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Do primary students understand how pregnancy can occur? A comparison of students in Jakarta, West Java, West Nusa Tenggara and South Sulawesi, Indonesia

Iwu Dwisetyani Utomo, Peter McDonald, Anna Reimondos*, Ariane Utomo and Terence H. Hull

Australian Demographic and Social Research Institute, The Australian National University, Acton, Australia

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In Indonesian primary schools, sex education is implicitly integrated into various related subjects, such as science, biology, social studies and religion. The technical facts of ovulation and sperm are mentioned in biology, although little or no connection is made between this process and sexual intercourse. By the end of primary school, therefore, children are likely to have a poor understanding of how pregnancy can occur. Given that young girls at this age have already experienced or will soon experience menarche, and given the increasing trend towards delaying the age at marriage in Indonesian society, this lack of knowledge places young people at risk of various negative consequences, including unwanted pregnancy. In this paper, we investigate the level of understanding regarding human reproduction amongst 1762 students attending the last year of primary school, distributed across 32 different schools in Indonesia. Despite the fact that all schools follow a national curriculum, our results reveal widespread variability in the students' comprehension of how pregnancy can occur. In particular, students attending Islamic religious schools and those in less developed provinces of Indonesia appear to have a much poorer understanding of the link between sexual intercourse and conception.

Keywords: sex education; conception; primary school; Indonesia; reproductive health

Introduction

In Indonesia, the world's most populous Muslim-majority country, sex is a taboo subject, and moral concern is growing with regard to youth sexuality and premarital sex (Harding 2008). It is therefore not surprising that the provision of sex education is a particularly sensitive and contested issue, and one that has recently been receiving increasing attention from researchers and policy-makers (Bennett 2005, 2007; Diarsvitri et al. 2011; Harding 2008; Holzner and Oetomo 2004; Schonhardt 2013; UNESCO 2010, 2011; Utomo 2006; Utomo and McDonald 2009). Sex education currently does not exist as a stand-alone subject. Instead, it is addressed in several related subjects, including science, biology, social studies and religion (Utomo et al. 2010). While the national government has implemented a number of policies to increase the coverage of sex and reproductive health education in schools, there remains much room for improvement. In particular, studies reviewing the content of reproductive health education have revealed that such topics are often taught from a purely biological perspective (UNESCO 2010; Utomo et al. 2010), while the personal and social dimensions of sex are often left unexplored. Moreover, such

*Corresponding author. Email: anna.reimondos@anu.edu.au

topics as conception and pregnancy are discussed primarily in the context of marriage and family planning (Smith et al. 2003).

Although some sex-related topics (e.g. reproduction and differences between male and female anatomy) may be covered at the primary school level, reproductive health matters are not discussed in greater depth until secondary school, and particularly senior secondary school (Smith et al. 2003; Utomo 2003). This can pose a problem for students who leave the school system after primary school, and who are therefore unable to benefit from the reproductive health knowledge provided in the junior or senior levels of secondary school.

While much of the recent research on sex education in Indonesia has focused on HIV and AIDS awareness amongst young people (Center for Health Research 2003; UNESCO 2010; Pisani 2006), less is known about the more general understandings of sex and conception amongst young people. Research has shown that many young Indonesian women fail to comprehend exactly how conception occurs (Bennett 2005; Situmorang 2003). Furthermore, studies amongst young people have demonstrated that misconceptions often exist even when the basics of sex and conception are understood. These misconceptions include the belief that pregnancy cannot occur during the first sexual occurrence (Shaluhiyah 2007) or after only one act of sexual intercourse (Situmorang 2001; BPS and Macro International 2008; Tunggadewi, Affandi, and Wawolumaya 2010). In a study by Tunggadewi, Affandi, and Wawolumaya (2010) involving female school students in Jakarta, aged 11–17 years, less than half of the participants knew that one-time sexual intercourse could lead to pregnancy. Even these studies may overestimate the level of knowledge about the consequences of sex. For example, in a focus-group study of young people in Medan, Situmorang (2001) reports a lack of understanding, even amongst some participants who said that it is possible for a woman to become pregnant from a single act of sexual intercourse. For example, some participants stated that pregnancy could occur after a single occurrence of sexual intercourse if the woman was very fertile, which they felt could be judged by a woman's appearance and healthiness, rather than with reference to the menstrual cycle (Situmorang 2001).

