

How young female adolescents understand their pubertal body changes and reproductive system

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Abstract

Background: Female adolescents undergo drastic changes in their bodies during puberty. Therefore, they need to be informed about these pending changes at an early age so they can build a foundation for healthy reproductive behaviour. This study explored young female adolescents' understanding of pubertal body changes and knowledge of their reproductive system. Method: Female students in grades seven, eight and nine were recruited from eight junior high schools in Kupang, Indonesia. Body mapping was conducted together with a semi-structured interview. Data was analyzed using inductive thematic analysis. Result: The median age of participants was 13 years and more than 85% had experienced menstruation. During interviews participants listed their pubertal body changes and then located the female reproductive system on body maps. Two main themes emerged in regards to participants' perceived pubertal body changes and understanding of reproductive system. Participants aware the changes in their five body areas and could name one or two organs in the female reproductive system but they were unable to locate them on the body maps. The body mapping exercise revealed that participants have limited knowledge of the anatomy and physiology of the female reproductive system. Conclusion: Young female adolescents demonstrated sound knowledge of pubertal body changes. However, they lacked an accurate understanding of the anatomy and physiology of the female reproductive system. The study identified a gap in young female adolescents' knowledge about the anatomy and physiology of the female reproductive system. This study provides evidence on the value of using the body mapping exercise in conjunction with semi-structured interviews in research with young female adolescents on a sensitive topic.

Introduction

Puberty is the period when female adolescents experience critical changes in their internal and external body as well as in their social and cultural acceptance [1, 2]. These progressions can be confusing and stressful for young females, especially when they have never been told about the pending changes [3]. The World Health Organization (WHO) defines adolescents as young people aged between 10 and 19 years [4]. This group is further divided into early adolescent (10-14 years) and late adolescent (15 – 19 years) categories. The middle school years (12 to 15 years) represent the early adolescent years and are a unique phase in which adolescents are confronted with many transitions [5], a phase when the major physical changes associated with puberty occur.

Indonesia is home to more than 42 million adolescents and by the end of 2019, 25% of Indonesia's population will be aged between 10 to 19 years [6]. Limited information is available on early adolescent's reproductive health in Indonesia as they have been omitted from national studies because most surveys include people above 15 years [7]. The Indonesian Demographic Health Survey (IDHS) 2017, found that adolescents' aged 15 to 19 years did not have comprehensive knowledge regarding body changes during puberty [8]. Indonesian young people have limited knowledge of their reproductive system and reproductive health in general [9]. In addition, although the subject of reproductive organs is part of the

high school curriculum, Tunggadewi (2016) found in her study in Jakarta, Indonesia that female high school students' (aged 11 to 17 years) knowledge of female reproductive organs was limited [10].

Reproductive health problems generally begin when young females reach puberty and commence menstruation. Adolescents' preparation for this life event will determine their health and well-being in the future [11]. Therefore, having a better understanding of their pubertal body development including their reproductive system will lay good foundations for young females' reproductive health especially for female adolescents. This study will fill the gap in information on young female adolescents' understanding of pubertal body changes and knowledge of their reproductive system. The findings of this study will be an input for stakeholders such as the health and education department and other organisations working in adolescent reproductive health, to make and to implement an age appropriate reproductive health literacy intervention for primary and secondary schools.

Methods

This study employed a body mapping exercise that was accompanied by a semi-structured interview. Body mapping works well as a participatory qualitative research method [12] especially among young research participants. This is because body mapping was considered an appropriate method to collect qualitative data as it allowed the young participants to explain their knowledge of their reproductive body, and discuss sensitive information through the use of a drawing [13]. The students were asked to draw or map their reproductive body on paper. Qualitative researchers [12, 14] who employ body mapping as a method sometimes used a direct approach. This included asking participants to draw their body or laying down on a large sheet of paper while another participant draw an outline of their body size. However, this direct approach was not deemed suitable for younger female participants. Instead an indirect approach was used which asked female students to produce an A3 size map of their body. This included firstly an outline of their body and secondly a map of their reproductive organs. The body mapping exercise was guided by a broad set of open ended questions using a semi structured interview guide, so new and unexpected issues could emerge and be explored [15].

