

RESEARCH ARTICLES

Konseling Gizi pada Remaja Kurang Energi Kronis (KEK)

Nutrition Counseling for Adolescents with Chronic Energy Deficiency

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Abstract

Chronic Energy Deficiency (CED) is a condition arising from insufficient food intake, leading to chronic health issues. Among adolescent girls, factors such as body image concerns and dietary habits contribute to the development of CED. This study aimed to examine variations in students' intake, knowledge, attitudes, and behaviors before and after receiving nutritional counseling at Private Madrasah Aliyah Alauddin. Employed a pre-experimental design with a one-group pretest-posttest approach, the study involved 49 subjects. Data analysis included univariate tests, normality tests, as well as paired t-tests and wilcoxon tests. The findings indicated that nutritional counseling had a positive impact on subjects' knowledge and behaviors, though no significant changes were observed in attitudes and dietary intake. The results emphasized the importance of regulating dietary habits. Additionally, the study suggests that, as a follow-up to nutritional counseling, students should actively engage in peer counseling initiatives for adolescents within the school community.

Keywords: adolescent, chronic energy deficiency, knowledge, nutrition counseling

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Abstrak

Kurang Energi Kronis (KEK) adalah suatu kondisi kekurangan makanan yang dampaknya dapat bersifat menahun (kronis) dan berakibat pada munculnya gangguan kesehatan. Salah satu faktor yang mempengaruhi terjadinya kurang energi kronis pada remaja putri adalah perhatian terhadap penampilan fisik (body image) dan pola makan. Tujuan dari penelitian ini adalah untuk menganalisis perbedaan asupan, pengetahuan, sikap dan tindakan siswi sebelum dan sesudah konseling gizi pada siswi kelas XI Madrasah Aliyah Swasta Alauddin. Penelitian ini merupakan penelitian pra-eksperimental dengan rancangan *one-group pretest-posttest design*. Jumlah subjek yang diperoleh sebanyak 49 sampel. Data yang diperoleh dianalisis dengan menggunakan uji univariat, uji normalitas dan uji t berpasangan dan uji wilcoxon. Hasil penelitian menunjukkan bahwa terdapat pengaruh konseling gizi terhadap tingkat pengetahuan dan tindakan subjek, sedangkan tidak terdapat perubahan yang signifikan pada sikap dan asupan subjek. Subjek perlu memperhatikan dan mengatur pola makannya. Sebagai tindak lanjut dari kegiatan penyuluhan gizi, siswa diharapkan dapat lebih berpartisipasi dalam kegiatan konseling sebaya untuk remaja di sekolah.

Kata Kunci: remaja, kurang energi kronis, pengetahuan, konseling gizi

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INTRODUCTION

Adolescents are residents in the age range of 10-19 years (WHO, 2021). According to the BKKBN (2018), a teenager is someone who is aged 10-24 years. Adolescence presents distinct nutritional challenges as the intricate hormonal processes crucial for typical pubertal advancement, linear growth, and neurodevelopmental alterations depend on sufficient nutrition to unfold properly. The prevalence of adolescents in Indonesia with an age range of 13-15 years with a skinny category of 6,8% and very thin 1,93% (Kemenkes RI, 2017). Based on data from the Indonesian health profile (2018), it says that the proportion of Chronic Energy Deficiency (CED) in adolescent girls who are not pregnant in 2007 was 30,9%, in 2010 it increased to 38,5%. In 2013, WUS aged 15-19 years who are not pregnant from 30,9% in 2010 increased to 46,6% (Kemenkes RI, 2019).

In 2018, among women aged 15-19 at risk of Childbearing-Age CED, 38,5% were pregnant, while 46,6% were not pregnant. For those aged 20-24, 30,1% were pregnant, and 30,6% were not pregnant. In 2007 it was 30,9%, in 2013 it increased to 46,6%, and decreased again in 2018 which was 36,6% (Kemenkes RI, 2019). For 2018 the prevalence of Chronic Energy Deficiency (CED) in Pregnant Women and Non-Pregnant Women by Province, in South Sulawesi pregnant women were 16,9% and non-pregnant women were 17,7% (Fazirah *et al.*, 2022).

