PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Information on, knowledge and utilization of support services during pregnancy and after childbirth: cross-sectional analyses of predictors using data from the KUNO Kids health study
AUTHORS	Brandstetter, Susanne; Rothfuß, David; Seelbach-Göbel, Birgit; Melter, Michael; Kabesch, Michael; Apfelbacher, Christian

VERSION 1 – REVIEW

REVIEWER	Virginia Schmied Western Sydney University Australia
REVIEW RETURNED	05-Apr-2020

GENERAL COMMENTS	Thank you for the opportunity to review this paper. Large cohort studies can make important contributions to the literature. The question of women's knowledge of health and social services available in the antenatal period and postnatal period is an important question but often the implications are country specific. The abstract and background are appropriate and cover the main issues, the methods are clear. The results are clearly stated. The major finding that women who are better education, have beater health literacy and have had previous children had better knowledge of health services is not particularly novel. The finding that migrant women have lower knowledge particularly about social services is also not surprising and not new. Please make a stronger argument about what this paper contributes that is new. While the discussion is well written and addresses some issues, what strikes me most is that women are navigating maternity and child health care in a fragmented system of care. The majority of the sample were well educated and had to speak German, and so had the ability to find out about services. I would like to see some discussion of the impact of fragmented services that is services that are not integrated and coordinated on knowledge and access to services. The literature used in the discussion is limited to only a small handful of papers supported what the authors have found. There are strong arguments for integrated maternity and child health services and I would like to see some of this added to the discussion. If the paper is to be published it will require editing by someone fluent in English. While generally well written there are a lot of grammatical errors for example issues with plurals and tense.

REVIEWER	KAMPAYANA DENIS KASHAIJA SEKOUTOURE REGIONAL REFERRAL HOSPITAL –MWANZA TANZANIA

REVIEW RETURNED	06-Apr-2020

GENERAL COMMENTS	Is the abstract accurate, balanced and complete? - NO: (The Abstract is well organized as per journal requirements, though the aim stated here is not directly sounding as the main aim stated in the main text) BACKGROUND; is well stated; HOWEVER, I am missing a clear definition of some terms (1. New Mothers versus First time mothers, 2. Patients 3. Higher education to support either number of years of studies or Level of studies participants reached) to make this section clear. Unless stated otherwise: The justification of researching on the social gradient in knowledge of services and programs is NOT coming out clearly to bridge the gap which were observed in the previous study which dealt with general parental knowledge and utilization of services for pregnancy and early childhood. Are the outcomes clearly defined? - NOT ENOUGH Are the study limitations discussed adequately? - NO : From the results obtained with statistical significant figures (numbers), I have a question on how these findings can be utilized. The direct link again is missing between paragraph five (5) of the Discussions section and the first caption of the conclusion “first time mothers are less likely to have good knowledge of different support services….” & “New mothers have good level of knowledge of support services…” Is the standard of written English acceptable for publication? - THIS PAPER NEEDS A REVIEWNBY AN ENGLISH SPEAKING EXPERT • This study is important as it has focused on searching on knowledge of Women of reproductive age (mothers) on services they need and the utilization of these services. As stated earlier it is a continuation of a previous study which has now involved a big sample. However I would suggest the author to rephrase on the conclusion section and indicate what will be next from this study.

REVIEWER	Rosie Cornish University of Bristol, UK
REVIEW RETURNED	03-Jun-2020

GENERAL COMMENTS	My main area of concern is that the authors have used causal language (e.g. “determinants of knowledge”) but (a) have not approached this as a causal analysis and (b) have not acknowledged the limitations of the study/data for drawing any causal conclusions. Detailed comments 1. Selecting variables for inclusion in a multivariable model on the basis of a p-value

