Does prenatal Ramadan exposure effect on health exist?
new evidence from the Indonesian Family Life Survey

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Introduction

Fasting during the holy month of Ramadan is one of the five pillars of Islam. During Ramadan, every adult Muslims are not allowed to eat and drink from dawn to dusk. Pregnant women are an exception. They are allowed to skip fasting, but many continue to fast for spiritual and sociocultural reasons

Previous cross-sectional studies showed symptoms of coronary heart problem and type 2 diabetes of those adults who were prenatally exposed to Ramadan [1]. However, others were against this evidence. By showing insignificant birth weight differences of mostly younger cohorts, they argued the child health condition is unaffected[2]

Thus, makes current debate on maternal Ramadan fasting effect on the health of the mother's child remain inconclusive

Improvement over previous studies

We explore the overlooked childhood and adolescence life stage (0 to 19 years old) and possible cohort effect. We consider religiosity and social context of the studied population that previously receive less attention

Research Questions

1. Does the effect of prenatal Ramadan fasting exposure on health exist in childhood and adolescence?
2. If the effect exists, then does the effect develop through age or is it cohort related?

Method

The data is a pooled sample of the Indonesian Family Life Survey (IFLS) comprising 42 birth year cohorts of children and adolescent from 1974 to 2015. The IFLS consists panel data on socioeconomic and health information of the Indonesian population: the world biggest country of Muslim-majority

- Dependent health indicators: height-for-age and BMI-for-age, based on the WHO reference 2007 z-score
- Estimation model: mother fixed-effects regression with dummy control variables (incl. sex, month of birth, and birth order)
- Since the maternal fasting rate is different by religiosity[3], sample are split further into children of Religious Muslims and non-Religious Muslims based on whether their mother follows *shalat* (Islamic five daily prayers)
- Children are identified as unexposed to Ramadan or exposed to Ramadan in five different timing: a) conceived during Ramadan, b) experience full Ramadan in early pregnancy, c) in mid-pregnancy, d) in late pregnancy, and e) born during Ramadan

Method, cont.

Our exposure identification procedure follows van Ewijk's method[1]:

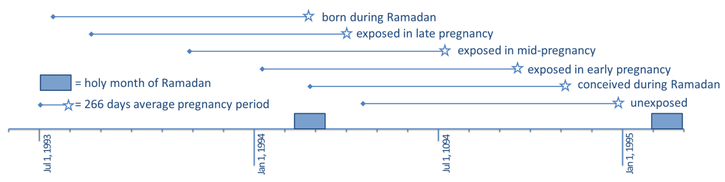

Figure 1. Exposure Identification procedure

Sample Characteristics

		Mean; Std.Dev.
Religious Muslims	Height, z-score	-1.70; 1.23
	BMI, z-score	-0.60; 1.26
N obs. = 25,819	N child. = 12,710	
	N mothers = 6,060	
Non-Religious Muslims	Height, z-score	-1.62; 1.17
	BMI, z-score	-0.55; 1.26
N obs. = 15,304	N child. = 9,843	
	N mothers = 5,935	

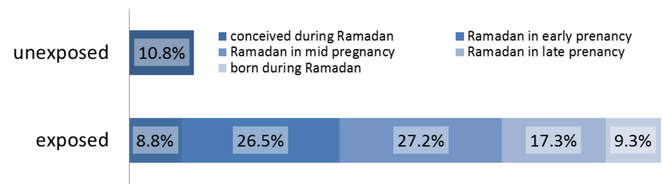

Figure 2. Sample % by exposure category

Results

Important Indonesian context

Food price hike around the time of Ramadan is very common
However, traditionally before 1994 and formally since 1994, Indonesian Muslims receive *Tunjangan Hari Raya* (feast day benefit) from their employer. The benefit is meant for them to have appropriate Ramadan and *Eid al-Fitr* celebration. Therefore, instead of food and drink shortage during Ramadan fasting, Muslims pregnant women who decide not to fast are more likely to consume more food and drink and presumably at better quality

