

Foregone health care in adolescents from school and community settings in Indonesia: a cross-sectional study

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Summary

Background Adolescence is a development period marked by the onset of a new set of health needs. The present study sought to quantify the prevalence of foregone care (not seeking medical care when needed) and identify which adolescents are at greater risk of having unmet healthcare needs.

Methods A multi-stage random sampling strategy was used to recruit school participants (grade 10–12) in two provinces in Indonesia. Respondent driven sampling was used to recruit out-of-school adolescents in the community. All participants completed a self-reported questionnaire which measured healthcare seeking behaviours, psychosocial wellbeing, use of healthcare services, and perceived barriers to accessing healthcare. Multivariable regression analysis was performed to examine factors associated with foregone care.

Findings A total of 2161 adolescents participated in the present study and nearly one in four adolescents reported foregone care in the past year. Experiences of poly-victimisation and seeking care for mental health needs increased the risk of foregone care. In-school adolescents who reported psychological distress [adjusted risk ratio (aRR) = 1.88, 95%CI = 1.48–2.38] or had high body mass index (aRR = 1.25, 95%CI = 1.00–1.57) were at greater risk of foregone care. The leading reason for foregone care was lack of knowledge of available services. In-school adolescents predominantly reported non-access barriers to care (e.g., perception of the health concern or anxiety about accessing care) whereas most out-of-school adolescents reported access barriers (e.g., did not know where to get care or could not pay).

Interpretation Foregone care is common among Indonesian adolescents, especially in adolescents with mental and physical health risks. Differences between in-school and out-of-school adolescents suggest that interventions to promote appropriate healthcare use will need tailoring. Further research is needed to determine causal relationships around barriers in access to healthcare.

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Research in context

Evidence before this study

Adolescents have important health needs but may forego care due to a variety of developmental (individual) and structural barriers. We searched PubMed using terms “forego* care”, “forego* health care” and “adolescents” to identify peer-reviewed articles reporting forgone health care in adolescents. All relevant studies were conducted in high-income countries, especially USA, Canada, New Zealand and Australia. Foregone healthcare was common and the proportion of adolescents reporting foregone care in the last 12 months ranged from 17 to 44%. Generally, foregone care was higher for mental health than physical health needs. For example, a study among transgender adolescents in Canada reported 68.4% of respondents had foregone care for mental health needs while 33.5% had foregone care for physical health needs. Concern about lack of confidentiality was the most cited reason for foregone care, followed by perceived low importance of the health problem, and lack of access to services due to financial and non-financial barriers.

Added value of this study

This is the first study to assess foregone care among adolescents in Indonesia, a middle-income country in Asia in which we intentionally sought to compare foregone care among in-school and out-of-school adolescents. Foregone care was found to be common, and 29% of in-school adolescents and 17% of out-of-school adolescents reported foregone care in the last 12 months. Adolescents who had high BMI, were subjected to poly-victimisation and

adolescents with mental health concerns had an increased risk of foregone care. The leading barrier to healthcare reported by in-school adolescents related to perceptions (e.g., thought problem would go away, afraid of what the doctor would say) whereas accessibility factors including poor service knowledge (e.g., did not know where to get care or who to go to), cost of services and lack of transport were the main explanations for foregone care among out-of-school adolescents. Adolescents who had previously sought care for mental health needs, or who had previously accessed mental healthcare services also experienced foregone care, indicating potentially unsatisfactory services that failed to meet adolescents’ expectations or needs.

Implications of all the available evidence

The extent of foregone healthcare in adolescents from a variety of countries and social strata represents significant unmet healthcare needs in this population. The reasons that adolescents forego healthcare varies from the demand side (perception of the health concern or anxiety about accessing care) to the supply side (availability, accessibility, affordability, and quality of health services, including access to confidential healthcare). Structural interventions to improve adolescents’ health literacy and access to health care (e.g., by reducing fees for adolescents) are indicated, as well as strategies to enhance the quality of care that is delivered (e.g., enhancing confidential services) in order to better meet adolescents’ need for healthcare.