	threshold in a univariable analysis is not an appropriate strategy for an analysis where the purpose is to identify whether specific risk factors are associated with an outcome. See for example: Sun GW, Shook TL, Kay GL. Inappropriate use of bivariable analysis to screen risk factors for use in multivariable analysis. J Clin Epidemiol 1996; 49(8):907-16. In this study each of the covariates is a potential "risk factor" for knowledge or utilisation of services. As such, for each of them the authors should consider what the likely confounders are and adjust for these in a multivariate analysis and, for each, should NOT adjust for variables that are potentially on the causal pathway. The set of confounders may be different for different "risk factors". 2. In addition to approaching the analysis differently, the authors should consider carefully whether there are likely to be any unmeasured confounders for each of the associations. If there are then they should discuss this issue. Further, they should discuss the limitations of using observational data to draw conclusions about determinants of utilisation and service use. 3. The authors have focussed on statistical significance in their interpretation of the results. This is considered bad practice and some journals now stipulate that the term "statistically significant" should not be used. The authors may want to read the American Statistical Association's statement on p-values: https://amstat.tandfonline.com/doi/full/10.1080/00031305.2016.1154108#.XteBWzpKhPb 4. The authors should give some indication whether the complete cases differed in any key respects from all women in the study – it is good practice to provide – for example – a table of characteristics of all participants (as per the online supplementary table) and then provide characteristics of complete cases alongside these. 5. It would be better to use the "married, living with husband" as the reference group in the logistic regression because the reference group actually used (unmarried and without partner, divorced or widowed) is quite small (n=60) which means that ALL the odds ratios for marital status will have quite wide confidence intervals. Further, to examine whether marital status is associated with the outcomes, one overall test (e.g. likelihood ratio test) rather than two separate significance tests should be used; the same applies to educational level. Minor comments 1. It is usual to give odds ratios and their confidence intervals to 2 decimal places, not 3. 2. The mean and SDs for mother's age and health literacy are also given to 2 decimal places. This is unnecessary and suggests that these variables were measured to this level of precision, which seems unlikely.

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1
Reviewer Name: Virginia Schmied
Institution and Country: Western Sydney University, Australia
Please state any competing interests or state 'None declared': None declared

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Thank you for the opportunity to review this paper. Large cohort studies can make important contributions to the literature. The question of women's knowledge of health and social services available in the antenatal period and postnatal period is an important question but often the implications are country specific.
The abstract and background are appropriate and cover the main issues, the methods are clear. The results are clearly stated.

Response: Thank you for the positive evaluation of our manuscript.

The major finding that women who are better education, have beater health literacy and have had previous children had better knowledge of health services is not particularly novel. The finding that migrant women have lower knowledge particularly about social services is also not surprising and not new. Please make a stronger argument about what this paper contributes that is new.
Response: We agree with the reviewer that the overall summary of findings might not appear novel enough at hindsight. However, we believe that by presenting this data we make relevant contribution for both research and practice in two ways.

First, although there is a large body of research on the broader subject, our study captured women's knowledge of support services at a crucial point in time - during the first days after delivery when mothers are about to be discharged from hospital to their home and have to manage the transition to parenthood.

Second, health services research is required to be specific for contexts and populations which means that findings from previous cannot easily be transferred to the situation of women in the Southeast of Germany. With regard to our study situated in the context of the German health care and welfare system it is remarkable that health professionals were not the most important source for information about support services, rather women researched on their own or referred to friends or family. Further, we were surprised by the finding that only about two thirds of women had engaged a midwife before delivery. Those findings are all the more important as an approach to facilitate access to psychosocial services ("Early Childhood Intervention Programme") has been implemented already in 2006.

Following the suggestions made by you and the other reviewers we now have revised some parts of the introduction and of the discussion in order to emphasize these issues of our study we consider to be novel and/or highly relevant for health services research and practice.