Education plays a key role in increasing understanding regarding sex and conception. In a recent large-scale study of 19,000 unmarried young people aged 15–24 years, 49% of women who had completed only primary school stated that a single occurrence of sexual intercourse could lead to pregnancy, as compared with more than 60% of women who had completed secondary school or further education (BPS and Macro International 2008). Less is known about the level of knowledge regarding sex and conception amongst younger children and adolescents, however, and about how that might vary according to the types of schools they attend and the regions in which they live.

Understanding the degree of comprehension about sex and conception is important, because although students in primary school are not yet of an age at which they are likely to be sexually active, they are likely to be entering puberty by the end of primary school. For example, the average age of menarche in Indonesia in the early 1990s was 12.96 (Batubara, Soesanti, and van de Waal 2010). Given that a significant number of young boys and girls today still do not progress to or complete junior secondary school, it is important to provide them with basic sex education *before* they enter their adolescent years. With the age at first marriage rising, adolescence has increasingly become a period during which young people may engage in premarital sex (Utomo 2002). Without adequate education, this places them at increased risk for several negative consequences, including unwanted pregnancy or forced marriages (Holzner and Oetomo 2004; Situmorang 2001; Tunggadewi, Affandi, and Wawolumaya 2010).

This paper examines the level of knowledge regarding conception amongst students in the final year of primary school (Grade 6), in order to obtain a better idea of how much students know before some potentially leave the school system. We use data from the 2010 Indonesian Gender and Reproductive Health Survey, which includes a sample of Grade 6 students from 32 different schools located in four provinces of Indonesia. These four provinces – Jakarta, West Java, West Nusa Tenggara and South Sulawesi – have widely varying sociocultural and religious environments. We differentiate between students whose understanding of conception is more advanced and those who know the biological mechanisms behind reproduction but who demonstrate little awareness of the connection between sexual intercourse and conception. Our key aim was to identify the extent to which understanding about conception varies between schools and the extent to which any variability between schools can be explained by geographic characteristics (e.g. province or urban/rural locality) and school-level characteristics (e.g. whether the school is general or religious).

The Indonesian education system

Public education has undergone dramatic expansion in Indonesia since the 1970s. After a concerted, large-scale programme designed to increase the number of primary schools in the country, universal primary school enrolment was achieved in the early 1980s, in the sense that all children were spending time in primary school, though not all were completing the level (Suryadarma and Jones 2013). The focus has now shifted towards increasing the quality of education and increasing enrolment at the junior and secondary school levels. Even though schooling up to Grade 9 has been compulsory (and free of school fees) since 1989, many children are still not completing the required nine years of schooling. As indicated by the rates of enrolment presented in Table 1, the gross enrolment rate for junior secondary school is only 80%, with a net enrolment rate of only 68%. Analysis of school progression rates also show that many students fail to progress from primary to junior secondary school. The latest data indicate that, in 2002–2003, only about 81 of every 100 students enrolled in primary school had completed six years of primary schooling, and only 66 had gone on to attend junior secondary school in 2008–2009 (Suharti 2013, 27). Given that a significant percentage of students either do not progress to junior secondary school or drop out during junior secondary school, these students leave

Table 1. Indonesian school system.

	Level	Grades	Age	Compulsory	Gross enrolment rate (2010)[a] (%)	Net enrolment rate (2010)[b] (%)
1	Primary school (*Sekolah Dasar*)	1–6	6–12	Yes	111	95
2	Junior secondary school (*Sekolah Menengah Pertama*)	7–9	13–15	Yes	80	68
3	Senior secondary school: general (*Sekolah Menengah Atas*), vocational *(Sekolah Menengah Kejuruan*)	10–12	16–18	No	63	

Source: Data on the gross enrolment rate and the net enrolment rate are from Suharti (2013), based on calculations from SUSENAS.

[a] Gross enrolment rate: enrolled children in the official school age group/total number of children in the official school age group.

[b] Net enrolment rate: enrolled children of all ages/total number of children in the official school age group.

the school system without gaining the more comprehensive information on sexual and reproductive health that is covered at higher levels of schooling.