Introduction

Adolescence is a development period that is associated with substantial changes in health needs¹ including injuries (unintentional or intentional), mental health, undernutrition and obesity, and physical activity.² The time of onset of many health risks, for e.g. tobacco smoking, are also relevant for adolescent’s health in the future and that of their children.³ Adolescence also coincides with a change in healthcare access, including site (specialist paediatric vs adult services) and there is greater ability to access healthcare independently without parental knowledge, which is especially important for sensitive health needs. Accessible primary health care is appreciated by the WHO as an essential aspect of optimizing health and wellbeing during adolescence, with the wider objective of maximising health across the lifecourse.⁴

While ensuring universal health coverage is a core global health policy goal,⁵ many populations cannot access the care they require, including adolescents.⁶

Qualitative data across high and low income settings have identified multiple individual (e.g., age, gender, ethnicity) and structural (e.g., social and gender norms, legislative and financial) barriers to accessing care.^{7,8} However quantitative data describing the magnitude of the problem are largely lacking, especially in low-income and middle-income countries. ‘Unmet need’ is a commonly used concept in quantifying the gap in healthcare coverage and encapsulates barriers on both the supply and demand side of healthcare. Foregone care is an important component within this. Specifically, foregone care is a measure of not seeking healthcare when the individual perceives it is required. It reflects a variety of factors including agency and the accessibility of services and is an important element of effective health coverage.⁹

Indonesia, currently the fourth most populous country in the world and home to 65 million adolescents, has experienced rapid socio-economic development and urbanisation which has driven a rapid epidemiological

transition.¹⁰ Adolescents in Indonesia now face a complex burden of disease which beyond a persisting burden of communicable diseases includes a rapidly increasing burden of non-communicable diseases, injuries and health risks.¹¹ Boys in Indonesia have an extremely high prevalence of tobacco use (35.3%). Furthermore, both boys and girls have experienced a rapid increase in the prevalence of obesity and insufficient physical activity.^{12–14} In 2014 the Indonesian government implemented the national health insurance scheme, the world's largest single-payer health insurance system which aims to provide health coverage to all Indonesians. However, engaging adolescents in community-based health programs has proven to be challenging.¹⁵ Also, the limited availability of health services means that many Indonesians may not have access to healthcare¹⁶ and the extent to which Indonesian adolescents utilise healthcare services when needed is unknown. The purpose of the present study was to measure foregone healthcare, and identify which adolescents are at greatest risk of not having their healthcare needs met.

Methods

Study population and sampling methods

Details of the sample size calculation, sampling process, recruitment and data collection procedures for this study have been reported elsewhere.¹⁷ Briefly, the study was conducted in two provinces in Indonesia: Jakarta and South Sulawesi. These provinces were purposively selected to represent Indonesia's geographic and socio-economic diversity; Jakarta is the most developed and populous urban megacity whilst South Sulawesi is a mountainous, remote region. The study population consisted of adolescents aged 16–18 years who were in-school (enrolled in grades 10–12 and had attended school in the preceding 90 days) and out-of-school (either not enrolled in school or had not attended school in the preceding 90 days) at the time of the study. For the in-school population, we applied a multi-stage sampling method using the list of all public, private, and religious senior high schools in each province as the sampling frame. We randomly selected 12 schools from each province and three classes (grades 10, 11, 12) from each school. All students from selected classes were invited to participate in the study, if they had attended school in the previous 90 days and obtained parental consent. For the out-of-school population, we used respondent driven sampling (RDS), a sampling method widely used in studies to provide more robust inference for hard-to-reach populations including adolescents. We identified seventeen “seed” participants across four locations in two provinces: five in Central Jakarta, four in non-central Jakarta, four in Makassar (urban South Sulawesi) and four in Jeneponto (remote South Sulawesi). These seeds were identified through staff at youth centres, homeless shelters, workplaces and by community health workers. Each of the seeds was given

coupons to recruit three peers to participate in the study. We established community-based hubs, staffed with study staff, in these four locations for data collection. At these hubs, participants completed the questionnaire (as for in-school participants) and had their anthropometry measurements taken by research staff. All participants were provided with a detailed explanation of the study and data for this study were collected between February and December 2018. Written informed consent was obtained from a parent/guardian prior to study enrolment. The study was approved by the Alfred Hospital Human Research Ethics Committee, Melbourne, Australia (approval number 114/17) and the Ethics Committee of the Faculty of Medicine, Universitas Indonesia (approval number 714/UN2.F1/ETIK/2017).

Study measures

Outcome measure (dependent variable)

Foregone care (not seeking medical care despite perceived need) was measured by response to the question “Has there been any time over the past year when you thought you should get medical care (e.g., see a doctor or nurse) but you did not?” (Yes/No).

