PLOS Science Wednesday: Hi reddit, my name is Sarka Lisonkova and I published a study in PLOS Medicine showing mothers over 40 years have increasingly higher rates of adverse health outcomes – Ask me Anything!

PLOSScienceWednesday [1] and r/Science AMAs[1]

[1]Affiliation not available

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Abstract

Hi Reddit, My name is Sarka Lisonkova and I am an Assistant Professor at the University of British Columbia, Department of Obstetrics and Gynaecology. My research focuses on risk factors and determinants of severe maternal morbidity. I recently published a study titled 'Maternal age and severe maternal morbidity: a population-based retrospective cohort study' in PLOS Medicine. This study shows that older mothers – aged 40 years or more – have increasingly higher rates of potentially life-threatening conditions including acute cardiac events, shock, acute renal failure, amniotic fluid embolism, and serious complications of obstetric interventions. Even though these serious complications are rare, our results provide important information for counseling to women who contemplate delaying childbirth until their forties. I will be answering your questions at 1pm ET. Ask me Anything! Don't forget to follow me on Twitter @sarkalis.

the WINNOWER

REDDIT

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PLOSSCIENCEWEDNESDAY R/SCIENCE

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Are there any positive impacts in the higher age groups? Do some complications become less likely to occur?

comparmentaliser

Good question. Actually, we found that older mothers have significantly lower rates of sepsis (generalized infection with a high risk of shock or organ failure) as compared to the young ones. We are not quite why. One possible explanation is that the signs of infection are not that apparent in younger mothers and that may delay the antibiotic treatment. Among older moms, cesarean delivery is more common and doctors use antibiotics prior to and during cesarean delivery to prevent infection. And as mentioned by others in their comments, socioeconomic advantage is a very positive factor. Older women are more likely to have a stable relationship (marriage) and a stable job, which has a positive impact.

Is there any indication of what it is about women over 40 that increases their rates of adverse health outcomes? Ie are they just less physically fit to cope with a pregnancy, more likely to already have compounding health issues, something to do with increased blood pressure related to age?

jamiek89

You partially answered your question. As we get older, all organ system do not perform as well as they

used to when we were young, and that is true also for the reproductive system. As women come to pre-menopause, they encounter hormonal imbalances and gradually stop having the ability to conceive. (This is probably an evolutionary trait - to protect women's bodies from a ceaseless train of pregnancies that would be very demanding.) The average age we die has increased in the last decades, but it is not true for our reproductive ageing (that remained the same). Having a healthy lifestyle, a proper treatment of hypertension and diabetes, and -basically - taking a good care of your body (including mental health) is the best prevention for any adverse health outcomes, including adverse birth outcomes.

Do you find the outcomes vary based on whether the mom became pregnant naturally vs. through IUI or IVF?

curiouserthangeorge

Conception by artificial reproductive techniques (ART - including IUI, IVF, etc.) is a risk factor, regardless of age. With age, both factors (age itself and ART) contribute to increased risk. When we adjusted for ART in our study, the risks were slightly lower, meaning that natural conception is associated with lower risk for older moms. However, if natural conception is not possible (for any reasons), ART is a good option. It is better not to delay ART for too long (after the 40s), if possible, as such conception becomes increasing more difficult and the risks increase during pregnancy and childbirth as well.

What do you recommend for women having children over the age of 40, to try to lessen or negate potentially harmful health problems i.e specific vitamins, exercise?

djseethat

https://doi.org/10.15200/winn.149804.49487 Hi, personally, my first advice would be not to stress about things going wrong. Adverse outcomes are rare, so the the absolute risk is low. Good prenatal care is a must. Monitoring your and your baby's progress throughout pregnancy is important, to find the signs of gestational diabetes or hypertension and deal with that right from the beginning. Chances are you will deliver by cesarean, so talking to your doctor about the date and time of your estimated delivery is also important - I would strongly recommend a hospital birth (e.g., a tertiary care centre), as some of the complications (e.g., excessive bleeding) can be dealt with in a timely manner in a hospital. Especially if you live in a rural area or without a timely access to hospital, it may be better to come to the city before the time of your estimated childbirth (if possible). Other than that, healthy diet, moderate exercise - and being happy - is a good prevention.