Financial reasons are a key factor leading young people to discontinue their education at the primary and junior secondary school levels. Even though education at these levels is provided free of charge, the cost of books, stationery, uniforms and transportation is prohibitive for many families (Suryadarma, Suryahadi, and Sumatro 2006). It is therefore not surprising that the probability that a student will complete primary school and progress to junior secondary school is strongly linked to household economic status. Amongst the poorest 20% of households in 2009–2010, only 72% of children aged 13–15 years were enrolled in school (at any level), compared with over 90% of those in the most affluent quintile (Suharti 2013). In addition to the disparities in enrolment across households of varying socio-economic status, there are also large disparities in enrolment across different regions of Indonesia. In more than one fifth of the nation's districts, the participation rate in junior secondary schools is still less than 60% (Kristiansen and Pratikno 2006). These geographical differences in enrolment reflect the substantial diversity in development across the Indonesian state, where the incidence of poverty within the population ranges from as low as 3.4% in Jakarta to as much as 42% in Papua (Hill, Resosudarmo, and Vidyattama 2008).

Regional disparities are not limited to school enrolment rates. Indicators of teacher quality and student learning outcomes also reveal strong cross-regional differences. For example, in 2009/2010, the percentage of primary school teachers who had completed the minimum four-year qualification ranged from less than 10% in several provinces to around 50% in DKI Jakarta (Suharti 2013).

It is important to note that, at every level of education, schools can be differentiated according to whether they are general or religious. Although the majority of students attend general schools, religious schools (*madrasah)* continue to form an integral part of the formal Indonesian school system. At the primary school level, about 10% of all students are enrolled in *madrasah*, as compared with 21% at the junior secondary school level. Unlike general schools, the majority of *madrasah* are private (Suryadarma, Suryahadi, and Sumatro 2006, 3), although they still receive state funding.

As established in legislation introduced in 2003, *madrasah* now have the same legal status as state schools, although they are still managed by the Ministry of Religious Affairs, while general schools are managed by the Ministry of Education (Kingham and Parsons 2013). In terms of the content taught, *madrasah* follow the national curriculum specified by the Ministry of Education for general subjects (e.g. science and mathematics). The national curriculum accounts for only 70% of school hours, however, with the remaining 30% devoted to religious teaching. Time devoted to religious teachings comes at the expense of teaching the other material. In practice, it is therefore difficult for *madrasah* students to compete with their peers in general schools in terms of academic achievement (Permani 2011). With fewer resources than state-funded schools have and providing a lower standard of education, *madrasah* are often regarded as the poor cousins of the state system (Kingham and Parsons 2013; Parker 2008).

Another important feature of the Indonesian school system to consider when analysing the delivery of sex education is its decentralised nature and the emphasis that it places on school-based management. In the past decade, the Indonesian government has adopted an explicit policy of decentralisation, which has shifted many responsibilities, including education, from the central government to local or district governments. Decentralisation has had a profound effect on the way in which education is delivered throughout the country (Power and Cohen 2005), as illustrated by changes in the management of the national curriculum. Although several recent versions and updates to the national

curriculum have emerged (Koto 2013), a common feature of post-decentralisation curriculums is that the responsibility for development and implementation is divided between the Ministry of Education and the local schools, with some management oversight at the district level (Power and Cohen 2005). In the latest curriculum (KTSP or Curriculum 2006), the Ministry is responsible for developing various 'standards', including standards of content, facilities, teacher and education staff, finance, process (teaching and learning), management, graduate competence and assessment. Each school is responsible for translating the standards into a meaningful school syllabus and instruction at the classroom level (Power and Cohen 2005). This arrangement is intended to allow space for adapting nationally developed standards to local community needs (Power and Cohen 2005). This aim is also reflected in the latest competency-based curriculum. In addition to the core curriculum, this policy reserves a certain amount of time each week for local content curriculum and for self-development activities.

The local content curriculum (*muatan lokal*), which is to be taught for a minimum of two and a maximum of six hours a week, is intended to offer schools the opportunity to include content that is relevant to the local situation. This content may take the form of vocational skills or local culture, language or arts and crafts. The policy calls for schools to decide on the local content themselves (in consultation with the district office and school committees). According to a review by Power and Cohen (2005), however, in practice, the content is often decided at the district or even the provincial level. In addition, some schools appear to use the reserved time for teaching subjects from the core curriculum that they had been unable to cover in the allocated time.