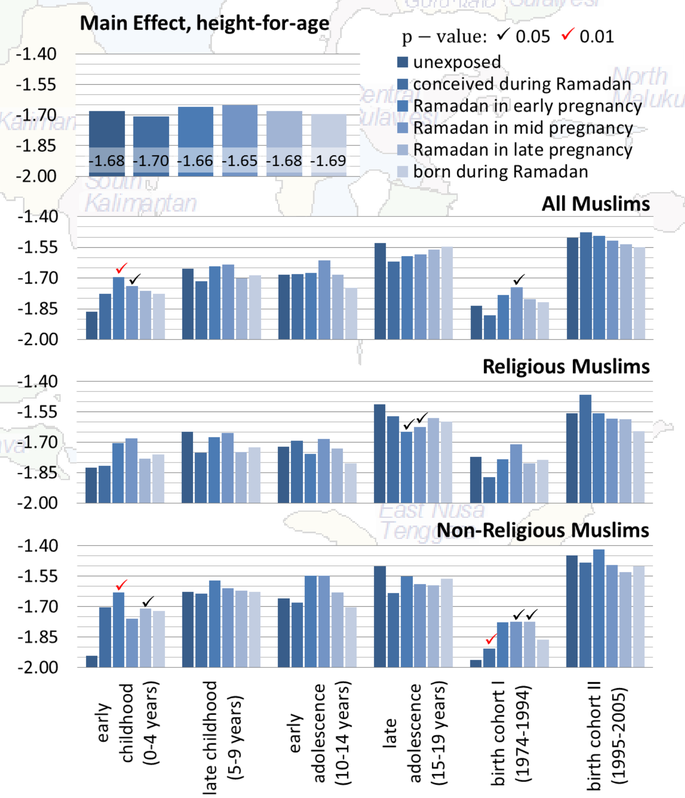

Figure 3. Prenatal Ramadan exposure effect on height-for-age, z-score; main effect, by life stages, and by birth cohort

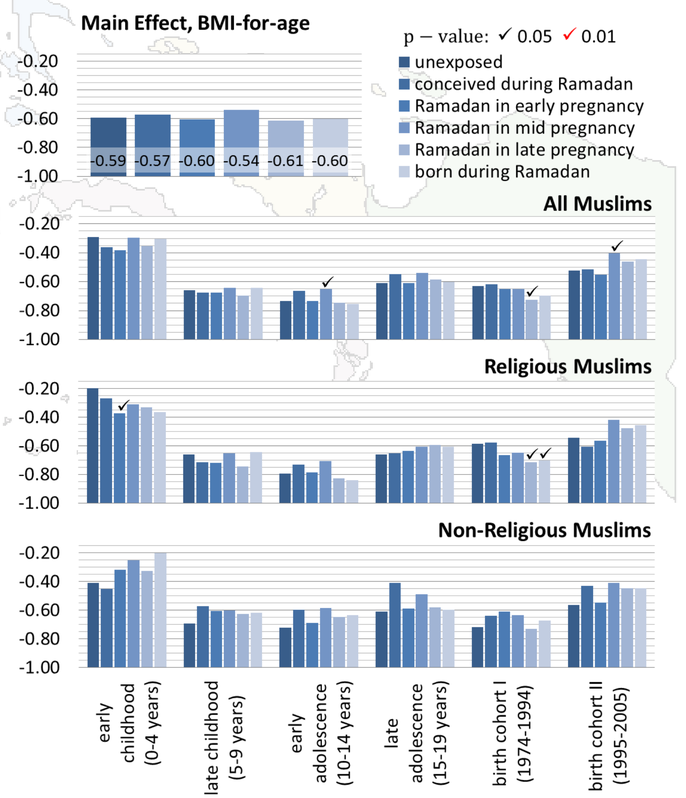

Figure 4. Prenatal Ramadan exposure effect on BMI-for-age, z-score; main effect, by life stages, and by birth cohort

Conclusions

- Significant negative effects of the exposure on health occur in Religious Muslims sample
- The negative effect on height-for-age becomes evident in late adolescence specifically to those who were exposed in early and mid-pregnancy
- The negative effect on BMI-for-age occurs in early childhood but not significant at later life stages. Those who were exposed in early pregnancy show the negative effect of the exposure
- There are some indications that prenatal Ramadan exposure effect is cohort related. The negative effect, especially on BMI-for-age, are stronger in the past

References

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