Independent variables

There were six groups of independent variables in the study: (a) Socio-demographics included gender; self-reported family socioeconomic status (SES; how well off the participant thinks his/her family is); living at home with biological parents; currently working for money. (b) Health-related behaviours included having ever smoked tobacco (have you ever tried or experienced cigarette smoking?); ever used illicit drugs (have you ever tried or experienced marijuana? Cocaine? Sniffed glue? Methamphetamines? Ecstasy? Hallucinogenic drugs? Injecting drugs?); ever drunk alcohol (have you ever-tried alcohol?). (c) Psychological factors included having been subjected to poly-victimisation (Juvenile Victimization Questionnaire)¹⁸; social connectedness (Social Connectedness Scale)¹⁹; family attachment (Family Attachment Scale)²⁰; community safety (Neighbourhood Scale).²¹ (d) Mental health included history of attempted self-harm (have you ever tried to harm yourself deliberately?) and symptoms of psychological distress (10-item Kessler Score).²² (e) Individual factors included self-efficacy (Generalised Self-efficacy Scale)²³ and quality of life (Youth Quality of Life Instrument),²⁴ dichotomised at median cut-offs; high body mass index (BMI>25, measured by research assistants). (f) Health services utilisation in the past 12 months included assessment by a doctor or nurse (When did you last have a health check-up by a doctor or nurse?); seeking care for health issues related to weight (In the last 12 months have you sought care for any weight issues that you may have?); seeking care for mental health needs (In the last 12 months have you sought care for any mental health needs?)

Data analysis

Given the distinctness of the two sampling frames used for the in-school and out-of-school (community) samples, quantitative data analysis was conducted separately for each sample. Population estimates of participant’s characteristics were calculated by applying complex sampling (school sample) and RDS weights (community sample).²⁵ Correlates of foregone care were estimated using generalised linear modelling with robust standard errors (Poisson distribution, log link function)²⁶ to account for the relatively high prevalence of the outcome (i.e. greater than 10%) and the bias this can impart in terms of estimating risk.²⁷ In these analyses, the complex sampling framework and inverse-probability sampling (school sample) and individualised RDS (community sample) weights were applied to ensure representativeness and correct estimation of standard errors. A complete case approach was applied for the generalised linear modelling analyses. Statistical analyses were performed using Stata version 15.0 (STATA Corp, College Station, TX, USA) with statistical significance set at 5% level.

Role of the funding source

The funder of the study had no role in the study design, data collection, data analysis, data interpretation, or

writing of the paper. The authors (MDP, PAA, PSA) had full access to the data presented in this manuscript and had responsibility for the decision to submit for publication.

Results

There were 2161 participants included in the present study, of whom 1337 were in-school adolescents and 824 out-of-school adolescents. The numbers of participants were approximately even across provinces. Females accounted for more than half (55%) of the in-school adolescents but less than a third of out-of-school adolescents (30%). A higher proportion of out-of-school than in-school adolescents had engaged in risky behaviours such as ever smoked (39% vs. 29%), ever used illicit drugs (21% vs. 17%) and ever drunk alcohol (15% vs. 13%). In-school adolescents had a higher prevalence of overweight than out-of-school adolescents (24% vs. 17%) but a similar prevalence of current psychological distress (24%) and previous poly-victimisation (31 vs 33%) (Table 1).

Overall, 502 (24.3%) of 2062 participants with available data had at least one occasion over the past 12 months when they thought they should have sought healthcare but did not. Over a quarter (29%) of in-school