Sex education in primary school

The decentralised way in which schools are managed and content is provided to students poses both opportunities and challenges in terms of the delivery of sex education. For example, the national government has made substantial efforts to improve the integration of reproductive health education into school curricula (e.g. the publication of training manuals for teachers and the inclusion of HIV and AIDS in the minimum standard requirement of subjects to be taught). In some cases, however, decentralisation has kept these national policies and guidelines from being implemented at the provincial and district levels (UNESCO 2010). At the district level, the execution of many policies and programmes relies on the commitment of district authorities and school principals (ANTARA News 2013; UNESCO 2010; Utomo 1997). The only sustainable programme on reproductive health education (which is delivered through peer-educator training for senior secondary school) was developed more than a decade ago by the National Population and Family Planning Coordinating Board (Hull, Hasmi, and Widyantoro 2004). Even this programme failed to reach all schools.

The local-content system nevertheless provides an opportunity for reproductive health education to be taught, regardless of whether the material is included in the core curriculum. In some provinces (e.g. West Java, West Nusa Tenggara, South Sumatra, West Kalimantan, Papua and West Papua), reproductive health education has already begun to be taught as a subject under the local-content curriculum system, with support from the United Nations Population Fund (UNFPA) or other organisations. Without continuous support from UNFPA, however, the local initiative to teach reproductive health education would encounter many obstacles from local governmental and religious leaders, as reproductive health education and services for those who are still single are strongly politicised.

As observed in a recent review of the content of reproductive health education in the national curriculum and textbooks of Indonesian primary and secondary schools, the coverage of reproductive health education at the primary school level is limited. At the Grade 6 level, the anatomical aspects of reproduction and human development are outlined in biology textbooks, although there is no explicit discussion about sexuality or reproductive health (Utomo et al. 2010). For example, the textbooks do not mention that sexual intercourse in a heterosexual relationship can cause conception. The terms used for sexual intercourse include heterosexual relationship (*hubungan lawan jenis*) or husband and wife relationship (*hubungan suami isteri*). None of the textbooks analysed explained what sexual intercourse or penetrative sex involves. Textbooks for social studies and Islamic religion discuss the moral aspects and religious judgements related to sexuality, menstruation and sex outside of marriage in the later years of primary school and in secondary school (Utomo et al. 2010). As concluded in the review, however, material about reproductive health tends to be presented with a strong biological and scientific focus at the primary school level. More systematic coverage of sex education is reserved for junior or senior secondary school.

In a study involving young men and women aged 15–24 years, when asked at which level of schooling they had first been taught about reproductive health matters, respondents confirmed that instruction in this topic had been virtually absent at the primary school level. Amongst women, 59% reported having received information about the reproductive system in junior secondary school, and only 6% mentioned that they had been given any information in primary school (BPS and Macro International 2008). As the study also reports, however, the percentage who mentioned having received information in primary school was higher amongst the younger cohort (aged 15–19 years), possibly indicating that they had benefited from the more comprehensive sex-education policies of recent years.

Even at the junior and senior secondary school levels, however, there is still an overly biological focus in the treatment of sex education, as confirmed by reviews of textbooks (UNESCO 2010; Utomo et al. 2010) and by focus groups conducted with young people (Situmorang 2001; Utomo 1997). With regard to human reproduction, qualitative studies amongst young people in Jakarta, Yogyakarta and Palembang (Utomo 1997) and Medan (Situmorang 2003) confirm that students do learn about human reproduction in biology class, although they often perceive the topic to be presented in an overly technical and dry fashion, leaving them with many unanswered questions.

Given the context of sex education in Indonesian schools, as described above, we examine the extent to which knowledge about conception varies across different schools and investigate whether specific characteristics (e.g. geography and whether the school is religious or general) can explain differences in student knowledge across schools. In terms of knowledge received from formal schooling, Indonesian students may receive very different levels of education depending on the level of commitment to reproductive health education on the part of their teachers and school principals, as well as on the region in which they live and whether they attend a religious or non-religious school. These unique features of Indonesian schools lead us to expect considerable variability in the degree of reproductive health knowledge amongst students across different types of schools and across various regions of Indonesia.

