Major comments.

1. Results: (P11, L22) Is there a significant difference in the proportion of women with a previous Caesarean section between these two groups? CS is likely to be selected as the next delivery mode for these women.

In women allocated to traditional midwifery care, more had a history of previous caesarean birth than in women allocated caseload midwifery (20.1% vs 14.0%). When mode of delivery was analysed separately in women who had had a CS in a previous pregnancy, the rate of any caesarean birth in women receiving caseload midwifery compared to traditional care (66.7 vs 72.5%; risk ratio: 0.96 P= 0.8; confidence interval 0.60 to 1.5.; risk difference -0.03 number needed to treat 35.9), did not reach significant difference. Furthermore, the rate of emergency cs was higher in the caseload group (27.3% vs 25.0%). However, analysis of mode of delivery in women with no history of previous cs, found the rate of any cs birth was significantly less in the women allocated to caseload midwifery compared to traditional care (17.9% vs 32.1%; risk ratio 0.54; P= 0.004 confidence interval 0.35 to 0.82 Risk difference: 0.16; number needed to treat 6.2), as was the rate of emergency cs (12.9% vs 21.8% risk ratio: 0.58; P= 0.04; confidence interval 0.36-0.96; risk difference: 0.10; number needed to treat 9.6), Interaction test suggests that while the effect of caseload midwifery on mode of delivery is strong in women without previous CS, there is no clear evidence for women with previous CS.

2. Results: (P12-13) Do authors have data of neonatal Apgar score which is a very common outcome? They could add the data if they assessed.

Please see updated table 6

3. Discussion: (P14, 51-) Authors compared the outcomes of the current study with other studies and described the difference between them. Authors should explain the reasons or factors that make a difference from the previous studies cited.

(In the discussion we had already discussed the trial differences which account for PTL, and I have added this paragraph to account for the difference in cs) .

A systematic review has not reported lower caesarean rate to be associated with caseload midwifery¹⁴. However, deprivation is associated with unplanned CS. Our cohort population, diverse and socioeconomically deprived, are vulnerable to lack of clear communication and failed engagement with services⁴⁹. The impact of communication is clearly illustrated by the risk ratio of 0.10 of caesarean section in mothers who need an interpreter.

It could be anticipated that more and longer antenatal appointments, with continuity of the health care

professional may have more impact. Opportunities to address fears regarding labour may reduce antenatal motivation for caesarean birth. Identification of a healthy support structure in labour, may be aided by enhanced knowledge of the family dynamics, through appointments in the family home and prolonged rapport with women. Discussion around women's expectations of what is a normal labour, may empower women in their birth support and analgesia options. A known carer may enhance support to execute birth plans, thereby improving motivation in labour to pursue vaginal birth. Benefits of a vaginal birth extend from the women to health economics, reducing need for additional antenatal appointments, a lower-cost labour location and reduced CS in the next pregnancy⁵⁰. Our results may differ from the POPPIE trial, due to a higher representation of BAME women (in POPPIE trial 58.6% were White vs 34% in LEAP area women) and women affected by deprivation (over 93% of LEAP area women in the 2 most deprived IMD quintiles vs 70% in the POPPIE trial).

- Minor comments

1. Abstract:(P3, L30) You could describe "caseload" instead of CL and add "traditional care" after "11.2%".

There was a significant reduction in preterm birth rate in women allocated to caseload midwifery, when compared to those who received traditional midwifery care (5.1% vs 11.2%; risk ratio: 0.45; P=0.04; confidence interval 0.21 to 0.96; number needed to treat: 14.9)

(I have removed 'CL', rather than elaborating to be consistent with the rest of the abstract and paper)

2. Abstract:(P3, L30-31, L33-36) The numbers seem to be different from the ones in Table 5 and Table 6. For example, risk ratio:0.45; confidence interval 0.21 to 0.96 in Abstract, risk ratio:0.41; confidence interval 0.18 to 0.86 in Table 6.

There was a significant reduction in preterm birth rate in women allocated to caseload midwifery, when compared to those who received traditional midwifery care (5.1% vs 11.2%; risk ratio: 0.41; P=0.02; confidence interval 0.18 to 0.86; number needed to treat: 11.9). Caesarean section births were significantly reduced in women allocated to caseload midwifery care, when compared to traditional midwifery care (24.3% vs 38.0%; risk ratio: 0.64: P=0.01; confidence interval: 0.47 to 0.90; number needed to treat: 7.4) including emergency caesarean deliveries (15.2% vs 22.5%; risk Ratio: 0.59; P=0.03; confidence interval: 0.38 to 0.94; number needed to treat: 10) without increase in neonatal unit admission or stillbirth.

3. Methods: (P7, L11) Authors could describe the criteria for the allocation of TC or CL by a screening team. As shown in Table 2, several important backgrounds in the CL group were fewer than the TC. (I have included the description of allocation below. The only criteria supposed to be utilised in allocation is LEAP area + "vulnerable". However as there was additional information on the questionnaire we corrected for that, to exclude bias. However e.g. resp disease and previous forceps were not themselves involved in the decision criteria.)