Changes in the manuscript:
Introduction: "That study has dealt with knowledge and utilization of parents during their child's first years of life when parents might have had many contacts to health care providers and might have had manifold opportunities to learn about services and programmes. In contrast, the present study focuses on the situation of mothers immediately after the birth of a child. We consider this a crucially important point in time: mothers are about to be discharged from hospital to their home and have to manage the transition to parenthood. It is of uppermost importance that they know which support services are available for them." (page 4-5)

Discussion: " Findings on knowledge and utilization of support services must not be interpreted without considering the context of the national health care and welfare system: In Germany, on the one hand, the situation for pregnant women and mothers of infants is characterized by the availability of comprehensive and highly specialized medical and social care services whose use is free of charge or reimbursed by (mandatory) health insurance. On the other hand, the system is very complex and - despite some efforts during the past years - still remarkably fragmented." (page 12)

Discussion: "In the light of this, already in 2006, the Early Childhood Intervention Programme ("Frühe Hilfen") was implemented in Germany.[4] It aims at the provision of psychosocial services by establishing structures which facilitate the cooperation of different service providers. However, collaboration and cooperation across and between sectors and disciplines remains a challenge, [14] corroborating findings from other countries and health systems. [15 16]Only about one third of participants in our study knew the institution which coordinates the services of the Early Childhood Intervention Programme (coordinating child protection office)." (page 13)

While the discussion is well written and addresses some issues, what strikes me most is that women are navigating maternity and child health care in a fragmented system of care. The majority of the sample were well educated and had to speak German, and so had the ability to find out about

services. I would like to see some discussion of the impact of fragmented services that is services that are not integrated and coordinated on knowledge and access to services.

Response: We agree with the reviewer that the fragmentation of services in the German health and welfare system is striking and that the findings of our study have to be interpreted in the light of this. The finding of a social gradient in knowledge and utilization of services would be less worrying if the health system would require less individual competences of patients. Further, empirical data from various countries suggest that mothers value consistency in care and counselling (Kurth, 2016, BMC Health Serv Res; Mattern, 2017, BMC Pregnancy Childbirth; Rayment-Jones, 2019, Birth). We now have restructured the discussion section of our manuscript and place greater emphasize on the fragmentation of the existing system, attempts to overcome this problem and consequences for women's access to services. The respective paragraphs of the discussion read as follows:

Changes in the manuscript:
Discussion: "Findings on knowledge and utilization of support services must not be interpreted without considering the context of the national health care and welfare system: In Germany, on the one hand, the situation for pregnant women and mothers of infants is characterized by the availability of comprehensive and highly specialized medical and social care services whose use is free of charge or reimbursed by (mandatory) health insurance. On the other hand, the system is very complex and - despite some efforts during the past years - still remarkably fragmented. This applies to the division between the medical and the social sector, ambulatory and stationary health care, as well as to providers from different professional backgrounds who might pursue distinct goals and assume different perspectives.[10] Fragmentation can cause over-utilization since people use different services simultaneously and important information for patient care and counselling can be lost if transitions are not standardized and communication between providers is not clearly structured. In addition, navigating through the system may be challenging for some women as pertaining inequalities in service utilization suggest: Large scale surveys found a social gradient in utilization of medical antenatal visits[11], non-medical antenatal visits [12] and of health check-up examinations for children.[3] Women's difficulties in accessing antenatal and postnatal care were also described by qualitative studies." [9] [13] (page 12-13)

Discussion: "In the light of this, already in 2006, the Early Childhood Intervention Programme ("Frühe Hilfen") was implemented in Germany.[4] It aims at the provision of psychosocial services by establishing structures which facilitate the cooperation of different service providers. However, collaboration and cooperation across and between sectors and disciplines remains a challenge, [14] corroborating findings from other countries and health systems. [15] [16]Only about one third of participants in our study knew the institution which coordinates the services of the Early Childhood Intervention Programme (coordinating child protection office)." (page 13)

The literature used in the discussion is limited to only a small handful of papers supported what the authors have found. There are strong arguments for integrated maternity and child health services and I would like to see some of this added to the discussion.

Response: Thank you for this suggestion. We took up the suggestion and describe the implementation (and its barriers) of the Early Childhood Intervention Programme which aims at improving the cooperation between services. Further, we refer to continuity of care and integrated care models.