Methods

Data and study sites

The data used in this study were obtained from the 2010 Indonesian Gender and Reproductive Health Survey, a multilevel survey of Grade 6 ($N = 1837$) and Grade 12

($N = 6555$) students, their teachers ($N = 521$) and school principals ($N = 59$). The survey was conducted in Jakarta, West Java, West Nusa Tenggara and South Sulawesi. These four provinces have contrasting economic, geographic, sociocultural and population characteristics (Table 2). The capital of Indonesia, Jakarta, is a modern urban agglomeration with a relatively high level of human development. Of the four provinces, students in Jakarta have the highest likelihood of finishing 12 years of education. West Java is a large province that encompasses Jakarta. Although it has performed relatively well on various facets of human development, the province has pockets of disadvantaged districts in which the population is struggling to achieve quality education. In contrast, West Nusa Tenggara and South Sulawesi, which are located in the eastern part of Indonesia, are characterised by a stronger Islamic religious environment. Bulukumba, a district in South Sulawesi included in this study, was the first district to implement Shariah Law.

In terms of the quality of schooling, there are also wide differences across the four provinces. For example in 2009–2010, the percentages of primary school teachers qualified to the minimum four-year qualification were around 20% in West Nusa Tenggara, 30% in South Sulawesi, 35% in West Java and around 50% in DKI Jakarta (Suharti 2013).

The sampling of schools was performed in several stages, using a sampling procedure designed to include students from a wide variety of backgrounds. In the first stage, two districts were selected from each of the four provinces (excluding Jakarta), one district in a rural area and one in an urban area. Two general public schools (*Sekolah Dasar*) and two public Islamic religious schools (*Madrasah*) were selected from each district to represent the best school (*sekolah unggulan*) and a school with average performance (*non-unggulan*). This stage thus involved the selection of 16 schools from each province. In each of the selected schools, all students in Grade 6 or Grade 12 participated in the survey by completing the self-administered questionnaire in class. In this study, we use information from 1762 Grade 6 students who had provided valid answers to the relevant dependent and independent variables. Basic descriptive characteristics of the students are shown in Table 3.

The questionnaire given to the Grade 6 students contained a range of questions on reproductive health understanding, gender role attitudes and other topics (e.g. domestic violence). This study focuses on a set of questions designed to test the students' understanding

Table 2. Study sites: selected indicators for 2010.

	DKI Jakarta	West Java	West Nusa Tenggara	South Sulawesi
Population (in millions)	9.61	43.05	4.50	8.03
Gross regional domestic product as a percentage of national GDP	16.3	14.8	0.9	2.2
Average monthly expenditure per capita in Rp	1,024,214	487,481	424,377	261,810
% of population living under the poverty line	3.5	11.3	21.6	18.1
Human development index	77.6	72.3	65.2	69.6
Net enrolment rates for primary school or equivalent (%)	94.6	95.0	95.2	92.9
Net enrolment rates for junior secondary school or equivalent (%)	72.0	68.4	71.7	62.3
Net enrolment rates for senior secondary school or equivalent (%)	50.6	38.8	49.4	42.8

Source: Statistics Indonesia 2013 – www.bps.go.id.

Table 3. Characteristics of students.

	Frequency	Percentage
Sex		
Male	857	49
Female	905	51
School type		
General	1026	58
Islamic religious	736	42
School performance		
Top	983	56
Average	779	44
Province		
Jakarta	530	30
West Java	492	28
Nusa Tenggara Barat	420	24
South Sulawesi	320	18
Geography		
Urban	849	48
Rural	913	52
Total	1762	100

Source: 2010 Indonesian Gender and Reproductive Health Survey.

of conception. The respondents were presented with a list of behaviours and processes, and asked to indicate whether they believed each behaviour or process could lead to pregnancy. The statements examined in this paper are as follows:

(1) When a man and a woman kiss.
(2) When a man and a woman hug.
(3) When a man and a woman have sex.[1]
(4) When the sperm comes into contact with the egg.

The first two statements are false, and the latter two are true. The third statement describes the behavioural process that can result in conception, and the fourth statement focuses on the biological mechanism.

Answers to the four questions were grouped into three categories. The first category represents an 'advanced' understanding of pregnancy and conception. Students in this category identified that kissing and hugging do not lead to conception, but that sexual intercourse and the sperm coming into contact with the egg can lead to pregnancy. The second category represents a purely biological understanding of conception, consisting of students who stated that conception occurs only when the sperm comes into contact with the egg, but not through sexual intercourse (or hugging or kissing). The third group consists of students who provided all other answers, including those who said that all of the statements were true, all of the statements were false or a combination of false and true answers (e.g. that kissing and hugging can lead to pregnancy but not the other two processes).

Analysis

In the first stage of analysis, we use χ^2 analysis to compare the proportion of students in the three categories (advanced, biological and other) according to individual-level, school-level and geographic characteristics. The strength of the association is tested using Cramer's *V*.