Study participants

Junior high school female students aged 12 to 15 years in grades seven to nine (middle schools) in Kupang, Indonesia were invited to participate in the study. Students from two private and six public schools were purposively recruited to identify any differences and to make a comparison between the data from both education settings. Participants were recruited using an invitation flyer that was posted on the school notice board. The researcher also provided verbal invitations in the classrooms. All students were given a plain language statement and an informed consent form for their parents and themselves. Data was collected from May to September 2018.

Data collection

The initial plan was to have individual body mapping exercises with semi structured interviews, however, the participants felt more comfortable doing the body mapping exercise in groups. The body mapping with interviews were audio recorded and pseudonyms used. Before the body mapping exercise commenced the researchers collected demographic data from the participants such as age, grade, school type and living conditions. During and after the body mapping activities, participants were also engaged in semi structured interviews with the questions loosely based on their drawing, such as what are these changes that are happening in their body, what is the shape of their reproductive organs and where did they think the reproductive system was located?

Data analysis

Body mapping drawings were photographed and then systematically analysed and coded. Patterns or themes were identified, including obvious absences in the images [13]. The body mapping data were then merged with the interview data and the qualitative data was analysed using thematic analysis. Two major themes emerged from the data analysis which include the degree of awareness of pubertal body changes and the range of understandings of the reproductive system. Under the pubertal body changes theme, there were five sub themes which were related to the growth of significant young female body areas.

Results

Participants' characteristics

Body mapping and interviews were conducted with 44 female students from eight high schools in Kupang. The demographic information about participants' age, living condition and menstruation status is presented in Table 1.

Five pubertal body changes

1. Getting bigger

The first feature of their body that underwent obvious changes during puberty were height and weight. When participants were asked whether they could identify where the changes occurred in their body, the first response was to say 'whole body', or 'my body is getting bigger'. This condition is reported by almost all of the younger participants (age between 12 and 13 years). The older participants (age between 14 and 15 years) noted that they were gaining weight, and failed to mention that they were growing taller. When Nona was asked about the changes taking place in her body she answered, 'my body is getting fat 'and' I am also gaining weight' (G9, 15 years).

2. Breast enlargement

Changes in their breast size was the most common response when young girls were asked about the differences in their body between when they were a young child and now as an early adolescent.

Nevertheless, it is interesting to differentiate the response between younger and older participants. Young participants, aged 12 or 13, said that their breasts were growing whereas older participants, age 14 or 15 years, said that their breasts are bigger. '[Y]es, my breasts have started to grow...' said Ella (G8, 12 years) while her older friend Lala (G9, 15 years) mentioned that '[M]y breasts are bigger now' indicating that the older participants perceived that their breasts had already grown.

Table 1. Summary of participants' characteristics

Characteristics	N (%)
Age (years)	
12	5 (11.4%)
13	18 (40.9%)
14	15 (34.1%)
15	6 (13.6%)
Grade	
7	1 (2.3%)
8	24 (54.5%)
9	19 (43.2%)
Type of school	
Public	38 (86.4%)
Private Catholic	5 (11.4%)
Private Christian	1 (2.2%)
Living arrangement	
With both parents	30 (68.2%)
With only one parent	7 (15.9%)
With guardian	7 (15.9%)
Menstruation	
Yes	37 (84.1%)
Not yet	7 (15.9%)
Menarche Age (n=37)	
10	1 (2.7%)
11	8 (21.6%)
12	13 (35.1%)
13	11 (29.7%)
14	3 (8.2%)
15	1 (2.7%)
Religion	

Christian	29 (65.9%)
Catholic	11 (25.0%)
Islam	3 (6.8%)
Hindu	1 (2.3%)

(*) The total number of participants is 44 female students, unless it state otherwise

3. *Growing body hair*

The young females said that they had growth of body hair under their armpits and pubic area. Nona (G9, 15 years), explained during the body mapping exercise that 'I am beginning to grow fine hairs in certain areas such as the armpit and around the pubic area'. It is important to point out that not all of the respondents experienced these changes. Those who were entering the pubertal period, reported that the growth of hair around the armpit was not obvious while others noted that they had pubic hair only.

4. *Voice changing*

Another change reported by the participants was the change in the sound and pitch of their voice and they noted that this also happened to their male counterparts. Some participants mentioned that the pitch of their voice now has a higher registered. Others participants said that the sound of their voice had become louder, while others revealed that their voice had become softer.