Changes in the manuscript:
Discussion: "In the light of this, already in 2006, the Early Childhood Intervention Programme ("Frühe Hilfen") was implemented in Germany.[4] It aims at the provision of psychosocial services by establishing structures which facilitate the cooperation of different service providers. However, collaboration and cooperation across and between sectors and disciplines remains a

challenge, [14] corroborating findings from other countries and health systems. [15 16]Only about one third of participants in our study knew the institution which coordinates the services of the Early Childhood Intervention Programme (coordinating child protection office).” (page 13)

Discussion: “It would be desirable for the health and social care system to be designed in a way that enables women to identify and to access support so that access becomes less dependent on individual womens’ capacity. Different approaches which strengthen the continuity of care or even foster integrated care have been proposed. [21 22] While many studies from Germany and other countries with fragmented health services unravelled that mothers prefer continuous and coordinated care [9 23 24] such approaches have not yet been fully implemented in Germany. They would require a re-orientation of health and social services and build on the local and regional infrastructure. Within the existing system the potential for collaboration between the service providers is not sufficiently exploited. Our finding that a remarkable proportion of participants did not receive information about support services through health professionals points in this direction.” (page 13)

If the paper is to be published it will require editing by someone fluent in English. While generally well written there are a lot of grammatical errors for example issues with plurals and tense.

Response: We edited the manuscript paying particular attention to grammatical errors relating to plurals and tense.

Reviewer: 2
Reviewer Name: KAMPAYANA DENIS KASHAIJA
Institution and Country: SEKOUTOURE REGIONAL REFERRAL HOSPITAL –MWANZA TANZANIA
Please state any competing interests or state ‘None declared’: NONE DECLARED

Is the abstract accurate, balanced and complete?
- NO: (The Abstract is well organized as per journal requirements, though the aim stated here is not directly sounding as the main aim stated in the main text)

Response: Thank you for your comment, however, we are not sure to what discrepancies between abstract and introduction section you are referring to.
The objective stated in the abstract is: “To investigate mothers’ knowledge and use of antenatal and perinatal support services as well as predictors of knowledge and service utilization.”

The phrase summarizing the aim of the study at the end of the introduction section reads: “We analyse data from a large birth cohort study and aim at describing which services are known by mothers after the birth of a child and which services were already utilized during pregnancy. In addition, predictors of knowledge and utilization of services will be explored.” The way the study’s aim is phrased in the abstract is a more concise way of phrasing the study aim as written in the introduction.

BACKGROUND; is well stated; HOWEVER, I am missing a clear definition of some terms (1. New Mothers versus First time mothers, 2. Patients 3. Higher education to support either number of years of studies or Level of studies participants reached) to make this section clear.

Response: Thank you for this advice. We now have clarified these terms.

New Mothers: We now refrain from using the term “new mothers” as it can be ambiguous. When speaking about our study participants we refer to “women/mothers after birth of a child” or “mothers of

infants". When speaking about parity we refer to "first-time mothers". We have changed the term throughout the manuscript.

Changes in the manuscript:
Introduction:
"Therefore we aimed at describing which services are known by mothers after the birth of a child." (page 5)
Discussion:
"Knowledge of support services was high and the vast majority of mothers knew at least a few services." (page 11)
"With regard to the latter a focus group with pregnant women and mothers revealed that the knowledge about specific offers and competences of midwives is scarce…" (page 12)
"In Germany, on the one hand, the situation for pregnant women and mothers of infants is characterized by…" (page 12)
"One might argue whether women are really supposed to know all the different services which are available to pregnant women and mothers…" (page 14)
Conclusion:
"Mothers of infants have a good level of knowledge of antenatal and perinatal support services."

Patient: The term "patient" is used in a section which is required by BMJopen: **"**Patient and public involvement: Patients were not involved in the design and conduct of this study". If the editor agrees we propose to adhere to the requirements of the journal in the headline but adapt it in the following sentence in a way that it corresponds to our study.