We then identify students who had an advanced understanding of conception (i.e. those who stated that kissing and hugging do not lead to conception, but that conception occurs when a man and a woman have sex and when the sperm comes into contact with the egg). Using multilevel logistic regression, we investigate factors associated with an advanced understanding of conception and measure variation at the regional and school levels (using *xtmelogit*, Stata 12.1).

Results

Overall, slightly more than half of the students appeared to have an advanced understanding of conception, in that they correctly identified that hugging and kissing do not lead to pregnancy and that sexual intercourse does, as does the process in which the sperm comes into contact with the egg. An additional 16% of the students had a purely biological understanding of pregnancy, and the remaining third were in the 'other' category (i.e. indicating a poor or 'confused' understanding of conception). Bivariate analysis between each independent variable and the three-way classification of a student's understanding of conception (advanced, biological and other) reveals significant differences at the individual level, the school level and the provincial level (see Table 4).

As compared with their male peers, female students were more likely to have an advanced understanding of pregnancy, although the percentages of boys and girls with a purely biological understanding were similar. In terms of school-level differences, students in general schools and those in top-rated schools were also significantly more likely to have an advanced understanding of the causes of pregnancy than were students in Islamic religious schools and schools with average performance.

Our results also reveal important differences according to where the students were living. Students in Jakarta stood out as having the most advanced understanding (60%),

Table 4. Student understanding of pregnancy.

	Advanced understanding (%)	Biological understanding (%)	Other (%)	Total (%)	Cramer's *V*
Sex					0.14
Male	46	15	39	100	
Female	57	17	26	100	
Type of school					0.10
General	56	14	29	100	
Islamic religious	46	18	36	100	
School performance					0.11
Top	57	14	30	100	
Average	46	18	35	100	
Province					0.09
Jakarta	60	12	28	100	
West Java	53	17	30	100	
Nusa Tenggara Barat	46	18	36	100	
South Sulawesi	46	18	36	100	
Urban or rural					0.08
Urban	56	15	29	100	
Rural	49	16	35	100	
Total	52	16	32	100	

Note: All bivariate relationships significant at $p < 0.05$ using a χ^2 test.
Source: 2010 Indonesian Gender and Reproductive Health Survey.

followed by students in West Java (53%), although we observed no differences in understanding between West Nusa Tenggara and South Sulawesi. Living in an urban area was associated with a higher likelihood of having an advanced understanding of the causes of pregnancy. The findings strongly relate to geographical and urban versus rural setting. Respondents living in Jakarta and West Java had a better understanding on conception because the standard educational quality of schools in these two provinces is higher than that of schools in West Nusa Tenggara and South Sulawesi, which are located in the eastern part of Indonesia.

It is important to note that what we have termed an advanced level of understanding does not necessarily indicate that a student has a comprehensive knowledge of sex and conception. Although students with an advanced understanding correctly identified that conception can occur when a man and a woman have sex (but not from kissing or hugging), and when the sperm comes into contact with the egg, we are unable to determine whether they understand the actual mechanism of sex or the penetration of the male penis into the female vagina. In other words, we can only make several assumptions about what the advanced students believe sex is *not* (hugging and kissing). We cannot make any assumptions about what they believe sex *does* involve or about whether their knowledge is free of many of the myths and misconceptions surrounding sex and conception.

Multivariate analysis

In the next stage of the analysis, we used multilevel logistic regression to examine factors at the individual, school and geographic levels associated with the degree of understanding about the causes of pregnancy. The outcome of interest concerns whether students have an advanced understanding (with reference to the other two categories).

We began by testing a model controlling only for the sex of the student (baseline model), in order to examine the variability across the 32 schools, as shown in Figure 1. Analysis of the baseline model indicates that 73% of the variance is at the school level.

In addition, the odds of having an advanced understanding of the causes of pregnancy are 1.65 times higher for females than they are for males in the baseline model. This gender difference remains strong in the later models, after the introduction of additional variables. Similar sex differences in knowledge of reproductive health matters have been highlighted in other studies (Vuttamont et al. 2006). One reason that has been suggested is that teachers often construct such topics as pregnancy and birth as 'girls' issue', thus possibly discouraging boys from paying attention to something that they do not see as affecting them (Vuttamont et al. 2006).

