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Assessment of nutritional status and nutrient intake of teenage pregnant women in the Philippines

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ABSTRACT

Introduction: Teenage pregnancy is a persistent global health challenge, with an estimated 13% of females below 18 years having given birth in 2022 (UNICEF, 2024). In the Philippines, approximately 5% of females aged 15–19 years have experienced pregnancy or childbirth (PSA, 2022). This study evaluated the nutritional and health status, nutrient intake, health-seeking behaviours, and participation in government programmes among pregnant adolescents (PAs) aged 10-19 years in selected municipalities in Batangas, Laguna, and Quezon Provinces. **Methods:** A cross-sectional design was employed in 2022, involving 165 PAs and 28 key informants (KIs) interviewed via mobile or video calls during the COVID-19 pandemic. Energy and nutrient intake were assessed using a 24-hour food recall. **Results:** Among participants (mean age 17.7 years), 50% were nutritionally at risk, 70% had normal blood pressure, 24% were pre-hypertensive, and 6% were hypertensive. Mean energy intake ranged from 2,267 kcal (16–18 years) to 2,791 kcal (13–15 years), with only one-third to one-half meeting recommended intake levels (p=0.087). Protein adequacy ranged from 59 to 70%, while calcium (28–39%) and iron (5–10%) intakes were markedly deficient. Niacin adequacy differed significantly across age groups (p=0.036). These findings align with national data, where only 14.9% of PAs meet energy intake, and 23% are anaemic (DOST-FNRI, 2023). Cultural beliefs (67.3%) and food fallacies (53.3%) were common, while 64% said needed programmes and services were available. **Conclusion:** The findings highlighted significant nutritional deficiencies, underscoring the need for intensified monitoring, targeted nutritional interventions, and comprehensive educational strategies to support adolescent maternal health.

Keywords: adolescent pregnancy, diet, government programme, nutritional status

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INTRODUCTION

Adolescence is the phase of life between childhood and adulthood, from ages 10 to 19 (WHO, 2019). During this stage, many young people face challenges related to sexual and reproductive health, making the issue of teenage pregnancy a significant concern worldwide. It affects the disadvantaged population because of poverty, lack of educational resources, and limited job prospects. In 2022, approximately 13% of teenage girls and young women around the world under the age of 18 became mothers (UNICEF, 2024). Teenage pregnancies are prevalent in developed and developing countries, where one-third of girls get married before they turn 18 years old.

In Southeast Asia, the Philippines ranks second highest in teenage pregnancy rates (Save the Children, 2019). In 2022, this had declined to 5.4% from 8.6% in 2017. Teenage pregnancy is highest among 19-year-olds (13.3%), followed by 18-year-olds (5.9%), and is more evident in rural areas (6.1%) compared to urban areas (4.8%) (PSA, 2022). Despite the decreasing trend in the prevalence of nutritionally at-risk pregnant women reported in the 2011 to 2018 National Nutrition Surveys, the proportion of nutritionally at-risk pregnant adolescents (35.1%) is still significantly higher compared to adults aged 20 years and older (18.2%). Additionally, adolescent mothers tend to have delayed initial prenatal appointments, attend fewer than the recommended four prenatal visits, and neglect taking nutritional supplements (DOST-FNRI, 2022).

Teenage pregnancies are influenced by physical, mental, and social factors (Patidar, 2015) and carry higher risks of complications, such as eclampsia, infections, and low-birth-weight infants, compared to pregnancies in women in their twenties (WHO, 2019). Local studies (Abecia *et al.*, 2010) showed that few teenage mothers attend prenatal classes (3.27%) or practise proper nutrition (2.87%). Limited education reduces reproductive health knowledge and future opportunities, heightening early pregnancy risks (WHO, 2019).

This study assessed the nutritional and health status, dietary intake, health-seeking practices, and government programme participation of pregnant adolescents aged 10-19 years in selected municipalities in Batangas, Laguna, and Quezon, Philippines.

METHODOLOGY

Study design

This study was a cross-sectional survey of households with pregnant adolescents (PAs) aged 10-19 years, conducted in 2022 when the COVID-19 pandemic was still prominent. It employed both quantitative and qualitative methods.

Sampling and sample size computation

A total of 165 PAs participated in the study. They were purposively selected from master lists provided by health implementers in the areas.