Changes in the manuscript:
Methods, Patient and public involvement: "Parents were not involved in the design and conduct of this study." (page 7).

Higher education: The study by Eickhorst et al. assessed the educational level of study participants in three categories: low, middle and high level of education. Both school and professional education were considered for this categorization. We have added this definition and we now use the term "level of education" when describing this study's findings.

Changes in the manuscript:
Introduction: "The authors found a social gradient in knowledge of services and programmes – parents with a higher level of education (considering both school and professional education) knew more of the services and programmes – and a differential effect of education on utilization of programmes: While services provided from midwives and educational classes for parents were more often used by families with higher level of education, families with lower level of education more often utilized counselling services such as pregnancy counselling centre or family support services. " (page 4)

Unless stated otherwise: The justification of researching on the social gradient in knowledge of services and programs is NOT coming out clearly to bridge the gap which were observed in the previous study which dealt with general parental knowledge and utilization of services for pregnancy and early childhood.

Response: The overall aim of our study was to investigate which support services for pregnancy and early childhood were known and utilized by mothers. In addition, we were interested in which factors were predictive of service knowledge and use. In the introduction section we report the findings of a Germany-wide study conducted by Eickhorst et al. which has investigated knowledge of support programs and utilization of these programs during early childhood between 2014 and 2015. The study of Eickhorst and colleagues is independent from our work (please see our response to your last

comment). General parental knowledge was not part of this study (we now have adapted the wording to make this clear). We believe that our study is of importance as it captures mothers' knowledge of services immediately after the birth of a child. Further, acknowledging the findings of a social gradient in service use as reported by Eickhorst we were interested whether also in our study area (an affluent region in Bavaria) a social gradient in knowledge and use of services was found.

Changes in the manuscript:
Introduction: "A previous study by Eickhorst and colleagues investigated parents' knowledge and use of a wide variety of services for pregnancy and early childhood in Germany.[5]" (page 4)
Introduction: "That study has dealt with knowledge and utilization of parents during their child's first years of life when parents might have had many contacts to health care providers and might have had manifold opportunities to learn about services and programmes. In contrast, the present study focuses on the situation of mothers immediately after the birth of a child. We consider this a crucially important point in time: mothers are about to be discharged from hospital to their home and have to manage the transition to parenthood. It is of uppermost importance that they know which support services are available for them. (page 4-5).

Are the outcomes clearly defined?
- NOT ENOUGH

Response: The outcomes of our study are knowledge and utilization of different services. We now have expanded the description of how the outcomes of our study were assessed and defined.

Changes in the manuscript:
Methods, Measurement of outcomes and predictors: "Outcomes: Knowledge of antenatal and perinatal support services as well as utilization of antenatal support services were assessed. Mothers were asked whether they knew a specific service (yes, no) and - for those services which can be used during pregnancy - whether they had utilized them (yes, no). The services considered in this study comprised …" (page 5-6)

Methods, Statistics: "Then, variables on knowledge and utilization of services were aggregated in order to use them as outcome variables in prediction modelling. A variable indicating the total number of services known was created. Median split was used to derive two categories (poor vs. good knowledge). Regarding the use of services, two variables were built: the use of services provided by midwives (yes, no) and the use of any other antenatal service (yes, no)." (page 6-7)

Are the study limitations discussed adequately?
- NO : From the results obtained with statistical significant figures (numbers), I have a question on how these findings can be utilized.

Response*:* The findings of our study have implications for the design of psychosocial support services. Acknowledging that social inequalities in knowledge and use of services exist efforts are needed to design health and social services in a way that care and counselling is better coordinated between different providers and continuity of care can be guaranteed. We have expanded the discussion section by a paragraph about this topic.