Variables	In-school (N = 1337)		Out-of-school (N = 824)	
	Sample estimates n/N (%)	Sample estimate applied design weight % (95%CI)	Sample estimates, n/N (%)	RDS ^a -adjusted population estimates, % (95%CI)
Province				
Jakarta	611/1337 (45.7%)	-	421/824 (51.1%)	-
South Sulawesi	726/1337 (54.3%)	-	403/824 (48.9%)	-
Gender				
Female	735/1331 (55.2%)	55.2% (46.1-64.0)	245/822 (29.8%)	26.9% (22.8-31.6)
Male	596/1331 (44.8%)	44.8% (35.9-53.9)	577/822 (70.2%)	73.1% (68.4-77.2)
Self-reported family socioeconomic status				
Upper/upper-middle class	278/1274 (22.5%)	22.9% (18.3-28.1)	65/798 (8.1%)	7.7% (4.9-10.8)
Middle class	339/1274 (26.6%)	27.0% (23.7-30.6)	192/798 (24.1%)	28.7% (23.7-33.7)
Lower/lower-middle class	648/1274 (50.8%)	50.1% (45.0-55.2)	541/798 (67.8%)	63.6 (58.5-68.9)
Lives with mother/father/stepparents	1030/1300 (79.2%)	80.0% (75.8-83.6)	611/803 (76.1%)	78.4% (73.6-82.5)
Currently works for money	127/1237 (10.3%)	9.8% (7.4-13.0)	214/800 (26.8%)	23.8% (19.0-28.4)
Ever smoked cigarettes	348/1203 (28.9%)	29.0% (20.7-38.9)	325/800 (40.6%)	38.8% (33.9-43.8)
Ever used illicit drugs	218/1261 (17.3%)	17.1% (14.0-20.8)	207/804 (25.7%)	21.4% (17.2-25.8)
Ever drunk alcohol	161/1285 (12.5%)	12.8% (6.9-22.6)	147/803 (18.3%)	14.9% (11.4-18.7)
Ever attempted self-harm	95/1307 (7.3%)	7.52% (6.2-9.1)	113/806 (14.0%)	11.4% (8.1-15.2)
Mental health concerns (Kessler10 ≥18)	289/1218 (23.7%)	24.4% (21.6-27.5)	174/745 (23.4%)	24.1% (19.0-29.0)
Subjected to poly-victimisation	345/1124 (30.7%)	30.6% (26.8-34.7)	269/710 (37.9%)	32.7% (27.3-38.1)
High BMI (>25)	306/1335 (22.9%)	23.7% (19.9-27.9)	123/824 (14.9%)	17.1% (12.9-21.3)
High perceived general self-efficacy	818/1334 (61.3%)	61.9% (57.6-65.9)	440/822 (53.5%)	53.6% (48.5-58.5)
High perceived quality of life	677/1332 (50.8%)	51.7% (48.0-55.3)	411/822 (50.0%)	45.2% (40.1-50.6)
Sought care for mental health concerns in the last 12 months	51/1276 (4%)	4.1% (2.6-6.2)	78/792 (9.9%)	8.2% (5.5-11.5)
Had health check-up by doctor or nurse in the last 12 months	660/1249 (52.8%)	53.2% (50.1-56.3)	383/788 (48.6%)	47.5% (42.1-52.9)
Did not seek medical care when needed ^b in the last 12 months	360/1272 (28.3%)	28.7% (25.5-32.1)	142/790 (18.0%)	17.4% (13.4-21.4)

^aRDS: Respondent Driven Sampling. ^bAdolescents did not seek care when they thought they needed it.

Table 1: Characteristics of in-school and out-of-school participants.

adolescents and nearly one in five (17%) out-of-school adolescents reported foregone care, respectively. In-school females (58%) and out-of-school males (65%) accounted for most adolescents who reported foregone healthcare. Around half had a health check-up by a health professional in the past 12 months, slightly more in the in-school than out-of-school adolescents (53% vs 47% respectively). The characteristics of the study participants by health utilisation status are presented in Table 2.

The reported reasons for foregone care (barriers to care) among adolescents are presented in Table 3. “Did not know who to go and/or see” was the leading reason for foregone care among in-school and out-of-school adolescents (40% and 43%, respectively), followed by “Thought the problem would go away” (39% in-school adolescents) and “No transportation” (24% out-of-school adolescents). “Did not want parents to know”/“Too embarrassed” and “Afraid of what doctor/nurse would say or do” were reported by 26% and 25% of in-school adolescents, respectively; whereas 21% of out-of-school adolescents selected “Parents/guardians would not go”/“No one available to accompany” as reasons for not seeking care when they thought they need it.

Results of the regression analyses assessing the correlates of foregone care in the past 12 months are

reported in Table 4. A total of 446 and 220 observations from in-school and out-of-school samples were excluded from multivariate regression analysis due to missing data, respectively. Factors associated with foregone care in both in-school and out-of-school adolescents in multivariable analysis were having been subjected to poly-victimisation and having previously sought care for mental health needs. In-school and out-of-school adolescents who reported experiencing poly-victimisation had 1.4 (95%CI = 1.1–1.9) and 3.3 (95%CI = 1.9–5.7) times higher the risk of not seeking healthcare, respectively, compared to their peers who had not experienced poly-victimisation. Similarly, in-school and out-of-school adolescents who reported previously seeking care for mental health needs had 1.8 (95% CI = 1.4–2.4) and 2.4 (95%CI = 1.6–3.7) times higher the risk of foregone care, respectively, compared to those who did not seek healthcare. Other factors associated with foregone care in in-school adolescents were ever smoked [adjusted risk ratio (aRR) = 0.7 95% CI = 0.5–0.9], current psychological distress (aRR = 1.9 95%CI = 1.5–2.4), high perceived quality of life (score >102–150; aRR = 1.3 95%CI = 1.0–1.7) and high BMI (body mass index >25–48.1; aRR = 1.3 95%CI = 1.0–1.6). Out-of-school adolescents who reported their family SES as upper/upper-middle class had an increased risk