According to the 2018 Riskesdas findings, there was a 36,3% prevalence of Severe Energy Undernutrition (SEZ) in girls aged 15-19. This adolescent demographic with SEZ faces a heightened risk of developing Chronic Energy Deficiency (CED) during pregnancy, given that SEZ is a consequence of prolonged insufficient food intake (Kemenkes RI, 2021). According to the Ministry of Health, adolescents who are underweight or chronically lacking in energy (CED) are adolescent conditions that can increase the risk of various infectious diseases and hormonal disorders that have a

negative impact on health. CED can be prevented by consuming a balanced nutritious diet (Kemenkes RI, 2018).

The Indonesian Ministry of Health when implementing the Nutrition Improvement Program (Macro) emphasized that Chronic Energy Deficiency is a state characterized by prolonged insufficient food intake, leading to chronic (long-term) repercussions that can give rise to various health issues. One of the health problems that can be caused when someone experiences CED, especially for young women, is iron deficiency with the impact of anemia, calcium deficiency with the impact of osteoporosis, and malnutrition with the impact of disrupting the adolescent growth process (Kemenkes RI, 2021). . In Indonesia, cases of chronic energy deficiency are mainly caused by a lack of nutritional intake such as energy and protein, so that the nutrients needed by the body are not sufficient. A person who lacks energy can experience weight loss and trigger low energy stores in the body which will cause chronic energy deficiency. The factors that cause the occurrence of Chronic Energy Deficiency in adolescents are divided into two, namely internal factors and external factors. Internal factors are genetic, obstetric, sex while external factors are nutrition, drugs, environment and disease (Arista *et al.*, 2017).

A woman can be categorized as experiencing SEZ if the size of the Upper Arm Circumference is less than 23,2 cm (<23,5 cm) (Arisman, 2009). According to Hafsah Nur Shodrina (2019), someone with poor nutritional status chronic energy deficiency energy. Energy is the most important nutrient for humans. If energy needs from carbohydrates is not fulfilled then the function protein will replace carbohydrates for burning energy. Khayatunnisa *et al.* (2021) also said that the impact of the disturbed function of processes in the body is on energy metabolism and iron stores, a decrease in energy metabolism that lasts a long time can later reduce the amount of iron stores in the body. Based on the results of the research by I Made Suarjana *et al.* (2020) show that the sample group with a poor perception of nutrition is considered a risk group, the perception of poor nutrition will have a 1.942 times risk of experiencing CED events compared to those who have a good nutrition perception.

The purpose of this study was to determine differences in knowledge, attitudes, actions, energy intake and macronutrients before and after nutritional counseling for female private Madrasah Aliyah Madani Alauddin.

METHODS

The design of this research is Pre-Experiment with one group pre and posttest design. The place of this practice was carried out at madrasah aliyah private madani alauddin this practice time was on January 7-14, 2022. The population in this study were all students in grades X - XII whose nutritional status category was thin and CED at madrasah aliyah private madani alauddin Makassar. The sampling technique is simple random sampling and 52 subjects were obtained. Implementation begins with building a basis for counseling, exploring problems, establishing a diagnosis and choosing intervention steps and obtaining commitment, the last is monitoring and evaluation. The intervention was carried out by providing nutrition counseling 5 times a week, including offline counseling 3 times and online 2 times.

The first offline counseling is screening (measurement of weight, height, Upper Arm Circumference, Food Recall 2x24 hours). The second counseling is online, providing education about nutrition problems in adolescents. The third offline counseling is to explore information, provide interventions for clients and provide

education about balanced nutrition, underweight and CED. The fourth counseling online asked the client again whether they had implemented the interventions given and distributed post tests. The fifth counseling is offline by monitoring and evaluating the 2x24-hour Food Recall. Counseling media used during offline and online are booklets and videos about underweight and chronic energy deficiency (CED). The data analysis used was univariate analysis and variables of knowledge, attitude, action and energy intake, and carbohydrate, protein and fat intake with normality test and Wilcoxon test. Data is said to be normally distributed if the p -value $>0,05$. Then, the results of the Wilcoxon test are said to have a significant effect if the p -value $<0,05$ is obtained.

RESULTS AND DISCUSSIONS

Subject characteristics

Based on Table 1 above that there are 39 subjects with nutritional status Underweight (79,5%), 10 subjects with normal nutritional status (20,5%), there are 49 subjects (100%) who have Chronic Energy Deficiency.