In our main, caseload midwifery comparator population, to meet the referral criteria caseload care, women were required to live in a LEAPa area (defined by postcode, where more than 90% residents fall in the two most deprived IMD quintile,15) and meet the definition of "vulnerable" (table 1). Other information on the referral form (see below), was not included in the defined allocation criteria.

4. Methods: (P7, L16) Authors could explain IMD quintile (scores) because it does not seem to be a common classification.

Have now put in introduction: English Index of Multiple Deprivation (IMD) is a tool which comparatively ranks areas according to markers of socioeconomic deprivation using domains of income, employment, education, skills and training, health and disability, crime, barriers to housing services, and living environment.

5. Results: (P11, L22-24) The numbers seem to be different from the ones in Table 5.

In the LEAP area women allocated to caseload midwifery care, when compared to traditional care, had significantly reduced total CS (38.9 vs 24.3%; risk ratio: 0.65, P=0.01 confidence interval: 0.47 to 0.90, number needed to treat: 7.4) and emergency CS (22.5 vs 15.2%; Risk Ratio: 0.59, P=0.03; confidence interval: 0.38 to 0.94; number needed to treat: 10) (table 5).

6. Results: (P11, L29-42) Authors could add the sub-analysis data of the BAME population in the table, as they are also important.

Table 7. Comparison of primary maternal and newborn outcomes in the LEAP area following introduction of caseload midwifery in women of White and women of BAME ethnicity.

White Ethnicity Caseload midwifery White Ethnicity Traditional care Comparison of caseload midwifery and traditional care in LEAP area BAME ethnicity Caseload midwifery BAME ethnicity Traditional care Comparison of caseload midwifery and traditional care in LEAP area

Risk ratio (95% CI) P value Risk ratio (95% CI) P value

Maternal outcomes

Any caesarean section 24.7% 39.8% 0.63 (0.40-0.99) 0.04 27.8% 43.1% 0.68 (0.47-0.99) 0.04
Emergency caesarean section 16.0% 20.4% 0.76(0.42-1.44) 0.42 15.7% 26.2% 0.64 (0.38-1.08) 0.10

Neonatal outcomes

Birth Before 37 weeks 2.5% 5.1% 0.45 (0.08-2.31) 0.23 7.3% 14.4% 0.49 (0.21-1.09) 0.08
Birth before 34 weeks 1.2% 2.0% 0.66 (0.07-7.2) 0.7 1.8% 7.2% 0.24 (0.05-1.12) 0.07

a Comparisons carried out using inverse probability weighting to minimise potential bias

7. Results: (P12, L41-42) The numbers seem to be different from the ones in Table 6.

Preterm birth rate was reduced in women allocated to caseload midwifery before 37 weeks, before 34 weeks and before 24 weeks gestation relative to traditional care. This was statistically significant in births before 37 weeks (5.1% vs 11.2%; risk ratio: 0.41, P=0.02; confidence interval 0.18 to 0.86, number needed to treat: 11.9). There was a trend towards reduction in preterm birth before 34 weeks (1.7% vs 4.3%) which did not reach statistical significance in our small cohort (risk ratio 0.35; P= 0.11; confidence interval 0.97 to 1.28; number needed to treat: 27.7). There were no pre-viable preterm births in the caseload midwifery group (table 6).

8. Results: (P12, L52-58) Authors could add the sub-analysis data of the BAME population in the table, as they are also important.

Low birthweight (<2.5kg): In LEAP area women allocated to caseload midwifery there was a trend reduction in low birthweight compared to those allocated to traditional care (7.2% vs 12.2%; risk ratio: 0.77; P=0.08; confidence interval: 0.24 to 1.08; number needed to treat: 15.2) (table 6).

9. Results: (P13, L42-43, L57-58) The numbers seem to be different from the ones in Table 6.

Our study showed significant reduction in birth before 37 weeks (risk ratio: 0.41) and all caesarean and emergency caesarean birth rate (risk ratio 0.65 and 0.59 respectively).

10. Table 5: (P22) The author should spell out the abbreviations in Table 5.

Gestational diabetes
Pregnancy induced hypertension
Pre-eclampsia
Postpartum Haemorrhage (>501mls)

VERSION 2 – REVIEW

REVIEWER	O'Brien, Denise University College Dublin, Nursing Midwifery and Health Systems
REVIEW RETURNED	15-Jul-2021

GENERAL COMMENTS	This is a very interesting and important study, I enjoyed reviewing it, and the paper has much to add to the international literature. I have made some final editing suggestions in the attached file in the discussion section. Also I know this is an observational study and data was accessed from maternal records, and ethics was not discussed in the paper could a line be added to the data collection section stating that the data collection standards in terms of confidentiality were maintain and include the appropriate ethical Framework/ guideline for the University or NHS please.
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REVIEWER	Koshida, Shigeki Shiga University of Medical Science, Perinatal Center
REVIEW RETURNED	07-Jul-2021

GENERAL COMMENTS	Thank you for reacting to my comments and revising your manuscript. I have no further comment on your revised manuscript.
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