Outcomes	Had health check-up by doctor or nurse in the last 12 months (N = 1043)		Foregone care ^a in the last 12 months (N = 502)	
	In-school	Out-of-school	In-school	Out-of-school
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Province				
Jakarta	54.4% (46.9–61.7)	47.3% (42.3–52.3)	56.4% (46.8–65.6)	45.1% (37.0–53.4)
South Sulawesi	45.6 (38.3–53.1)	52.7% (47.7–57.7)	43.6% (34.4–53.2)	54.9% (46.6–63.0)
Gender				
Female	56.5% (46.7–65.8)	33.4% (28.9–38.3)	58.2% (46.6–68.9)	35.2% (27.7–43.5)
Male	43.5% (34.2–53.3)	66.6% (61.7–71.1)	41.8% (31.1–53.4)	64.8% (56.5–72.3)
Self-reported family socioeconomic status				
Upper/upper-middle class	24.1% (19.3–29.7)	8.2% (5.8–11.5)	26.9% (20.4–34.6)	12.4% (7.8–19.2)
Middle class	26.4% (22.7–30.5)	23.9% (19.9–28.5)	25.2% (21.0–30.0)	22.6% (16.3–30.5)
Lower/lower-middle class	49.4% (44.1–54.8)	67.8% (62.9–72.3)	47.9% (40.7–55.1)	65.0% (56.5–72.6)
Lives with mother/farther/stepparents	81.0% (76.8–84.6)	79.3% (74.9–83.1)	82.1% (75.7–87.1)	68.8% (60.5–76.1)
Currently works for money	9.4% (6.7–13.1)	24.7% (20.6–29.4)	11.3% (7.6–16.4)	25.7% (19.1–33.7)
Ever smoked cigarettes	28.1% (18.8–39.6)	40.4% (35.5–45.5)	26.2% (18.2–36.2)	43.8% (35.6–52.3)
Ever used illicit drugs	16.7% (12.9–21.4)	25.1% (20.9–29.7)	19.8% (14.7–26.2)	39.6% (31.7–48.0)
Ever drunk alcohol	12.7% (5.8–25.3)	18.3% (14.7–22.6)	16.1% (8.4–28.7)	21.2% (15.1–28.9)
Ever attempted self-harm	7.7% (6.0–9.7)	14.3% (11.1–18.3)	12.8% (9.6–16.9)	20.1% (14.2–27.7)
Mental health concerns (Kessler10 ≥18)	23.9% (20.1–28.3)	21.6% (17.6–26.2)	39.5% (33.4–45.8)	30.5% (23.2–39.0)
Subjected to poly-victimisation	32.2% (28.2–36.5)	38.6% (33.6–43.9)	40.9% (32.5–49.9)	66.9% (58.2–74.6)
High BMI (>25)	24.6% (20.4–29.3)	14.1% (10.9–17.9)	31.0% (24.5–38.4)	16.9% (11.5–24.1)
High perceived self-efficacy	62.6% (58.0–66.9)	55.9% (50.8–60.8)	60.3% (54.5–65.8)	57.0% (48.7–65.0)
High perceived quality of life	53.7% (48.8–58.6)	49.9% (44.8–54.9)	53.9% (47.7–59.9)	52.1% (43.8–60.3)
Sought care for mental health needs in the last 12 months	5.0% (3.1–8.0)	11.1% (8.3–14.7)	8.4% (4.7–14.2)	28.1% (21.1–36.2)

^aDefinition of foregone care: did not seek medical care when they thought they needed it.

Table 2: Characteristics of study participants by health utilisation status and sample.

	In-school sample N = 360 n (%) ^{a,b}	Out-of-school sample N = 142 n (%) ^b
Access barriers		
Did not know who to go and/or see	144 (40.0%)	61 (43%)
No one available to go along with	60 (16.7%)	18 (12.7%)
Could not pay for visit	41 (11.4%)	8 (5.6%)
Parent/guardian would not go	21 (5.8%)	12 (8.5%)
Difficult to make an appointment	18 (5.0%)	3 (2.1%)
No transportation	17 (4.7%)	34 (23.9%)
Non-access barriers		
Thought the problem would go away	139 (38.6%)	23 (16.2%)
Afraid of what the doctor/nurse would say or do	90 (25.0%)	12 (8.5%)
Did not want parents to know	59 (16.4%)	8 (5.6%)
The problem went away	45 (12.5%)	3 (2.1%)
Too embarrassed	36 (10.0%)	4 (2.8%)
Other	15 (4.2%)	4 (2.8%)

^aDefinition of foregone care: did not seek medical care when they thought they needed it. ^bThe total percentages were greater than 100% as participants could choose more than one reason.