Changes in the manuscript:
Discussion: "It would be desirable for the health and social care system to be designed in a way that enables women to identify and to access support so that access becomes less dependent on individual womens' capacity. Different approaches which strengthen the continuity of care or even foster integrated care have been proposed. [21 22] While many studies from Germany and other countries with fragmented health services unravelled that mothers prefer continuous and coordinated care [9 23 24] such approaches have not yet been fully implemented in Germany. They would require a

re-orientation of health and social services and build on the local and regional infrastructure. Within the existing system the potential for collaboration between the service providers is not sufficiently exploited. Our finding that a remarkable proportion of participants did not rceive information about support services through health professionals points in this direction." (page 13)

The direct link again is missing between paragraph five (5) of the Discussions section and the first caption of the conclusion "first time mothers are less likely to have good knowledge of different support services…." & "New mothers have good level of knowledge of support services…"

Response: Our study showed that overall participating mothers had good knowledge of services. When analysing predictors of good knowledge of services we found that first-time mothers had poorer knowledge than multiparous mothers. This alleged contradiction is caused by the use of the terms "first-time mothers" vs. "new mothers". We now have clarified this by refraining from the term "new mothers" (see above). The respective sentences now read as follows:

Changes in the manuscript:
Discussion: "Moreover, we found that first-time mothers were less likely to have good knowledge of the different support services suggesting that mothers develop a more comprehensive knowledge about services during parenthood. (page 11)
Conclusion: "Mothers of infants have a good level of knowledge of antenatal and perinatal support services." (page 14)

Is the standard of written English acceptable for publication?
- THIS PAPER NEEDS A REVIEW BY AN ENGLISH SPEAKING EXPERT

Response: We edited the manuscript paying particular attention to grammatical errors relating to plurals and tense.

This study is important as it has focused on searching on knowledge of Women of reproductive age (mothers) on services they need and the utilization of these services.
As stated earlier it is a continuation of a previous study which has now involved a big sample.
However I would suggest the author to rephrase on the conclusion section and indicate what will be next from this study.

Response: Thank you for your positive feedback on the importance of our study. However, regarding your last point there might have been a misunderstanding. The previous study on a similar subject we cite in the introduction section is not related to our study but we refer to that study as it is an important basic for our work.
The conclusions section has been rephrased and expanded. We now propose a way in which health and social services should be designed for facilitating access also for socially disadvantaged mothers.

Changes in the manuscript:
Conclusion: "… Social determinants of knowledge and of utilization of services suggest inequality with regard to the preconditions for service utilization. We propose better cooperation between the different service providers. This might help facilitating access to support services during pregnancy and early childhood. Particularly, first-time mothers and socially disadvantaged women who were found to have poorer knowledge of services could benefit from such measures." (page 14-15)

Reviewer: 3

Reviewer Name: Rosie Cornish
Institution and Country: University of Bristol, UK
Please state any competing interests or state 'None declared': None declared

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My main area of concern is that the authors have used causal language (e.g. "determinants of knowledge") but (a) have not approached this as a causal analysis and (b) have not acknowledged the limitations of the study/data for drawing any causal conclusions.

Response: Thank you for the thorough review of our paper**.** We did not intend to analyse causal exposure-outcome links but aimed at predictive modelling. Therefore, throughout the manuscript, we use the term associations instead of effects.
We stated in our manuscript that the aim of our study was to describe knowledge and utilization of services as well as to explore potential determinants. To make our predictive modelling approach very clear we have now replaced "determinants" by "predictors" throughout the manuscript. Please see also our responses to the following comments.

Changes in the manuscript:
Title: Information on, knowledge and utilization of support services during pregnancy and after childbirth: cross-sectional analyses of predictors using data from the KUNO Kids birth cohort study (page 1)

Abstract: "This study investigated mothers' knowledge and utilization of services as well as predictors of knowledge and service utilization." (page 2)
Introduction: "… predictors of knowledge and utilization of services will be explored". (page 5).
Methods: "Predictors of knowledge and utilization of services: Sociodemographic information, parity, health literacy and health insurance status were considered potentially predictive variables of knowledge and utilization of services." (page 6)
Methods, Statistics: "For all predictors univariable logistic regression models with knowledge and utilization as outcomes were calculated, respectively." (page 7)
Tables 1 to 3: The titles of the tables now reads: "Predictors of …: univariable and multivariable logistic regression analyses"
Discussion: "The large sample size allowed to perform multivariable analysis considering various predictive factors of knowledge and service utilization." (page 14)