Are the adverse outcomes attributed to the embryo itself even when transplanted into a younger surrogate or is this true for gestation of any embryo in a 40+ year old woman.

test6554

We did not have data to study this specific question. From the previous literature that I know, the pregnancy and baby health outcomes are better with a younger surrogate for women in late 40s.

Did you control for parity? It seems like those who give birth for the first time after 40 would be most at risk. Did you find that the risk declines for each subsequent birth?

down_home_girl

We did control for parity - as others commented on already. We present results in several ways: 1) first the crude rates in Table 3 - for each age category, you can see what is the average probability of having the outcome. For example, the average probability of having an antepartum hemorrhage with transfusion is 17.7 per 10,000 women in age group 40-44 years. 2) second, we present unadjusted odds ratios - Table 4 left part. This will tell you how much are the average odds higher for women in each age group as compared to women 25-29 years. As these outcomes are very rate, the odds ratio is identical to risk ratio (i.e., how much more higher risk is there for older women). 3) third, we present adjusted odds ratio (AOR) - Table 4, right part. This will tell you, how much more higher risk is there for older women, as compared to 25-29 years old, when we take into account differences in parity, BMI, race, marital status, education, etc. In other words, if you compare 20-29 and 40-44 year old that have the same parity, education, race, BMI, marital status, health insurance, etc., the 40-44 year old will have on average a 50% higher chance of antepartum hemorrhage with transfusion (AOR = 1.5, ie 50% higher than 1:1). If you look at OR (unadjusted odds ratio, Table 4 - left part), you will see that 40-44 years old will have 101% higher chance (OR=2.1, which is 101% higher then 1:1) - or double the odds - of having antepartum hemorrhage with transfusion. This is because these odds ratios are unadjusted, and - on average - 40-44 years old will more likely have hypertension, high BMI, or other comorbidity. All that means that given the comorbidity and higher BMI etc that women likely acquire as they age, the risk of adverse outcome is higher. But even if they are relatively healthy and lean, etc, the risks are still higher (not so much though) just because of age. Now, when we further adjusted for chronic hypertension, diabetes, assisted conception and other health problems, the relative risks went down but did not disappear completely.

Are the life threatening conditions during the pregnancy and birth or post birth too?

Rumbledog

We included the period around birth - that included complications of pregnancy after 20 weeks gestation that lead to delivery, and postpartum period until hospital discharge. The rates may have been slightly higher if we included a period from conception till 6 weeks after delivery. The conditions we studied are only POTENTIALLY life-threatening, as many obstetricians would say that transfusion for an excessive bleeding is not a serious complications. However, it could be serious if this woman delivers in a rural hospital or a tertiary-level care is not available.

What does the risk curve by age look like? Is it fairly linear until a sharp drop at 40?

Would you consider counselling a woman who delays pregnancy until 35? 39?

Flexo-130

The risk curve is better at depicting the association between maternal age and adverse heath outcomes, and we included these risk curves as supplemental tables (Plos Medicine website). These curces differ for each condition, but generally the risk increases very slowly by late 30s and then more sharply at early 40s and and even more at late 40s and 50s (an exponential increase). That's why one or two years do not matter too much in your 30s but can make a difference in late 40s. It does no make sense to be considered low-risk just months before turning 35 and the be considered 'high risk' advanced maternal age a day after your 35th birthday. However, doctors often need to make decisions based on certain cut-offs. And we need to decide when is it warranted to take lab test etc. It is just a precaution. It is like one day you are 35 years old and the next day (your birthday) you are 36 years old - just one day apart - but you are one year older. I agree, we should change the term :)

Do you find a difference in non-first time mothers pregnant again at age 40+?

Aelintari

As mentioned in an earlier reply, we adjusted for parity (first time moms or pregnant again). The risks increase with age regardless of parity. However, first-time mothers have on average elevated risk as compared with moms who had 1-3 children, and grand mutiparas (moms with their 4th child or more) have also higher risks, regardless of age. So for mom who are over 40 and with their first child, the risk are a bit higher then for older moms with the second or third child. This, however, also depends on how far apart these childbirths were and whether there were any adverse outcomes previously, etc.

How much are the effects decreased with a healthy/fit mother? How big of a role does obesity play into adverse outcomes?

belovedbug

Obesity plays a role, that's why we adjusted for (took into account) BMI. This means that regardless of BMI, older mothers have a higher risk. It also means that if an older mom has a high BMI, the risks are higher as compared with an older mom who has a normal BMI.