Table 3: Reasons for foregone care^a or barriers in accessing health care in the last 12 months (by sample).

foregone health care (aRR = 2.0 95%CI = 1.2–3.4) compared to their peers who reported lower/lower-middle class SES.

Discussion

To our knowledge, this is the first study of adolescents in Indonesia, and in a low-income and middle-income country, to determine the prevalence, reasons and factors associated with foregone health care. Despite around half the sample having seen a health professional in the past 12 months, nearly one in four adolescents had experienced foregone care over this period. This figure is not dissimilar to the rates of foregone care reported in adolescents from high income countries with markedly different health care systems. For example, in New Zealand, the prevalence of foregone care within 12 months prior to study ranged between 17 and 20% in a group of in-school adolescents^{28,29} compared to 13–43%^{30–33} among in-school and up to 62% in out-of-school 15-17-year-olds in the USA.³⁴ We found that in-school and out-of-school adolescents who sought care for mental health concerns in the past 12 months were more likely to forego care, indicating previous experience with health care services may not be satisfactory and may have a negative impact on adolescent's future health seeking behaviours. Almost all (>99%) adolescents from Indonesia included in the present study expect services which are confidential, friendly, and welcoming, when seeking help for mental health problems.³⁵ However, the fear of being judged for their conditions may still prevent the adolescents from accessing care. These findings suggest that despite Indonesia's national health insurance scheme which

aims to provide health coverage to all Indonesians, foregone health care among adolescents in Indonesia is a significant concern.

Previous studies show that adolescents with physical and mental health concerns, as well as those with health risk behaviours, have a higher risk of foregone care.^{28,33} Other factors reported to be associated with foregone care in high-income countries include high BMI, depressive symptoms,^{28,33} school bullying,²⁹ and substance use (frequent or current cigarette use, binge drinking or illicit drug use).^{28,34} To some extent our results are consistent with previous studies, as adolescents who had a high BMI (>25), high psychological distress (in-school adolescents), and who were subject to polyvictimisation (in-school and out-of-school) were most at risk of foregone care. We did not find evidence of an association between reported health risk behaviours (e.g. substance use) and increased risk of foregone care. In fact, in-school adolescents who responded “yes” to the question “have you ever smoked cigarettes?” had a 35% reduced risk of foregone care compared to their peers who had never smoked. However, as we enquired about any experience with substance use, it is possible that current substance use and experience with substance use may have different effects on the risk of foregone care.³⁶

Few studies have compared foregone care in different groups of adolescents simultaneously using the same study measures. In this Indonesia study, we found a higher proportion of in-school adolescents reported foregone care compared to their out-of-school peers (29% vs 17%). This finding is contrary to a US study that reported a higher rate of foregone care in out-of-school versus in-school adolescents (62% vs 43%).³⁴ We cannot exclude that this is explained by differences in sampling. Despite the relatively large size of the out-of-school sample, the in-school sample is likely to provide more robust population estimates. Differences in health profile and health care needs between in-school and out-of-school adolescents may also explain our study finding. Whilst out-of-school adolescents are more likely at risk of physical health problems, in-school adolescents may be more susceptible to mental health problems for which the barriers in accessing to care are greater.³⁷ Attending school and school-related activities is also a barrier to accessing care during the day. It is also possible that in-school adolescents might have better health literacy and are more capable of dealing with common health problems compared to their out-of-school peers (e.g. 13% of in-school vs 2% of out-of-school participants cited “problem went away” as a reason for foregone care). However, we were unable to examine this hypothesis within the scope of the present study. Nevertheless, our study findings highlight the important role of the education system in nurturing and supporting students' physical and mental wellbeing. School should be a place where young people can easily