5. *Emergence of pimples*

The last body change recognized by the participants was the emergence of pimples or acne, or in their language, *jerawat*. The appearance of *jerawat* is easily identifiable because it is on their face; the majority of participants drew pimples on their face during body mapping. Figure 1 is a body map drawn by Rosa. She highlighted the changes in her body, which included the growth of pimples on her cheeks. She mentioned, '[T]he changes that I experience are: my cheeks grow *jerawat*, my hair is getting longer, my breasts are getting bigger, armpits and genitals have begun to grow fine hair' (G9, 14 years).

Knowledge of the reproductive system

During the body mapping exercise, the majority of participants had difficulty drawing their reproductive system. When they were asked whether they knew about the female reproductive system, but only a few participants declared that they had learnt about it. According to the participants who are in grade 9, some reported that they had already learnt about the human reproductive system while others said that they will learn about it during their grade 9 year. While in grade 8, they learnt human reproduction in general. During the semi-structured interviews, probes were used to explore the extent of participants' knowledge of the reproductive system. Participants tried to draw their reproductive organs using several symbols.

The majority drew a reverse triangle (See example in Figure 2, the left picture) or a circle or an X mark to indicate where they thought a reproductive organ was located.

The majority of the participants knew that the vagina is the name of the female external genital organ. The participants referred to the female genitals collectively as the vagina and male genitals as the penis. Lala stated that, 'the male reproductive organ is called penis and vagina for a woman' (G9, 15 years). Some participants quietly uttered the name of the female genitals referring to them as the vagina. Christin (see the Figure 2, right picture) stated 'I only know one, it is in here (pointing to lower part of her body mapping), but there is a skirt here. I just drew it as a circle as I don't know how to draw it. The name of the organ is vagina if I am not mistaken' (G7, 12 years). Christin could name one reproductive organ. Very few participants could name other organs in the female reproductive system.

Participants with more knowledge could name two to three reproductive organs, such as the vagina, the ovary, and the uterus. This limited understanding of the female reproductive organs was prevalent among students across the three age groups and school type. When asked about the function of the reproductive organs, almost all of the participants said that it is related to fertilization and reproduction. Lala explained 'it is also called reproductive organ because it has a function to have pregnancy due to fertilization' (G8, 14 years). However, very few participants could describe the function of the reproductive organs and how this related to the menstrual cycle. Many participants were unable to differentiate between the orifice for urination and menstruation. When they were asked to use the body map to assist them to explain the passage where the menstrual blood travels through the body, Ellen said, 'the same place where the urination comes out' (G8, 13 years).

Discussion

Body Mapping Method

Female students were aware of their body changes during puberty but they had limited knowledge of the anatomy and physiology of their reproductive system. To our knowledge, this is the first study that has used body mapping to explore young female adolescents understanding of pubertal body development. Since the establishment of Tanner's pubertal staging [16] and later the Pubertal Development Scale (PDS) [17], studies on pubertal development have generally used one of the two measures. However, the use of Tanner's pubertal staging might have problems due to the approval required from parents and the schools for a physician to conduct an examination of the young females and, the social appropriateness of visual material portraying of sexual maturation in girls. The use of self-assessment of pubertal development scale might also present a problem related to the differences in understanding and measuring their own pubertal development [18]. In this study we used the qualitative method of body mapping to explore pubertal development because the young females were less embarrassed discussing this sensitive topic. Data from the body mapping exercise showed similar pubertal body changes that identified using the PDS. However, the result of body mapping could not depict the differences in the

changes in the adolescents' pubertal body. This is because the body mapping does not have a scale to measure the changes, which is in contrast to the PDS. Nevertheless, body mapping could be extended to explore the young females understanding of their reproductive system.

The body mapping technique provides rich data about young adolescent girls' knowledge of their reproductive body. We argue that, in terms of triangulation of data, body mapping can be used to self-triangulate, because the researcher can check what the participants know about their body by comparing their drawing and their verbal explanation. Therefore, this study advocates for the use of body mapping to explore and understand sensitive issues such as the reproductive body, especially among the young population.