Detailed comments
1. Selecting variables for inclusion in a multivariable model on the basis of a p-value threshold in a univariable analysis is not an appropriate strategy for an analysis where the purpose is to identify whether specific risk factors are associated with an outcome. See for example: Sun GW, Shook TL, Kay GL. Inappropriate use of bivariable analysis to screen risk factors for use in multivariable analysis. J Clin Epidemiol 1996; 49(8):907-16. In this study each of the covariates is a potential "risk factor" for knowledge or utilisation of services. As such, for each of them the authors should consider what the likely confounders are and adjust for these in a multivariate analysis and, for each, should NOT adjust for variables that are potentially on the causal pathway. The set of confounders may be different for different "risk factors".

Response: The reviewer points toward a very important discussion about the choice of a modelling strategy for multivariable analysis. We are aware of the different approaches for multivariable modelling, in particular, the distinction between explanatory and predictive models. While the first aim for causal explanation and should be based on a framework with causal pathways the latter are restricted to empirical prediction and can be used for the generation of hypotheses (Please see for an in-depth discussion of the two approaches: Kleinbaum & Klein, Logistic Regression, Springer 2002; Shmueli, 2010, To explain or to predict?, Statistical Science.).

We are coming from a public health/health care research perspective in which we can improve health, *even if we do not know the exact causal links between predictors and outcome*. We also adopt this perspective for the present paper when analyzing potential predictors or correlates of knowledge and utilization of services. In light of this background, we did not attempt to analyse causal exposure-outcome links but were rather interested in which variables might
be predictive of outcomes irrespective of causality. This implies that we did not investigate potentially confounding or mediating variables nor were we exploring possible interactions. We now present the choice of our prediction modelling strategy more clearly and mention the possibilities and limitations of the strategy in the discussion section.

Changes in the manuscript:
Methods, Statistics: "Finally, predictive regression modelling was performed for analysing predictors of knowledge and utilization of services. For all predictors univariable logistic regression models with knowledge and utilization as outcomes were calculated, respectively." (page 7).

Discussion: "It must be emphasized that both the cross-sectional design of this observational study and the predictive modelling strategy employed do not allow to draw any causal conclusions. Due to the lack of a theoretical model and prespecified analytical pathways our findings on predictors of knowledge and utilization of services cannot be in interpreted in terms of single risk factors. However, the study's findings have policy implications and might be useful to inform the development of causal models which should be explored in future studies." (page 14).

2. In addition to approaching the analysis differently, the authors should consider carefully whether there are likely to be any unmeasured confounders for each of the associations. If there are then they should discuss this issue. Further, they should discuss the limitations of using observational data to draw conclusions about determinants of utilisation and service use.

Response: The omission of relevant variables is a relevant issue in any study
with observational design. However, since we did not attempt to analyse causal pathways or specific exposure-outcome associations in our study but performed predictive modelling we suggest to not use the term residual or unmeasured confounding. We now mention in the discussion and in
the limitation section that our study and the regression models are restricted to the data available in this study and that it is possible that we missed important variables.

Changes in the manuscript:
Discussion: "Overall, the predictive models for knowledge or utilization of services in our study explained only small proportions of the variance observed between study participants (6-22%). This indicates that variables beyond individual characteristics and social factors considered in our study are likely to be relevant for the prediction of knowledge and use of antenatal and perinatal services." (page 11-12).

Discussion: "Despite data collection was comprehensive and covered many variables potentially relevant for service knowledge or use the proportion of variance explained was small. We cannot exclude that our regression models lacked important predictor variables which would have changed the resulting prediction models remarkably. " (page 14).