All PAs aged 10–19 years, regardless of socioeconomic status and stage of pregnancy, who consented to participate were included in the study.

Twenty-eight implementers of maternal, newborn, and child health and nutrition (MNCHN) programmes at the city/municipal and *barangay* levels from the provinces of Laguna, Batangas, and Quezon, Philippines – those with the highest number of teenage pregnancies in 2021 – were interviewed as key informants (KIs). A *barangay* is the smallest political unit in the Philippines (philatlas.com), wherein each municipality or city is made up of several *barangay*s.

Data collection tools

Coordination and data collection with

Table 1. Mean energy and nutrient intakes and proportion of pregnant adolescents meeting the Recommended Energy and Nutrient Intake (RENI)/Estimated Average Requirement (EAR)

Energy and Nutrients	*RENI/EAR*			*Mean intake*			*Meeting RENI/EAR*			*P-value*
	13-15 y.o	*16-18 y.o.*	*19 y.o.*	*13-15 y.o*	*16-18 y.o.*	*19 y.o.*	*13-15 y.o*	*16-18 y.o.*	*19 y.o.*	
				n=11	*n=95*	*n=59*	*n=11*	*n=95*	*n=59*	
Energy (kcal)	2170 or 2470†	2280 or 2580†	1930 or 2230†	2791	2267	2408	36.4	34.7	52.5	0.087
Protein (g)		72		101	87	94	63.6	59.0	69.5	0.419
Calcium (mg)	840		640	913	659	658	36.4	28.4	39.0	0.384
Iron (mg)		31.7		17.5	15.5	17.8	9.1	5.3	10.2	0.507
Thiamin (mg)		1.2		1.5	1.4	1.6	54.6	51.6	61.0	0.519
Riboflavin (mg)		1.4		1.6	1.5	1.7	36.4	48.4	52.5	0.603
Niacin (mg)		14		24.7	23.7	26.6	81.8	80.0	94.9	0.036
Vitamin C (mg)	52		56	55.2	47.9	46.8	63.6	29.5	30.5	0.068
Vitamin A (mg)	640		720	666.2	816.4	1122.8	45.5	33.7	37.3	0.709

y.o.: years old; †Energy requirements are based on the recommended values for PAs during the second and third trimesters

PAs and KIs were done via phone and video calls (Messenger and Zoom). Consent and assent forms were obtained through email and Messenger before the interviews, while research staff secured master lists and prenatal records from health programme implementers.

Height and weight measurements and clinical information (e.g., blood pressure, pregnancy weeks) were obtained based on prenatal records. Data collected included personal, demographic, and socioeconomic profiles, as well as information on prenatal visits, immunisation, supplements, maternal programme participation, and health practices.

Three pre-tested interview tools were used in the data collection process: a structured in-depth interview questionnaire, a 24-hour food recall form for PAs, and a KI questionnaire for local programme implementers (doctors, nurses, midwives, and other health workers). Trained researchers facilitated data collection.

Two non-consecutive 24-hour food recalls were collected from PAs to estimate food intake, with quantities measured using standard tools (e.g., measuring cups, food models, rulers, tablespoons, teaspoons, and matchboxes).

Data analysis

Nutritional status was assessed using the weight-for-height classification (Magbitang et al., 1988), based on the weight and height measurements

recorded in the prenatal book of PAs.

Magbitang's criteria are the standard classification used in the Philippines to identify nutritionally at-risk pregnant women. Although originally developed for adult Filipino women, these criteria were applied to pregnant adolescents due to the absence of an adolescent-specific standard. In addition, blood pressure measurements were obtained from the prenatal book.

Food intakes of PAs were converted into weight in grams and "as purchased" values. These values were computed and translated into nutrient intake using the Individual Dietary Evaluation System (IDES), developed by the Department of Science and Technology-Food and Nutrition Research Institute (DOST-FNRI). The adequacy of energy and nutrient intakes (protein, calcium, iron, and vitamin A) was assessed based on the Estimated Average Requirement (EAR) from the Philippine Dietary Reference Intakes 2015 (PDRI) (DOST-FNRI, 2015). For energy, the adolescent requirement plus the additional need for the 2nd/3rd trimester (as applicable) was applied. For protein and micronutrients, the corresponding EAR or RENI (Recommended Energy and Nutrient Intakes) was used, where an EAR is not defined. A dichotomous adequacy variable for every nutrient: "meeting RENI/EAR" (intake ≥ requirement) vs. "not meeting RENI/EAR" was created (Table 1).