The risk of limited knowledge

Data obtained through body mapping found differences between younger and older participants' description of their pubertal body changes. Older participants, or those who were in Grade 9, knew more about their body compared to their younger peers. This was to be expected as, in the Indonesian school curricula whether it is a private or public school, the topic of the human reproductive system, including an explanation of menstruation and pregnancy is delivered in Grades 8 and 9. However, we argue that the subject is taught too late in the school curriculum and should be a subject that commences in the elementary school (grade 4) to prepare young females before the onset of puberty. Several studies note the limitations of sexual and reproductive health education which does align with the sexual behavior and sexual risks faced by Indonesian adolescents [19, 20]. In addition, studies found that being prepared for the onset of puberty correlates to the psychological wellbeing of adolescents [21] and could be a protective factor for physiological, emotional, and social implications associated with the onset of puberty [22, 23]. Accordingly, practical support, advice, and accurate written information about puberty needs to be readily available at schools to the young females which will assist them in enjoying their pubertal time of life

Awareness of body changes and reproductive health literacy

In this study we identified the gap in knowledge in both the reproductive body and pubertal body changes specifically among young female adolescents. There are several studies that used body mapping to explore female knowledge on their anatomy and physiology of reproductive system [24-26]. The finding of these studies were similar to our study in which female participants were shown to have limited understanding of their reproductive system. Even though the female participants could draw their reproductive system, they lacked accurate knowledge regarding the physiology of their reproductive body including the menstrual cycle. However, only Victora & Knaught study [24] found the majority of the female adult participants could draw their reproductive system and it was similar to the biomedical model [24]. However, the participants in our study were female adolescents (12 to 15 years old), so much younger than the female participants in the Victora & Knaught study. This younger age might influence their limited knowledge about their body. Despite the marked difference in the age of participants in these studies [24-26], they have similar findings with our study. Those found that the female participants'

knowledge regarding the reproductive system was limited. This finding points to the need for reproductive health literacy, which should commence at an early age such as grade 4 or 5 and provide comprehensive information regarding their reproductive bodies, reproductive health and rights including sexuality.

Limitations of the study

The participants were female junior high school students and they all resided in the inner suburbs of the city of Kupang, Indonesia. Therefore, the results may not be generalizable to adolescents in different circumstances such as out-of-school adolescents, or adolescents who live in rural or remote areas of Indonesia. The data were based on participants' ability to recognize and self-report their growth and development therefore their responses maybe subjective and influenced by social desirability biases.

Conclusion

Young female adolescents are aware of their pubertal body changes but they have limited knowledge of their reproductive system. The provision of sexual and reproductive health literacy should be delivered to students at grade 4 in primary schools. The Indonesia Government, community and families are responsible to ensure young females have knowledge regarding their body and reproductive health. Sexual and reproductive health education need to be given corresponding to the adolescent's development. For instance, before the young females experience menarche, they should receive comprehensive information about menstruation. Further research is needed to understand how young females source information during the pubertal period. This information could then be used by stakeholders to design the best methods to deliver sexual and reproductive health information to young female adolescents at school as well as out of school.

Declarations

Acknowledgements

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Conflict of interest

The authors declared that there is no conflict of interests in conducting and publishing this study.

List of Abbreviations

1. WHO : The World Health Organization
2. IDHS: The Indonesian Demographic Health Survey
3. PDS: Pubertal Development Scale

Declarations

The study was granted ethics approval by the Deakin University Human Research Ethics Committee (Ethics approval number: 2018-018). This study also obtained research approval from the Department of Politic and Community Protection in Kupang, Indonesia.

Consent for publication

Participants were assured that in all forms of dissemination, including publications and dissemination meetings, participants would not be identified by name or any other identifier. All the names used in the manuscript were not the real names of the participants. Written permission as part of the consent process was obtained from the participants and their parents to reproduce body maps and their related data. Confidentiality and anonymity were ensured throughout the process of data collection, analysis, and publication.

Availability of data and material

The data used in the current study are available from the corresponding authors upon reasonable request.

Authors' contributions

CN was the first author, conceptualized and designed the study, conducted data collection and analysis and drafted the manuscript. EH and JW assisted in study conceptualization and design supervised data collection and analysis and reviewed the manuscript. All authors read and approved the final manuscript.