Interesting study! I was aware of an increased risk of child disease/mortality in older mothers, but not of the increased risk for maternal disease.

Your study only included data from Washington State residents. Would you say that the results are representative of others states/European countries?

BioPowerr

Thank you! I'd think the results are quite representative, as we adjusted for race, the type of health insurance, marital status, etc. Some European countries may have lower baseline rates, as the access to care may be better in general (for example, on average shorter distance to a tertiary care centre as compared with the US). However, the relative risk (i.e., teh relative increase in risk), I assume, would be similar.

Do you have any suggestions for anything an older mother can do during childbirth/labor to stay safer, and/or better communicate with her medical team to increase her chances of survival?

cheezits_and_PB

The chances of survival are very high, the rates of maternal death were between 6 and 9 per 100,000 women! As I mentioned previously, there is no need to stress about adverse outcomes, pregnancy should be enjoyed... staying healthy, having a good communication with the maternity care provider and a good prenatal care, moderate exercise with proper nutrition - are all good preventive strategies.

We excluded...multiple births, births before 20 wk gestation, births to females aged <15 or >60 y (35,598 mothers, 3.7%)

Can you explain a bit more about how you chose these specific exclusion criteria? As someone who is currently creating exclusion criteria for a study (unrelated to OB/GYN), I am just curious on how you settled on these specifically (ie: why <15 and not <16, why births before 20 weeks and not births before 24 weeks when the mortality rate drops to about 50%)

Boston_Red_Sox

These decisions are specific to your study. The categories (ie <15y vs <16y) are often based on previous literature (for comparability reasons) or clinical relevance (i.e. BMI categories). Regardless of reason, they are often arbitrary. They need to relate to what you study (your outcome) and what population is available (ie if there is only one woman >60 y, then the results won't be relevant to women over 60 y; or we excluded multiple births, as we did not have adequate data). This speaks to the intended generalizability of your results. As for excluding births before 20 weeks, these are considered miscarriages, except for live births, and are not consistently reported in birth certificates (so it was a data issue, however, this is standard in perinatal/obstetrics literature). Good luck with your study :)

How does advanced maternal age influence the rate of vaginal births vs. cesarean births? Are older mothers more likely to be induced?

swampassbitch

Yes, older women are more likely to have a cesarean delivery (in our study, almost 50% of women over 40 had a cesarean. The association with induction was not that clear (20%-24% in all age groups). The decision about cesarean delivery is not straightforward, the pros and cons have to be carefully evaluated.

Were income, access to healthcare, demographics and geography factored in?

flexiebee

We adjusted for the type of health insurance, BMI, marital status, education, race, drug use, smoking, and parity in the main results (and chronic conditions and assisted conception in supplementary analyses), these are factors closely correlate with income, access to healthcare, etc. However, we did not have data on geography, so some residual confounding cannot be ruled out.

Did you find a trend of women in the US born around a certain year waiting until their 40s to gave a child? The reason I ask is, every single person I know my age (born early 70s) waited until their 40s. It's anecdotal, but I always wondered if this was a gen-x trend.

13_0_0_0_0

We did not set to answer this particular question, however, it is known from previous studies that women often delay their childbirth to have a career of their choice, good education and to find a mature, reliable partner. All these reasons are positive, including a resulting better socio-economic status, the only caveat is not to wait too long, if possible :)

Greetings and thank you for taking the time for inquisitive redditors. I read the paper provided in the link and would ask the folowing:

- the comparisons of the reference group (25-29y) are mostly made to the teen group (15-19y) or the very advanced group (>40y). Are there any noticable differences between reference group and 30-35y group, or are these two age groups relatively the same in regards to the parameters you were observing?

Much obliged!

8_legged_spawn

Hi, thank you. We did look at all age groups, in Table 3, you can see the rates of each adverse outcome by age category (per 10,000 women); in Table 4 you can see the unadjusted odds ratio, and adjusted odd ratio that represents the increase in risk as compared to 25-29 y reference category. For example, the risk of any adverse maternal outcome increases by 10% for 30-34 y, by 30% for 35-39 y, by 60% for 40-44 y, and by 100% for 45+ y (AOR = 1.1, 1.3, 1.6, and 2.0, respectively) as compared with 25-29 y old women. Thus the risk increases exponentially.