It is important to determine the extent to which the wide variability between schools can be accounted for by school-level differences or geographic differences. To this end, we analyse two additional models to test the effect of school-level and geographic characteristics. The second model includes a variable describing whether the school is a religious school and whether it is a top-performing or average school. Confirming the bivariate analysis, results from this analysis indicate that the odds of having an advanced understanding are significantly lower amongst students in religious schools, as compared with students in non-religious schools. Students in top-performing schools are also significantly more likely to have an advanced understanding of conception, as compared with their peers in average schools (Table 5). After accounting for these two factors, the proportion of variability remaining at the school level is 59%.

In the third and final model, we examined the additional effect of location (i.e. province and urban vs. rural setting). The addition of these two factors decreases the

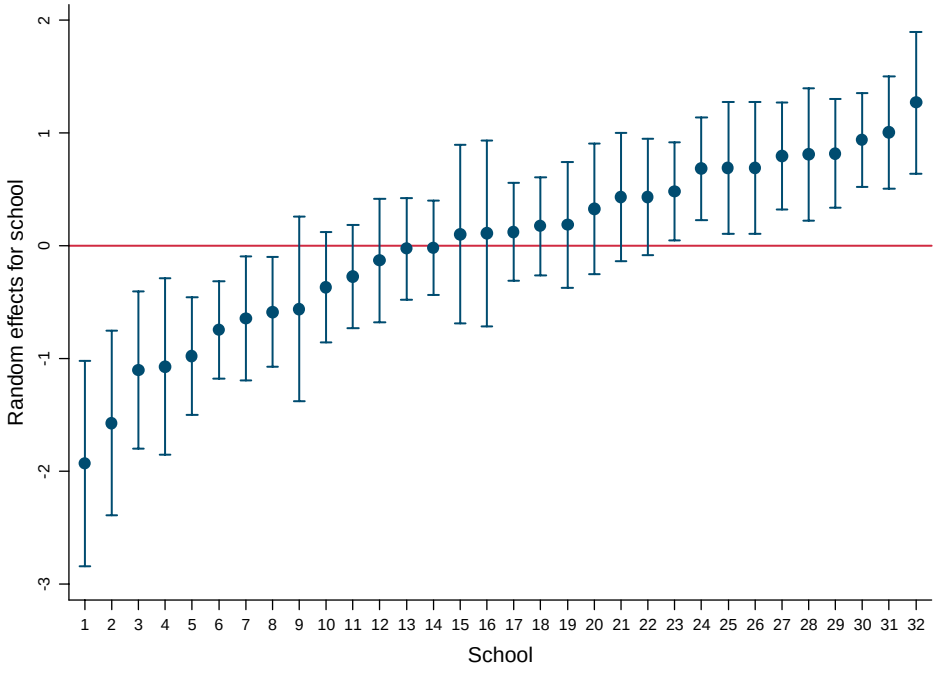

Figure 1. Random effects for school.
Source: 2010 Indonesian Gender and Reproductive Health Survey.

percentage of variability at the school level to 40%. Location was significantly associated with the odds of a student having an advanced understanding of conception, with West Nusa Tenggara and South Sulawesi showing particularly lower odds in comparison with Jakarta. Students in rural areas also demonstrated a poorer understanding of conception in comparison with students in urban areas. Calculating the predicted probabilities indicates that, controlling for all other factors in the model, the probability of having advanced knowledge of conception ranged from 67% for a student in a general school in Jakarta, to 37% for a student in a religious school in South Sulawesi.

Discussion

In this study, we examined variability of knowledge regarding conception amongst Grade 6 students in four Indonesian provinces. For several reasons, we expected considerable variability in knowledge across the 32 different schools included in our study. These reasons include the varied levels of development across the different regions of the country, the decentralised nature of the school system and decisions regarding the curriculum and delivery of content, in addition to differences in the standard of education between general and religious schools. The results of both bivariate and multivariate analysis confirm that there is a large degree of variation amongst school students with regard to their understanding of how conception occurs, and that much of this variation can be explained by the type of school they attend and the province in which they live.

The odds of having an advanced understanding of pregnancy and conception were significantly higher for students in general schools, as compared with students in *madrasah*, controlling for all other characteristics. Although all of the schools follow the national curriculum, the delivery of sex education is obviously more effective in general

Table 5. Multilevel logistic regression for having an advanced understanding of conception.