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References

1. Miriam Temin and Ruth Levine. Start with a girl: A new Agenda for Global Health. Available at: https://www.cgdev.org/sites/default/files/1422899_file_Start_with_a_Girl_FINAL_0.pdf. Accessed 30 October, 2019
2. Chandra-Mouli V, Plesons M, Adebayo E, et al. Implications of the Global Early Adolescent Study's Formative Research Findings for Action and for Research. *Journal of Adolescent Health*. 2017;61(4):S5-S9. DOI:10.1016/j.jadohealth.2017.07.012.
3. Chandra-Mouli V, Patel SV. Mapping the knowledge and understanding of menarche, menstrual hygiene and menstrual health among adolescent girls in low- and middle-income countries. *Reproductive Health*. 14:30. DOI:10.1186/s12978-017-0293-6.
4. World Health Organization. The second decade: Improving adolescent health and development. Geneva: WHO, 2001. Available at

- https://apps.who.int/iris/bitstream/handle/10665/64320/WHO_FRH_ADH_98.18_Rev.1.pdf?sequence=1. Accessed 30 October 2019
5. Cousineau TM, Franko DL, Trant M, et al. Teaching adolescents about changing bodies: Randomized controlled trial of an Internet puberty education and body dissatisfaction prevention program. *Body Image*. 2010;7(4):296-300. DOI:10.1016/j.bodyim.2010.06.003.
 6. BPS-Statistics Indonesia. Population of Indonesia: result of population census 2010. Available at: http://sp2010.bps.go.id/files/ebook/populasi_indonesia_20101017/index.html. Accessed 17 April, 2017.
 7. Gray N, Azzopardi P, Kennedy E, et al. Improving Adolescent Reproductive Health in Asia and the Pacific: Do We Have the Data? A Review of DHS and MICS Surveys in Nine Countries. *Asia-Pacific Journal of Public Health*. 2011;25(2):134-144. DOI:10.1177/1010539511417423.
 8. BKKBN – National Population and Family Planning Board of Indonesia. Indonesia Demographic and Health Survey 2017: Adolescent Reproductive Health. Available at: <https://dhsprogram.com/pubs/pdf/FR343/FR343.pdf>. Accessed 30 October 2019
 9. Utomo ID, McDonald P, Reimondos A, et al. Do primary students understand how pregnancy can occur? A comparison of students in Jakarta, West Java, West Nusa Tenggara and South Sulawesi, Indonesia. *Sex Education*. 14(1):95-109. DOI:10.1080/14681811.2013.833503.
 10. Tunggadewi SA, Affandi B, Wawolumaya C. Behavior study about teenage pregnancy and related factors in female junior and senior high school students in Jakarta. *Indonesian Journal of Obstetrics and Gynecology*. 2010; 34 (2): 51-58 DOI:10.32771/inajog.v34i2
 11. Patton GC, Sawyer SM, Santelli JS, et al. Our future: a Lancet commission on adolescent health and wellbeing. *The Lancet*. 2016;387(10036):2423-2478. DOI:10.1016/S0140-6736(16)00579-1
 12. Chenhall R, Davison B, Fitz J, et al. Engaging Youth in Sexual Health Research: Refining a “Youth Friendly” Method in the Northern Territory, Australia. *Visual Anthropology Review*. 2013;29(2):123-132. DOI:10.1111/var.12009
 13. Bell, S. Visual methods for collecting and analysing data. In Bourgeault I, Dingwall R, De Vries R, eds. *The SAGE Handbook of Qualitative Methods in Health Research*. London: SAGE Publications Ltd, 2010: 513-535. DOI: 10.4135/9781446268247.n27
 14. Coetzee B, Roomaney R, Willis N, Kagee A. Body Mapping in Research. In Liamputtong P, eds. *Handbook of Research Methods in Health Social Sciences*. Singapore: Springer, 2019:1237 – 1254. DOI:10.1007/978-981-10-5251-4_3
 15. de Jager A, Tewson A, Ludlow B, Boydell K. Embodied ways of storying the self: A systematic review of body-mapping. *Forum Qualitative Social Research Sozialforschung*. 2016;17(2). DOI:10.17169/fqs-17.2.2526
 16. Marshall WA, Tanner JM. Variations in pattern of pubertal changes in girls. *Archives of disease in childhood* 1969; 44.235: 291. Retrieved from <https://adc.bmj.com/content/archdischild/44/235/291.full.pdf>. Accessed 27 November 2019