No software was used for qualitative data analysis because questions were simple, structured, and straightforward. KI responses were organised, with themes identified on maternal programme participation, service delivery in geographically isolated and disadvantaged areas (GIDA), prenatal workforce and supplies, support for pregnant adolescents, peer advice, available services, and factors driving high teenage pregnancy.

Data were processed and analysed using Stata version 16 (StataCorp LLC, College Station, Texas, USA). Relationships between continuous variables (e.g., weight, height, energy intake, and blood pressure) were examined using Pearson's and Spearman's correlation coefficients. A p-value of <0.05 was considered statistically significant.

Ethical considerations

The Food and Nutrition Research Institute (FNRI) Institutional Ethics and Review Committee (FIERC), a PHREB-accredited ethics review committee, reviewed and approved the study protocol FIERC-2022-002, dated April 28, 2022.

Study limitations

The study was conducted during the pandemic year, and data were collected via phone and video calls through Zoom or Facebook Messenger. Constraints during phone-based data collection were minimised by reading the questions twice, or until the respondent fully understood them and answered accordingly.

RESULTS

Profile of pregnant adolescents and households

PAs were aged 13–19 years, with a mean age of 17.7 years; the largest proportion (35.8%) was 19 years old. Participants were in various stages of pregnancy, from the first to the third trimester. The majority (31.7%) reached at least Junior High School level, while 27.0% attended Senior High School (SHS). More than half (61.2%) stated that their pregnancy was unplanned and that they had healthy prenatal check-ups.

Most PAs lived in an extended-family household (60%), with at least five family members. The majority (93.9%) were not engaged in any income-generating activities. More than 20% stayed in a household with at least two working

members, with a mean household income of 19,877.29 pesos (approximately 361 USD) per month.

Nutritional status and health

Results revealed that half of PAs (50%) were nutritionally at risk. The majority (70%) had normal blood pressure, 24% had elevated blood pressure, and 6% had high blood pressure.

Dietary intake

Energy and nutrient intakes by age group

Table 1 presents the mean energy and nutrient intakes of PAs aged 13–19 years, together with the proportion meeting RENI/EAR and the statistical comparisons across age groups.

Results were summarised by three age groups (13–15, 16–18, and 19 years). The table reports, for each nutrient and age group, (i) the requirement, (ii) mean intake, and (iii) proportion meeting the requirement. Pearson's chi-square test of independence on the 3×2 contingency table (age group × adequacy status) was used to test whether adequacy differed by age group.

Where any expected cell count was <5, results were verified using Fisher's exact test (findings were unchanged). A two-sided α=0.05 indicated statistical significance. The *p*-values presented in the table are from these chi-square (or Fisher's exact) tests of adequacy proportions (e.g., for niacin: Pearson $\chi^2(2)=6.64$, $p=0.036$).

Energy intake

Mean daily energy intake of PAs ranged from 2,267 kcal among 16–18-year-olds to 2,791 kcal among the youngest group (13–15 years old). Only about one-third (36.4% for 13–15 years; 34.7% for 16–18 years) to one-half (52.5% for 19 years) met their recommended energy intake, with no statistically significant difference observed across age groups ($p=0.087$). The relatively higher mean intake among the youngest group may reflect overestimation due to a limited sample size (n=11) or greater consumption in later stages of pregnancy. Overall, the findings showed that more than half of the PAs did not meet their energy requirements, indicating widespread inadequacy to support both maternal and foetal energy needs. This pattern is consistent with national estimates from the Expanded National Nutrition Survey (ENNS) 2018–2019, which reported that only 14.9% of pregnant adolescents (≤19 years old) met their recommended energy intake, one of the lowest proportions among physiological groups in the country (DOST-FNRI, 2022).

Protein intake

Protein adequacy was higher than that of energy, ranging from 59.0% among 16–18-year-olds to 69.5% among 19-year-olds, though differences were not statistically significant ($p=0.419$). Mean protein intakes (87–101 g/day) exceeded RENI for some age groups, suggesting that while quantity may be adequate, quality and source (e.g., animal vs. plant protein) may vary. Protein adequacy is crucial for foetal growth and maternal tissue development; however, a considerable proportion of adolescents still fall below the recommended requirements.