Tabel 1. Subject characteristics (n=49)

Variabel	n	%
Age		
15 – 16 year	39	79,5
17 – 18 year	10	20,5
Nutritional Status		
Underweight	39	79,5
Normal	10	20,5
Upper Arm Circumference		
Chronic Energy Deficiency	49	100
Normal	0	0

Source: Primary data, 2022

The effect of nutrition counseling on energy intake and macronutrient intake

Based on the results (Table 2), the average energy intake before and after nutrition counseling was based on the Wilcoxon test where the p -value was 0,085 (p -value $>0,05$). These results indicate that there is no significant change in the level of intake before and after counseling. The p -value on the subject's protein intake is 0,426 (p -value $>0,05$), which means that there is no significant change in the level of intake before and after counseling. The p -value on the subject's fat intake was 0,094 where $>0,05$ so there was no significant change in the subject's intake before and after counseling. while the p -value on the subject's carbohydrate intake was 0,270 (p -value $>0,05$) so it can be concluded that there was no significant change in the subject's intake before and after counseling.

The results of this study found that the intake of macronutrients before being given nutritional counseling was less than the RDA, due to the small portion of the subject's meal. Prior to counseling, many subjects claimed to have felt full with little food intake. Another factor is also due to the small and less varied food portions. Many subjects admitted that they did not know the portion that was suitable for their needs, so that they consumed food that was not according to the portion, only according to their own wishes. After being given nutritional counseling, subjects began to understand the importance of eating portions that are in accordance with the subject's needs as a

support for weight gain so that food intake increases, this is indicated by an increase in carbohydrate intake (18,3g) and fat (4,7g) (Ananda *et al.*, 2019).

Table 2. The influence of the counseling program on energy and nutrient intake for adolescent girls at MA Madani in 2022

Nutrient Intake	Average Intake	Average RDA (%)	<i>p-value</i>
Energy (cal)			
Before	147,3 ± 3451,2	24±164	0,085
After	111,1 ± 2247,3	16±138	
Protein (g)			
Before	16,2 ± 5385,0	24±192	0,426
After	11,4 ± 5485,0	20±167	
Fat (g)			
Before	7,6 ± 4185,0	11±284	0,094
After	12,3 ± 3405,0	17±148	
Carbohydrates (g)			
Before	15,7±2362,0	1 1±150	0,270
After	34±2144,0	19±359	

Note: *Wilcoxon test, significant if *p-value*<0,05

The results of this study indicate that the energy intake of CED is less than the Nutritional Adequacy Ratio (RDA). According to the RDA, women require an energy intake of 2250 kcal (Kemenkes RI, 2019). Energy is the result of protein, fat and carbohydrate metabolism. Energy is needed by the body for growth, metabolism, utilization of food and activity. Energy that enters through food must be balanced with needs. Imbalance of energy intake with demand that lasts for a long time can cause nutritional problems (Hartono *et al.*, 2014).

The subject's frequency of eating is irregular, for example, only having lunch or snacks in a day, small portions of food and an unvaried food menu. Many subjects claimed to have felt full with little food intake. And according to the confession of several subjects, the number of activities including extracurricular activities that the subjects participated in was one of the factors causing the lack of intake. After being given nutritional counseling, there was no significant change in the subject's protein intake. If protein intake is less, the risk of CED increases and vice versa. These findings suggest that when the intake of carbohydrates and fats is diminished, protein assumes the ultimate responsibility for meeting energy requirements by contributing to the construction of body tissues (Hartono *et al.*, 2014).

This study is in line with research conducted by Gifari *et al.* (2018) from the results of statistical tests showing that there is no significant effect of the intervention on energy nutrient intake. Other studies that are not in line show that there is a significant effect on macronutrient intake (*p-value* = 0,000) in CED in the work area of the Sawah Lebar Health Center, Bengkulu City in 2018. The design of this research is One Group Pretest-Posttest Design. Nutrition counseling at CED was carried out 3 times for 3 weeks (Ananda *et al.*, 2019).