17. Petersen AC, Crockett L, Richards M, Boxer A. A self-report measure of pubertal status: Reliability, validity, and initial norms. *Journal of Youth and Adolescence*. 1988;17(2):117-133. DOI: 10.1007/BF01537962.
18. Bond L, Clements J, Bertalli N, et al. A comparison of self-reported puberty using the Pubertal Development Scale and the Sexual Maturation Scale in a school-based epidemiologic survey. *Journal of Adolescence*. 2006;29(5):709-720. DOI:10.1016/j.adolescence.2005.10.001.
19. Pakasi DT, Kartikawati, R. [Between Needs and Taboos: Sexuality and Reproductive Health Education for High School Students](#). *Makara Journal of Health Research*. 2014;17(2): 79-87. Retrieved from <http://www.ijil.ui.ac.id/index.php/health/article/viewFile/3030/2367>. Accessed 31 October, 2019
20. Bennett LR. Zina and the enigma of sex education for Indonesian Muslim youth. *Sex Education*. 2007;7(4):371-386. DOI:10.1080/14681810701635970
21. Crichton J, Okal J, Kabiru CW, Zulu EM. Emotional and Psychosocial Aspects of Menstrual Poverty in Resource-Poor Settings: A Qualitative Study of the Experiences of Adolescent Girls in an Informal Settlement in Nairobi. *Health Care for Women International*. 2013;34(10):891-916. DOI:10.1080/07399332.2012.740112.
22. Grower P, Ward LM, Beltz AM. Downstream consequences of pubertal timing for young women's body beliefs. *Journal of Adolescence*. 2019;72:162-166. DOI:10.1016/j.adolescence.2019.02.012.
23. Sommer M. Where the education system and women's bodies collide: The social and health impact of girls' experiences of menstruation and schooling in Tanzania. *Journal of Adolescence*. 2010;33(4):521-529. DOI:10.1016/j.adolescence.2009.03.008.
24. Victora CG, Knauth DR. Images of the body and the reproductive system among men and women living in shantytowns in Porto Alegre, Brazil. *Reproductive Health Matters*. 2001;9(18):22-33. Retrieved from <http://www.jstor.org/stable/3776146>. Accessed October 31, 2019.
25. Kenny B, Hoban E, Pors P, Williams J. A qualitative exploration of the sexual and reproductive health knowledge of adolescent mothers from indigenous populations in Ratanak Kiri Province, Cambodia. *Rural and Remote Health* 2019; 19: 5240. <https://doi.org/10.22605/RRH5240>
26. Cornwall, A. Body mapping in health RRA/PRA. *RRA Notes*. 1992; 16(July), 69-76. Retrieved from <https://pubs.iied.org/pdfs/G01449.pdf?>. Accessed 31 October, 2019