	In-school (N = 891)		Out-of-school (N = 604)	
	RR (95%CI)	aRR (95%CI)	RR (95%CI)	aRR (95%CI)
Socio-demographics				
Gender				
Female	Ref	Ref	Ref	Ref
Male	0.869 (0.727–1.038)	0.951 (0.756–1.197)	0.655 (0.421–1.021)	0.808 (0.463–1.414)
Self-reported family socioeconomic status				
Lower/lower-middle class	Ref	Ref	Ref	Ref
Middle class	0.959 (0.769–1.197)	0.978 (0.759–1.259)	1.053 (0.628–1.767)	1.282 (0.715–2.297)
Upper/upper-middle class	1.171 (0.947–1.449)	1.184 (0.877–1.598)	1.822 (0.962–3.452)	1.978 (1.163–3.365) ^a
Lives with mother/father/stepparents				
No	Ref	Ref	Ref	Ref
Yes	1.134 (0.899–1.430)	1.018 (0.734–1.412)	0.602 (0.377–0.960) ^a	0.617 (0.376–1.012)
Health-related behaviours				
Ever smoked cigarette				
No	Ref	Ref	Ref	Ref
Yes	0.860 (0.696–1.061)	0.664 (0.471–0.937) ^a	1.351 (0.873–2.092)	0.729 (0.436–1.219)
Ever tried alcohol				
No	Ref	Ref	Ref	Ref
Yes	1.317 (1.044–1.660) ^a	1.268 (0.849–1.892)	1.465 (0.874–2.456)	0.927 (0.465–1.850)
Ever used illicit drug				
No	Ref	Ref	Ref	Ref
Yes	1.220 (0.981–1.516)	1.021 (0.720–1.448)	2.243 (1.444–3.484) ^{***}	1.707 (0.948–3.072)
Mental health				
Ever attempted self-harm				
No	Ref	Ref	Ref	Ref
Yes	1.828 (1.451–2.303) ^{***}	1.251 (0.886–1.765)	1.531 (0.857–2.737)	0.980 (0.556–1.726)
Subjected to poly-victimisation				
No	Ref	Ref	Ref	Ref
Yes	1.604 (1.326–2.940) ^{***}	1.438 (1.047–1.976) ^a	4.308 (2.665–6.965) ^{***}	3.261 (1.874–5.675) ^{***}
Psychological distress (Kessler10 ≥ 18)				
No	Ref	Ref	Ref	Ref
Yes	2.069 (1.739–2.461) ^{***}	1.878 (1.484–2.377) ^{***}	1.664 (1.034–2.678) ^a	1.381 (0.836–2.284)
Sought care for mental health concerns				
No	Ref	Ref	Ref	Ref
Yes	2.211 (1.720–2.841) ^{***}	1.782 (1.347–2.356) ^{***}	3.379 (2.178–5.242) ^{***}	2.389 (1.558–3.664) ^{***}
Other individual factors				
High perceived general self-efficacy				
No	Ref	Ref	Ref	Ref
Yes	0.934 (0.781–1.116)	0.910 (0.707–1.172)	1.172 (0.756–1.817)	1.120 (0.668–1.878)
High perceived quality of life				
No	Ref	Ref	Ref	Ref
Yes	1.092 (0.916–1.302)	1.319 (1.040–1.671) ^a	1.195 (0.775–1.843)	1.279 (0.781–2.094)
High BMI (>25)				
No	Ref	Ref	Ref	Ref
Yes	1.413 (1.176–1.698) ^{***}	1.254 (1.004–1.565) ^a	1.137 (0.621–2.082)	1.093 (0.606–1.969)

^ap ≤ 0.05; ^{**}p < 0.01; ^{***}p < 0.001. ^bDefinition of foregone care: did not seek medical care when they thought they needed it. Multivariable regression analysis: Generalised linear modelling (poisson distribution, log link, robust standard errors).

Table 4: Factors associated with foregone care^b in the past 12 months, by sample: risk ratio (RR), adjusted risk ratio (aRR) and 95%CI.

access information about what health services are available to them and how to access these services. Future studies should investigate adolescent healthcare needs, association/relationship between health literacy

and health seeking behaviours among in-school and out-of-school adolescents, informing future interventions/programs to improve the availability and utilisation of adolescent health services.

Somewhat surprisingly, we also found that in-school adolescents who reported high perceived quality of life and out-of-school adolescents who reported higher perceived family SES had an increased risk of foregone care. This finding also contrasts with previous reports that adolescents living in neighbourhoods with high levels of socioeconomic deprivation²⁸ and low family SES were more likely to experience foregone care.²⁹ While these factors suggest barriers to access such as cost may explain at least some of these differences, especially in the US studies, the effect of these factors on adolescent health-seeking behaviour remains unclear.³⁸ Shame and/or anxiety about accessing health care may partly explain the higher risk of foregone care among adolescents with high perceived quality of life or family SES found in our study. However, given the dearth of data on accessibility and utilisation of health care services among adolescents, particularly out-of-school adolescents, further research is needed to examine the sociodemographic determinants of health seeking behaviours among adolescents in different health systems.