Energy for the body is measured in calories needed to carry out daily physical activities. In general, men (2400-2800 kcal/day) require more energy than women (2000-2200 kcal/day), if a young woman does not fulfill her energy intake from the recommendation, it can lead to nutritional problems such as underweight and malnutrition. chronic energy (CED). This figure is recommended as much as 50%-60%

comes from complex carbohydrates obtained from food ingredients such as rice, flour, tubers, corn and their processed products (Kemenkes RI, 2019).

In addition, there were some subjects who were not enthusiastic about participating in the counseling phase, including doubts about answering, and difficulty in providing time. However, several other subjects were very enthusiastic, including being active in asking questions, and even spending more time for counseling sessions.

Islamic integration related to the intake of nutritious food in terms of acquisition, based on the Word of God in the Qur'an Surah Al-Baqarah /2:168.

لَكُمْ أَيُّهَا الْإِنْسَانُ لَوْ أَنَّ الْأَرْضَ لَلْآلِ آلِ إِبْنَةِ

Translation:

"O people! Eat of (food) that is lawful and good that is on earth and do not follow the steps of the devil. Indeed, Satan is a real enemy to you." (Al-Qur'an and Translation Ministry of Religion).

Based on the interpretation of the Ministry of Religion of the Republic of Indonesia, Allah SWT shows His power and greatness through livestock. Where Allah SWT separates milk (labanan) from blood and dirt (farsiw wa damil). Farm animals eat grass, and from that food they produce blood and feces. Between the two, Allah SWT produces milk that is clean (khālīṣan) and nutritious. This is also the same as breast milk which contains nutrients for the baby's needs to avoid nutritional and health problems (Pentafsir Al-Qoeraan, 2019).

The effect of nutrition counseling on knowledge, attitudes and actions

Nutrition counseling is done 2 times a week for 1 week. Knowledge, attitude and action variables were measured once before being given nutritional counseling and once after nutrition counseling was done by filling out the questionnaire sheet given to the subjects. Based on statistical tests, there were differences in the knowledge and actions of subjects after being given nutritional counseling, indicated by p-values of 0,000 and 0,001 (p-value<0,05). This shows that there is a significant difference in knowledge and actions before and after being counseled.

Table 3. The effect of counseling on knowledge, attitudes and actions on young women at MA Madani in 2022.

Variable	Pre-test (n=49)		Post-test (n=49)		p-value
	n	%	n	%	
Knowledge					
Good (>80%)	1	2	11	22,4	0,000*
Enough (60-80%)	12	24,5	22	44,9	
Less (<60%)	36	73,5	16	32,7	
Attitude					
Good (>80%)	5	10,2	6	12,2	0,733
Enough (60-80%)	26	53,1	26	53,1	
Less (<60%)	18	36,7	17	34,7	
Action					
Good (>80%)	7	14,3	18	36,7	0,001*
Enough (60-80%)	16	32,7	18	36,7	
Less (<60%)	26	53,1	13	26,5	

Note: *Wilcoxon test, significant if p-value<0,05

All subjects in the interviews that were conducted stated that after the nutrition counseling, they tried to apply balanced nutrition and the contents of my plate. For example, the 17-year-old EN subject was classified as undernourished (15,2) and the UAC measurement found that this subject had CED or Chronic Energy Deficiency. Based on the eating history, the subject does not like to consume protein such as fish and egg yolks and according to the eating history this subject is included in the subject with a little and irregular eating pattern. After counseling, the subject admitted that he gradually tried to consume balanced nutrition, namely adequate intake of macronutrients.

The results of this study are in line with the research of [Laras Sitoayu *et al.* \(2023\)](#) which has been carried out from the level of knowledge of young women with adequate nutrition knowledge levels as many as 13 people and a percentage of 30,2% while young women with good nutrition knowledge levels as many as 30 people with a presentation 69,8%, indicating that there is a difference in the average knowledge of adolescent nutrition before and after the video media intervention. [Norhasanah dan Dewi's](#) research (2021) showed that the average score of balanced nutrition knowledge was increased after nutrition intervention was given to adolescent girls with CED through counseling about CED and balanced nutrition with visual media in the form of powerpoint slides and leaflets. Based on the results of statistical tests showed that there was no difference in the attitudes of subjects after being given nutritional counseling, indicated by a p value of 0,733 ($p\text{-value} > 0,05$).