Figures

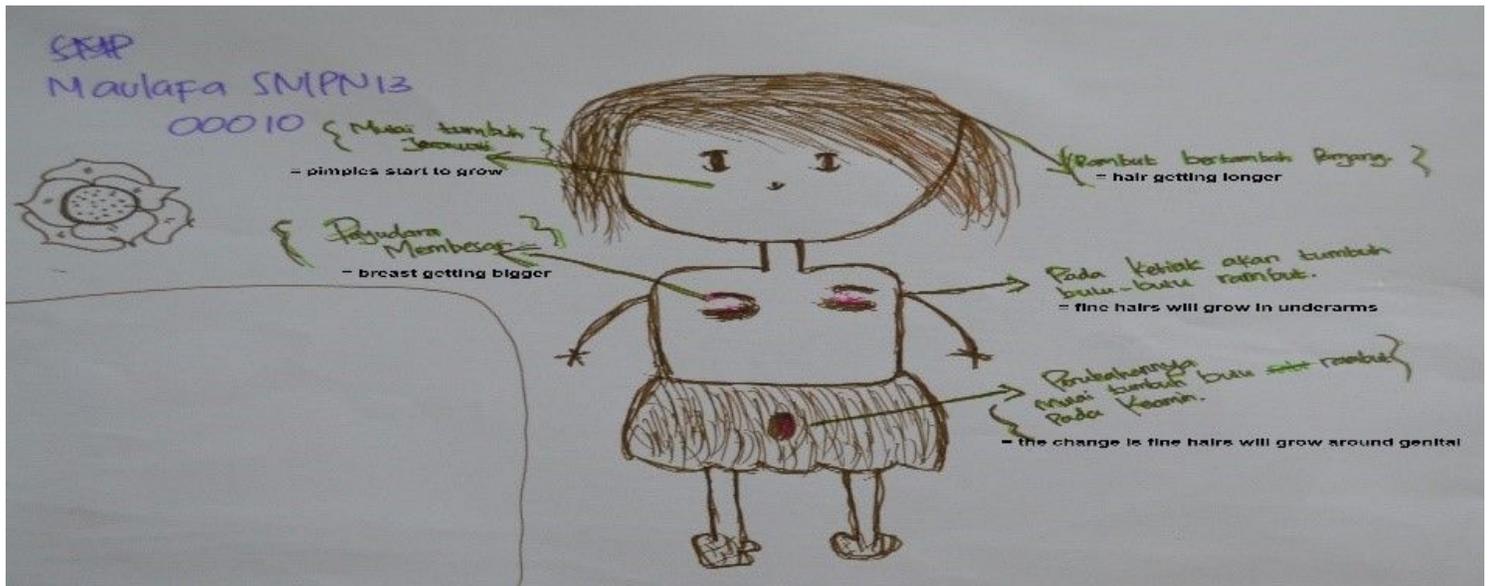


Figure 1

Rosa's body mapping

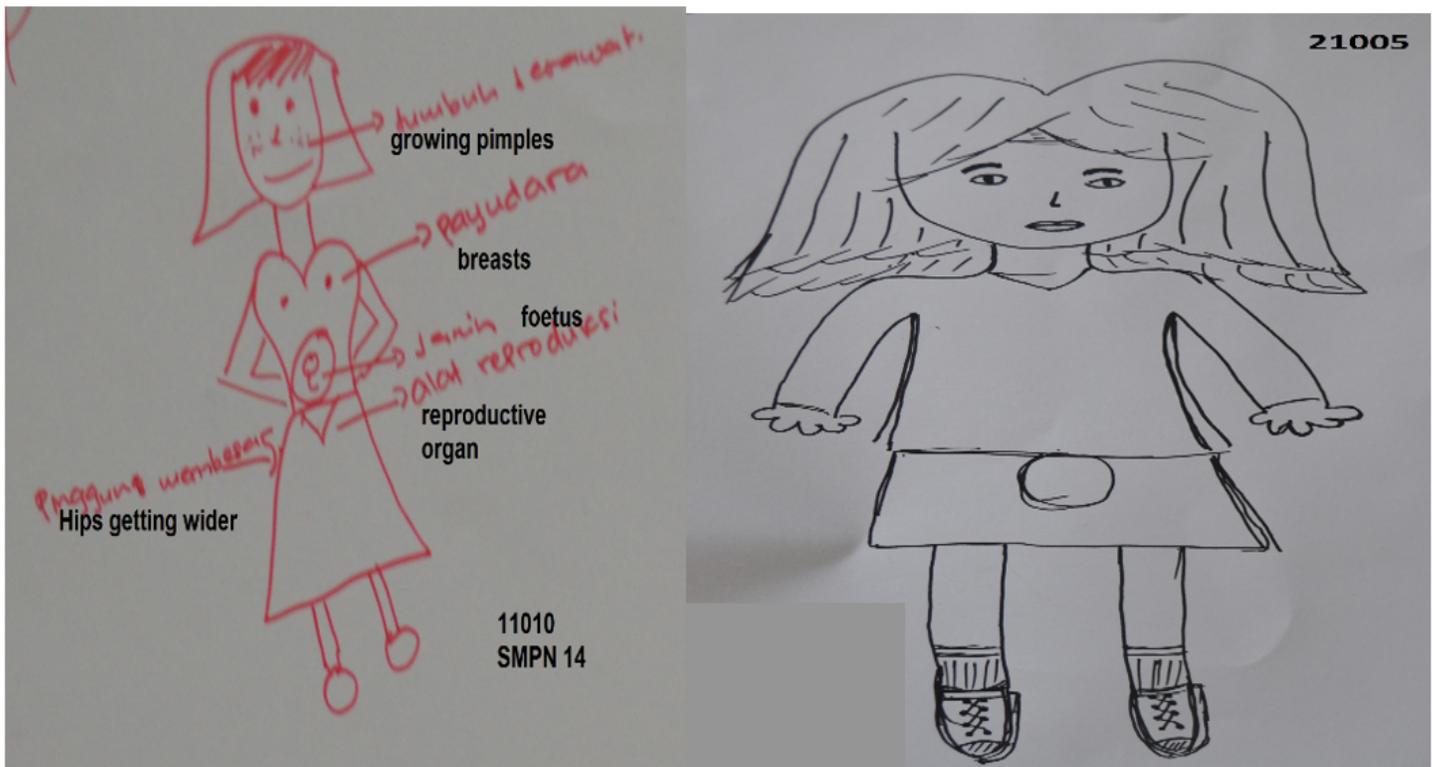


Figure 2

Murni's and Christin's body mapping