Calcium and iron intakes

Calcium intake was notably insufficient, with only 28.4–39.0% of PAs meeting their requirements ($p=0.384$). Mean calcium intake ranged from 658 to 913 mg/day, well below the increased needs of pregnancy. Similarly, iron adequacy was alarmingly low across all age groups, with only 5–10% meeting the recommended levels ($p=0.507$). Mean iron intakes (15.5–17.8 mg/day) were roughly half of the required 31.7 mg per day, underscoring the increased risk of iron-deficiency anaemia. This aligns with national estimates from the

Table 2. Health-seeking practices of pregnant adolescents

Health-seeking practices	*n (N=165)*	*%*
Regular check-up, antenatal		
Yes	42	25.5
No	123	74.6
Location of check-up		
Health Centre	22	13.3
Private Clinic	4	2.4
Government Hospital	11	6.7
Private Hospital	2	1.2
Health Centre and Government Hospital	3	1.8
No answer	2	1.2
Not applicable	121	73.3
Check-up while pregnant		
Yes	165	100.0
No	-	-
Location of check-up		
Health Centre	119	72.1
Private Clinic	3	1.8
Government Hospital	6	3.6
Private Hospital	2	1.2
Health Centre and Government Hospital	20	12.1
Health Centre and Private Clinic	11	6.7
Health Centre, Private Clinic, and Government Hospital	2	1.2
Health Centre and Lying-in	1	0.6
Health Centre and a quack doctor	1	0.6

ENNS 2018–2019, which reported that 23% of pregnant women aged 15–49 years in the Philippines were anaemic (DOST-FNRI, 2022). The persistently low dietary iron intake observed in this study supports the continued prioritisation of iron and folic acid supplementation and dietary counselling in maternal nutrition programmes.

B-vitamin intake

Thiamin and riboflavin adequacy ranged from 51–61% and 36–53%, respectively, showing moderate sufficiency but no significant differences by age (p>0.05). Niacin adequacy, however, was significantly different across age groups (p=0.036), with the highest adequacy among 19-year-olds (94.9%). This likely reflects higher consumption of staple foods such as rice and fish, which are common sources of niacin in the Filipino diet.

Vitamins C and A intakes

Vitamin C adequacy was generally low, particularly among 16–19-year-olds (≈30%), with younger adolescents showing higher adequacy (63.6%), though the difference was only borderline significant

Table 3. Prenatal programmes and services availed by pregnant adolescents

Prenatal programmes and services†	*n*	*%*
Counselling (nutrition/breastfeeding)	144	87.3
Iron and folic acid supplementation	123	74.6
Immunisation-Tetanus toxoid	94	57.0
Family planning method	52	31.5
Urine and blood test	32	19.4
Mothers' class/Nutrition education	26	15.8
Dietary supplementation	19	11.5
Buntis kit pack (Pregnancy kit pack)	18	11.0
Vitamin A supplementation	15	9.1
Others (Dental check-up)	19	11.5

†multiple responses

(p=0.068). This pattern suggests limited intake of fruits and vegetables rich in vitamin C, possibly due to food preferences or economic constraints. Vitamin A adequacy ranged from 33.7% to 45.5% (p=0.709), consistent with suboptimal consumption of animal sources (e.g., liver and eggs) and provitamin A-rich vegetables (Table 1).

Health-seeking practices

Regular check-ups are vital for the mother and her foetus. Table 2 illustrates how PAs sought healthcare. During the pre-pregnancy period, most of them did not go for medical examinations (74.6%). Those who did seek medical check-ups during the pre-pregnancy period usually went to a health centre (13.3%) or a government hospital (6.7%). Once pregnant, all sought prenatal care, mostly at health centres (72.1%) or government hospitals (12.1%).

Prenatal programmes and services availed by pregnant adolescents

The most availed prenatal programmes and services by PAs were nutrition and breastfeeding counselling (87.3%), iron and folic acid supplementation (74.6%), tetanus toxoid immunisation (57%), and family planning methods (31.5%), as shown in Table 3.