Based on the results of interviews on changes in subject attitudes, there are subjects who still cannot apply balanced nutrition and the contents of my plate after nutrition counseling, namely NS subjects aged 16 years classified as underweight and CED nutritional status. Based on the eating history, the subject more often consumed snacks such as junk food when compared to the consumption of staple food sources of rice, fish, and vegetables. Then after being counseled and given education regarding balanced nutrition, the subject still has not implemented a healthy eating pattern as recommended by the contents of my plate.

Based on the results of this study, it can be seen that there is no significant change in the attitude of the subjects after counseling, namely about the benefits of doing physical activity/sports, the main function of food originating from carbohydrates. Ignorance of young women about the function and types of food sources can affect the amount of intake consumed, carbohydrates are the main food source of energy. There are still many who think that only rice is the staple food that can meet their daily needs. Sources of energy substances as capital to carry out various activities, lack of energy will make the body experience a negative balance, as a result, the adolescent's body weight is less than the body weight it should (ideal weight).

This research is in line with previous research conducted by [Tengku Hartian Silawati Ningsih](#) (2018), regarding changes in attitudes, showing that there are still some attitude statements answered by subjects after providing education/counseling on balanced nutrition guidelines for thin teenagers who experienced a decline, namely before buying packaged food, looking at the label on the label. packaging, drink only when you feel thirsty, when buying packaged food, and don't need to read food labels.

Counseling actions can change a person's health behavior, namely through health education which can affect the behavior (knowledge, attitudes and actions) of patients. A counselor needs an intermediary in the form of media when conducting counseling including being able to use booklets and leaflets ([Luthfiyah *et al.*, 2019](#))

Behavior change is a change that occurs from actions taken by individuals or society. In theory, behavioral change or adopting new behavior is followed by several stages, namely through a process of change: Knowledge – attitude – practice. Certain research has substantiated this claim, yet other studies have demonstrated that the process of behavior change doesn't consistently align with theoretical frameworks. In practical, everyday scenarios, it frequently transpires contrarily. In other words, individuals may exhibit positive behavior despite maintaining negative knowledge and attitudes (Lumbanbatu *et al.*, 2019).

CONCLUSIONS

Based on research on the effect of nutritional counseling on the knowledge, actions and attitudes of adolescent girls, it can be concluded that there are significant differences in the knowledge and actions of subjects after being given nutritional counseling, while in the attitudes of subjects there is no significant difference after being given nutritional counseling. While the results of the average intake of energy and macronutrients can be concluded that there is no significant change in the level of intake of energy, protein, fat and carbohydrates before and after nutrition counseling. However, there is an increase in the intake of carbohydrates and fats. Counseling-based education for CED youth is one of the sensitive interventions in preventing the occurrence of nutritional problems including stunting in the next generation, therefore efforts are needed to carry out this counseling evaluation on an ongoing basis through school and local government programs.

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CONFLICT OF INTEREST

No potential conflict of interest was reported by the authors.

REFERENCES

- Ananda MD, Jumiyati, Yuliantini E. 2019. Pengaruh Konseling Gizi Terhadap Pengetahuan dan Asupan Zat Gizi Makro WUS KEK di Wilayah Kerja Puskesmas Sawah Lebar Kota Bengkulu. *Sanitas: Jurnal Teknologi dan Seni Kesehatan*, 10(1): 35–46. <https://doi.org/10.36525/sanitas.2019.4>
- Arista AD, Widajanti L, Aruben R. 2017. Hubungan Pengetahuan, Sikap, Tingkat Konsumsi Energi, Protein, dan Indeks Massa Tubuh/Umur dengan Kekurangan Energi Kronik pada Remaja Putri (Studi di Sekolah Menengah Kejuruan Islamic Center Baiturrahman Semarang pada Puasa Ramadhan Tahun 2017). *Jurnal Kesehatan Masyarakat*, 5(4): 585-591.
- BKKBN. 2018. Laporan Kinerja BKKBN 2018. Jakarta: Badan Kependudukan dan Keluarga Berencana Nasional.
- Fazirah K, Syahrudin AN, Irmawati. 2022. Faktor Risiko yang Berhubungan dengan Kejadian Kurang Energi Kronik (KEK) Pada Ibu Hamil di Wilayah Kerja Puskesmas Sudiang Raya Kota Makassar. *Journal of Indonesian Community*