Lack of service knowledge (did not know who to go/see) was found to be the greatest barriers to access healthcare services among Indonesian adolescents in this study. This is an issue of particular concern given that the Indonesian government has implemented a number of health programs targeting youth such as the *Pelayanan Kesehatan Peduli Remaja (PKPR)* program (Care for Adolescent Health Services), in schools and in communities, for some years.³⁹ Recent studies from Indonesia showed that more than half of high school students have never used PKPR services.⁴⁰ Qualitative assessments of PKPR implementation suggested that lack of facilities (e.g., separated room to provide counselling/health services to youth), staffing shortage and/or insufficient training for staff have limited the reach of PKPR, particularly among adolescents who do not attend school.⁴¹ Our data emphasise the need for strengthening school-based and community-based health programs to better orient them towards adolescents.

We observed distinctly different patterns in the reasons related to foregone care among the two groups of adolescents. For in-school adolescents, 87% reported “non-access barriers” including reasons related to perception of the health concern (thought the problem would go away), privacy (did not want parent know/too embarrassed) or anxiety about accessing health care (afraid of what doctor would say or do). In contrast, 92% of out-of-school adolescents reflected problems around accessibility, including service knowledge, direct and indirect costs (could not pay for care, could not pay for transportation) as well as lack of support from parents/guardian in seeking care (no one available to go with). Further efforts to support adolescents translate their beliefs about the need for health services into efforts to

access them appear indicated, especially for in-school adolescents. Specifically, given the anxiety by adolescents about being scolded by doctors and their privacy concern, efforts to improve the confidentiality and quality of care provided to adolescents by Indonesian health professionals also appear indicated. In contrast, the access barriers experienced by out-of-school adolescents suggest more focused efforts are required to equip these adolescents with basic knowledge about what services exist, and how they might access them, including financial support to cover the cost of needed healthcare services. Among adolescents in Indonesia, A greater focus on building health literacy among adolescents in Indonesia, in school and in the community, is required. Whilst educational activities can help in-school adolescents to build and improve their ability to process health information and more appropriately seek help, community-based, targeted information, education and communication programs for out-of-school adolescents are needed to provide them with information about where and how to seek help.⁴²

Some limitations need to be considered in interpreting our study findings. First, our study was conducted in only two provinces. While intentionally selected to represent diversity, the extent to which these participants are representative of Indonesian adolescents more generally is unknown. The cross-sectional design of the study also makes us unable to determine any causal relationships between exposures (socio-demographics, health risks) and outcomes of interest. Second, with the exception of BMI, data are self-reported and may be affected by recall bias and social desirability bias, that might contribute to under-reporting health risk behaviours (e.g. alcohol, illicit drug use) or psychosocial distress (e.g. attempted self-harm). Common to all survey studies, this may be a relatively greater concern in Indonesia, given its laws around illicit substance use and the extent of stigma around mental disorders. We also did not seek to verify the actual health problems that may require medical attention; and therefore, some potential confounding factors could be missed. Third, as our study sample was drawn from two different sampling frames, we were not able to pool the data, which may limit the statistical power of our analyses. We attempted to mitigate this risk by achieving relatively large sample sizes for both school-based and community-based adolescents and by using robust statistical analyses. Indeed, a strength of this study is the efforts made to include both groups of adolescents, given how often out-of-school adolescents are not studied.

In conclusion, our finding that nearly a quarter of Indonesian adolescents reported foregoing health care when they thought they needed it in the past year suggests greater efforts are required in Indonesia to support adolescents to access healthcare in a timely manner, especially those with mental health concerns and those

who had experienced poly-victimisation, who are at greatest risk of foregone care. Alongside interventions to build health literacy and reduce barriers to accessing health care, efforts to enhance the quality of health care delivered to adolescents by the Indonesian health system are also needed. Further research into causal relationships between health risks, health seeking behaviours and barriers to accessing healthcare services is required to inform policy development in Indonesia to ensure that universal access to healthcare is a reality for all populations, including adolescents.

Contributors

PSA, SL, SMS, MDP conceptualised this study. PSA, SL, NRW, ECK, MDP, SMS developed the study protocol and data collection tools. AA, FK, TW, YD, BM, AR, BW supported local implementation of the study in country. MDP, PAA, PSA led the analysis. MDP, SMS, PSA wrote the first draft; KIC, TT, JF provided critical feedback on the methods and results of the manuscript with all authors contributing to the interpretation of study findings. All authors approved the final manuscript and were responsible for the decision to submit the manuscript.

Data sharing statement

The study protocol is available for sharing. Individual participant data will not be available due to the risk of identifying individuals.

Declaration of interests

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