3. The authors have focussed on statistical significance in their interpretation of the results. This is considered bad practice and some journals now stipulate that the term "statistically significant" should not be used. The authors may want to read the American Statistical Association's statement on p-values: https://amstat.tandfonline.com/doi/full/10.1080/00031305.2016.1154108#.XteBWzpKhPb

Response:
We agree with the reviewer that often too much attention is paid to statistical significance of findings and that a thorough interpretation of findings must not only refer to p-values. Even if we keep on reporting p-values we use them with caution and adhere to the recommendations on how to make their use less prone for misunderstanding and misinterpretation (see Amrhein, Greenland, McShane: Retire Statistical Significance, Nature, 2019). Accordingly, we present exact p-values (instead of dichotomized significant – not significant) and ORs with 95% confidence intervals in the tables of our manuscript. These allow for evaluating the estimates and their uncertainty. Furthermore, our interpretation of results in the discussion focuses on overarching patterns in the data, for example when speaking about a social gradient in knowledge and utilization.

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4. The authors should give some indication whether the complete cases differed in any key respects from all women in the study – it is good practice to provide – for example – a table of characteristics of all participants (as per the online supplementary table) and then provide characteristics of complete cases alongside these.

Response: Thank you for this suggestion**.** We have included this additional information to the online supplementary table. The overall sample and the analytical sample do not differ in any key aspects relevant for this study.

Changes in the manuscript:
Online supplementary table: “Characteristics of all study participants and of study participants with data on knowledge and utilization of services”

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5. It would be better to use the “married, living with husband” as the reference group in the logistic regression because the reference group actually used (unmarried and without partner, divorced or widowed) is quite small (n=60) which means that ALL the odds ratios for marital status will have quite wide confidence intervals.

Response: We have changed the reference group for the variable “marital status”) according your suggestion. This led to slight changes in the univariable and multivariable regression model for the outcome “knowledge” (marital status now was included in the multivariable model) which did not impact the interpretation of the findings (please see below: changes in the manuscript). Marital status had already been included in the multivariable regression models for the outcomes “use of midwife” and “use of any antenatal service”. Thus, there were no changes except for the ORs, CIs and p-values of the predictor variable.

Changes in the manuscript:
Tables 1-3.

Results: “In the multivariable model, higher education (OR (odds ratio): 1.37, 95% CI (95% confidence interval): 1.13-1.67), no migration background (OR: 2.26, 95% CI: 1.76-2.90) and better health literacy (OR: 1.04, 95% CI: 1.03-1.06) significantly increased the chance of good knowledge of services, while being primiparous (OR: 0.72, 95% CI: 0.60-0.86), being unmarried/living with a partner (OR: 0.71; 95% CI: 0.57-0.89) and lower education significantly reduced the chance (OR: 0.68, 95% CI: 0.51-0.92) (see table 1).” (page 8)

Further, to examine whether marital status is associated with the outcomes, one overall test (e.g. likelihood ratio test) rather than two separate significance tests should be used; the same applies to educational level.

Response: We now provide the results of an overall test (omnibus test of model coefficient based on chi-square statistics) for both marital status and education in the footnote of each of the tables. The results of the omnibus test did not lead to any further changes.

Changes in the manuscript:
Tables 1 to 3.

Minor comments
1. It is usual to give odds ratios and their confidence intervals to 2 decimal places, not 3.

Response: We have adapted the tables accordingly.

Changes in the manuscript:
See Tables 1 to 3.

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2. The mean and SDs for mother's age and health literacy are also given to 2 decimal places. This is unnecessary and suggests that these variables were measured to this level of precision, which seems unlikely.

Response: We have adapted the number of decimal places for mother's age and health literacy.

Changes in the manuscript:
See Table 1.

VERSION 2 – REVIEW

REVIEWER	Rosie Cornish University of Bristol, UK
REVIEW RETURNED	18-Aug-2020

GENERAL COMMENTS	The authors have addressed my previous comments. One minor point: The patient and public involvement section reads: "Parents were not involved…" I believe this should be "Patients were not involved…".