- Nutrition, 11(1): 10-19.
- Gifari N, Kuswari M, Azza D. 2018. Pengaruh Konseling Gizi dan Latihan Stretching Terhadap Perubahan Asupan Gizi dan Status Gizi. *Darrusalam Nutrition Journal*, 2(1): 29-40.
- Hartono A, Mann J, Truswell AS. 2014. *Buku Ajar Ilmu Gizi (Essentials of human Nutrition)*. Jakarta: EGC.
- Kemendes RI. 2017. *Infodatin Reproduksi Remaja: Situasi Kesehatan Reproduksi Remaja*, 1–8.
- Kemendes RI. 2018. *Hasil Riset Kesehatan Dasar Tahun 2018*. Jakarta: Kementerian Kesehatan Republik Indonesia.
- Kemendes RI. 2019. *Peraturan Menteri Kesehatan Republik Indonesia Nomor 28 Tahun 2019*. Jakarta: Kementerian Kesehatan Republik Indonesia.
- Kemendes RI. 2021. *Laporan Kinerja Kementerian Kesehatan Tahun 2020*. Jakarta: Kementerian Kesehatan Republik Indonesia
- Khayatunnisa T, Sari HP, Farida. 2021. Hubungan antara Kurang Energi Kronis (KEK) dengan kejadian Anemia, Penyakit Infeksi, dan Daya Konsentrasi pada Remaja Putri. *Jurnal Gizi dan Pangan Soedirman*, 5(1): 46-61.
- Lumbanbatu, MR Adventud, Mertajaya, Made I, Mahendra. 2019. *Buku Ajar Promosi Kesehatan*. Jakarta: Program Studi Diploma Tiga Keperawatan Fakultas Vokasi.
- Luthfiah N, Susyani S, Telisa I. 2019. Konseling Gizi dan Perubahan Perilaku Pasien Dislipidemia yang Mendapat Booklet dan Leaflet di RSI Siti Khadijah Palembang. *Jurnal Media Kesehatan*, 12(2): 58–64. <https://doi.org/10.33088/jmk.v12i2.433>
- Ningsih THS. 2018. Pengaruh Edukasi Pedoman Gizi Seimbang Terhadap Pengetahuan dan Sikap Remaja Putri Kurus. *Jurnal Ilmu Kebidanan*, 2(2): 90–99.
- Norhasanah, Dewi AP. 2021. Pengaruh Pendidikan Gizi terhadap Pengetahuan dan Sikap Mengenai Gizi Seimbang pada Remaja Putri Kurang Energi Kronik di Madrasah Aliyah Negeri 2 Banjar. *Jurnal Kesehatan Indonesia*, 11(3): 111-115.
- Pentafsis Al-Qoeraan. 2019. *Al-Quran dan Terjemahannya Edisi Penyempurnaan 2019*. Jakarta: Lajnah Pentashihan Mushaf Al-Qur'an Kementerian Agama RI.
- Shodrina HN. 2019. Hubungan Pengetahuan, Asupan Energi dan Zat Gizi, Lingkar Lengan Atas (LLA), Menstruasi dengan Kadar Hemoglobin pada Mahasiswi Sarjana Terapan Gizi Tingkat I Politeknik Kesehatan Kemendes Jakarta II. [skripsi]. Jakarta: Politeknik Kesehatan Kementerian Kesehatan Jakarta.
- Sitoayu L, Febriana R, Windhiyaningrum R, Dewi YK, Juliana, Fitri YP, *et al.* 2023. Peduli Kurang Energi Kronis (KEK) Remaja Putri dengan Edukasi Sehat Tanpa KEK (Setapak). *J-Abdi: Jurnal Pengabdian Kepada Masyarakat*, 2(10): 6749-6754. <https://doi.org/10.53625/jabdi.v2i10.5144>
- Suarjana MI, Nursanyoto H, Dewi NNA. 2020. Kurang Energi Kronik (KEK) Remaja Putri Pelajar SMA/SMK di Kabupaten Karangasem Provinsi Bali. *Jurnal Sehat Mandiri*, 15(1): 41-51.
- WHO. 2021. *Adolescent health in the South-East Asia Region*.