Delivery of programmes for pregnant adolescents in distant *barangays* and geographically isolated and disadvantaged areas (GIDA)

Key informants suggested ways to ease pre- and postnatal services for PAs in GIDA *barangays.* Interviews revealed midwives making weekly *Barangay* Health Station visits, supporting maternal and child health nutrition with *Barangay* Health Workers and *Barangay* Nutrition Scholars.

Findings showed that prenatal programmes and services were offered to PAs in GIDA areas, which included nutrition and breastfeeding counselling, urine and blood tests, iron and folic acid supplementation, family planning methods, mothers' classes on nutrition education and breastfeeding, and tetanus toxoid immunisations. Based on the interviews, there was a sufficient number of staff (ranging from 80% to 100%) to deliver these services to PAs.

Support provided and received by pregnant adolescents

Being pregnant at an early age creates a considerable challenge for the family. Based on the interviews, most families of PAs provided moral, emotional, and financial support.

"Kinukupkop pa rin ang anak kahit may sarili ng mga pamilya, tuloy ang suporta" (PAs were taken care of and supported by their families, despite their situation, from the perspective of the mother of a PA).

The *barangay* supported PAs by providing patrol services, prenatal check-ups, medicines, vitamins, maternal kits, food aid, and livelihood assistance, especially for those in remote areas. The city/municipal health officers (C/MHO) provided prenatal and postnatal care with free vitamins, lab tests, ultrasounds, and maternal health counselling.

Support from private groups and Non-Governmental Organisations (e.g., Seventh Day Adventists, Rotary Clubs, UNFPA) included food (milk, biscuits), free counselling and health exams, pregnancy information sessions, monetary vouchers, and electric bikes for PAs.

Advice from PAs to Their Peers (statements from PAs)

PAs advised peers to avoid early pregnancy and sexual relationships, prioritise their health and studies, and follow parental guidance.

"Hangga't kaya, huwag munang magbuntis kasi mahirap magbuntis ngayon, lalo na at bata pa. Huwag gagaya; huwag muna mag-"syota"; mahirap ang buhay; mag aral muna". (Avoid early pregnancy and relationships; focus on your studies instead).

"Pag-isipang mabuti at baka sa huli ay magsisi. Panindigan ang magiging bunga at sila naman ang gumawa. Sabi ng iba baka na nabigla lang, parang nadapa lang" (Think ahead to avoid regrets; if things go wrong, face them responsibly).

"Ako nagsisi di sumunod sa payo ng magulang, yung huwag munang magbuntis kasi mahirap manganak; malalaman ang hirap after manganak, ang anak na ang intindihin bago ang sarili; maging losyang ka na, wag lang mapabayaan ang anak" (I regret not following my parents' guidance; childbirth is hard and caring for the baby often means neglecting myself).

PAs were advised to commit to their choices, care for themselves and their baby, attend regular check-ups, and seek parental guidance and support.

"Huwag ipalaglag kahit di pa sila handa; panindigan" (Do not abort; take responsibility for your child).

"Magpa check-up *agad at magpakonsulta agad sa doktor; sundin lahat ang payo ng doktor/*midwife *para maging malusog ang nanay at* baby*"* (Attend regular prenatal check-ups and follow medical advice for a healthy pregnancy and baby).

*"Huwag pabayaan ang pag-aaral kahit mabuntis sila; pwede pang ituloy ang pangarap kahit na mabuntis dahil may makukuhang lakas mula sa anak; wag madala sa sasabihin ng ibang tao dahil masusuportahan at masusustentuhan ng nanay ang anak; wag magpa-*stress*; hayaan ang iba na mag-isip".* (Continue studying and pursuing your dreams; ignore others' opinions and don't let them stress you).

DISCUSSION

Socioeconomic characteristics

PAs, often dependent on their parents and lacking parenting knowledge, struggle to balance schooling and motherhood, leading many to drop out. Young mothers face significant educational disadvantages, highlighting the need for continued education on the risks of early sexual activity and marriage, alongside efforts to reduce wealth disparities (Chirwa *et al.*, 2019).