	Model 1 Odds ratio	Model 2 Odds ratio	Model 3 Odds ratio
Sex			
Male	1.00	1.00	1.00
Female	1.65***	1.66***	1.66***
Type of school			
General		1.00	1.00
Religious		0.59*	0.60**
School performance			
Top		1.00	1.00
Average		0.60*	0.58**
Province			
Jakarta			1.00
West Java			0.66
West Nusa Tengara			0.42***
South Sulawesi			0.39***
Geography			
Urban			1.00
Rural			0.62*
School-level variance	0.73	0.59	0.40
Log-likelihood	− 1132.1	− 1129.3	− 1124.2
Prob > χ^2	<0.001	<0.001	<0.001

*$p < 0.10$, **$p < 0.05$ and ***$p < 0.01$.
Source: 2010 Indonesian Gender and Reproductive Health Survey.

schools, as well as in those classed as top-performing. This is understandable, for while general schools follow only the national curriculum, Islamic religious schools include additional material based on Islamic religion in their teaching. It is also possible that these differences reflect differences in the family backgrounds of the students and their exposure to information about sex and reproduction outside of school. For example, students attending *madrasah* might come from poorer families or from those with stronger religious character. Unfortunately, we are not able to differentiate the extent to which differences amongst students in general and religious schools can be explained by differences in the content taught or by differences in their exposure to similar content outside of school hours.

Our results also reveal significant differences across the provinces, with the odds of having advanced understanding being significantly higher for students in Jakarta, as compared with students in West Nusa Tengara and South Sulawesi. In addition to the higher quality of education offered in these areas, students in Jakarta and West Java, as well as those living in urban areas, may have better access to information and the Internet.

It is not surprising that the lowest scores were observed amongst students in West Nusa Tengarra and South Sulawesi, given that they are relatively less developed than West Java and Jakarta and given that the schools are likely to have lower standards of education and fewer resources. The greater lack of conception knowledge amongst these students relative to their peers in Jakarta is particularly worrying, however, as these two provinces also have higher dropout rates between primary and secondary schools.

Cross-national studies in the West have shown that, by the end of primary school, children have the intellectual capacity to understand the process of sex and reproduction, and children as young as six years of age are able to understand the basics of how

conception occurs, if they are provided with accurate information (Caron and Ahlgrim 2012). The obstacle to providing children with comprehensive sex education thus has less to do with the children's ability to understand than it does with the strong apprehension of parents, teachers and policy-makers, to discuss sex with children given the taboo character of the topic in Indonesian society.

However, if they are not provided with accurate information from their teachers or their families, children and young people are likely to turn to other sources for information, including their peers, the mass media or the Internet (Harding 2008). The quality of information available from these sources may be questionable, possibly leading them to believe common myths and misconceptions (e.g. that a single occurrence of sexual intercourse cannot lead to pregnancy). If left to their own devices to find information and formulate their own understandings about sexuality, adolescents are increasingly at risk of practising unsafe sex (Harding 2008). This in turn can have lifelong consequences including unwanted pregnancies and forced marriages, as well as unsafe abortions (Holzner and Oetomo 2004).

Given the evidence that reproductive health knowledge amongst young people is relatively low, it is imperative that more efforts are made to integrate holistic sex education in the core of the standard national curriculum that goes beyond the basic biological facts. Providing sex education at an early age is particularly important for students in poorer areas, where it may be some time before nine years of schooling becomes standard in practice. Attention should also be paid to make sure that students attending religious schools are not disadvantaged when it comes to the quality and coverage of sex education.

For this to occur, however, a concerted effort is needed to overcome the various challenges provided by the current decentralised nature of the Indonesian school system. As reported in the report by UNESCO (2010), due to decentralisation, even current topics such HIV and AIDS, which *are* included in the minimum standards for the national curriculum, do not always reach the district or school levels and are not always adhered to by textbook publishers. Due to the sensitive nature of sex, an essential element of any plan to broaden sex education in Indonesian schools must also put strong emphasis on the training of teachers so that they feel comfortable teaching the materials (Smith, Kippax, and Aggleton 2000; UNESCO 2010). In the interim, however, for individual schools or districts, the local content curriculum provides some opportunities for including reproductive health material.

Note

1. In *Bahasa Indonesia*, the term used in the questionnaire was '*Bila antara laki-laki dan perempuan melakukan hubungan kelamin/seksual*', which can be translated as 'if a man and a woman have intercourse/sex'.

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