Cultural practices, poverty, and low literacy contribute to teenage pregnancy (Mahavarkar *et al.*, 2008). Earlier research has indicated a link between teenage pregnancy and economic disadvantage, which in turn affects the educational and career goals of young individuals (Penman-Aguilar *et al.,* 2013; Ahorlu, Pfeiffer & Obrist, 2015; Chirwa *et al.,* 2019). According to Penman-Aguilar *et al.* (2013), adverse socioeconomic circumstances faced by communities and families are responsible for the high rate of teenage pregnancies in the United States, while Aluga & Okolie (2021) noted that social, structural, economic, and environmental factors may influence teenage pregnancy and childbirth.

Moreover, teenage pregnancy may not pose a direct threat to the health of adolescents, but the absence of social and financial assistance could increase the risk for young girls dealing with this situation (Pfeiffer *et al.*, 2012).

Health and nutrition status of PAs

Studies show that younger pregnancies affect health and nutrition. In India, teenage mothers face higher risks of hypertension (Mahavarkar *et al.*, 2008). In this study, half of the PAs were nutritionally at risk, and 30% had high blood pressure, endangering both mother and child. Poor maternal nutrition, as shown in India, often leads to low birth weight (Restu *et al.*, 2017), whereas adequate prenatal care reduced anaemia and hypertension among PAs in Saudi Arabia (Mahfouz *et al.*, 1995).

Nutritional status of PAs was assessed using the Magbitang weight-for-height table, a long-standing tool and local reference for Filipino women. Though practical, it may not fully reflect adolescents' growth needs and could therefore underestimate the nutritional risks of younger adolescents who are still growing. Newer standards could classify more women as underweight, too. Still, in the absence of an adolescent-specific international standard, the Magbitang classification remains a useful tool for identifying at-risk pregnancies.

In this study, only 40% of PAs met the recommended energy intake, while one-third achieved recommended calcium and vitamins A and C intakes – nutrients that are vital for foetal development. Deficiencies in these nutrients can increase maternal mortality risk (Branca *et al.*, 2015).

MNCHN participation and underlying factors of teenage pregnancy

The Department of Health (DOH),under Republic Act 10354, ensures that family planning, maternal care, and BEmONC services are accessible through local government units (PCW, 2013). Its Adolescent Health and Development Programme (AHDP) provides quality healthcare for adolescents aged 10–19 years, which may have encouraged pregnant adolescents to access maternal health services (Commission on Population and Development, 2025).

This study found PAs used various pre- and postnatal services at local health centres, including supplementation of iron, folic acid, and vitamin A, tetanus vaccination, family planning, nutrition education, pregnancy kits, newborn immunisations, and counselling. KI interviews identified drivers of teenage pregnancy—individual circumstances, family problems, peer pressure, social media, and the pandemic. These factors often affect adolescents from broken homes or those lacking parental guidance due to busy parents.

Biggs *et al.* (2010), Jordahl & Lohman (2009), and Odhiambo (2018) found that many adolescents with unplanned pregnancies came from troubled families with little parental support, peer pressure, and partner influence; those in single-parent or separated households were more likely to engage in

sexual activity. The influence of peers is significant, particularly when teenagers see their friends in relationships and want to be in one too. Adolescents from families facing challenges may adop a rebellious mindset and seek comfor from their romantic partners, leading t involvement in physical relationships Social media also greatly influence teenage pregnancy, with electroni media and sexual content as key factors Kimemia & Mugambi (2016) found thi impact among students in Imenti North where the issue of teenage pregnanc was exacerbated during the pandemic as online schooling created more datin opportunities for teenagers.

CONCLUSION

This study found that PAs in selected municipalities in the Philippines face risks related to poor health and nutrition. Thus, the following steps are recommended: (i) intensive monitoring of PAs, (ii) allocation of local government funds for dietary supplementation, and (iii) wider use of media to spread information on food fallacies, reproductive health, and sex education for teens. It is also advisable to provide complete multivitamin supplements, strengthen community-based nutrition education, and enhance sex education within the high school curriculum.

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Authors' contributions

Emily OR, principal investigator, conceptualised and designed the study, conducted data collection, write-up, drafted and finalised the manuscript; Eldridge BF, performed statistical data analysis, interpretation and write-up and reviewed the manuscript; Joanne Jette SG, Rowena VV, Georgina SC, conducted data collection, write-up and reviewed the manuscript; Julieta BD, assisted in the conceptualisation and design of the study and reviewed the manuscript.

Conflict of interest

The authors declare no competing interests.

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