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Family socio-economic background modified secular trends in age at menarche: evidence from the Pró-Saúde Study (Rio de Janeiro, Brazil)

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Summary. *Background:* Since age at menarche has been associated with socio-economic status, its downward secular trend might vary according to the different socio-economic status levels of the family in which women lived during their childhood.

Aim: This study seeks to describe secular trends in age at menarche for Brazilian women whose fathers had different levels of educational attainment.

Subjects and methods: A self-administered questionnaire was applied to 2053 women born between 1931 and 1977. Multiple linear regression models were employed to estimate trends in age at menarche according to categories of educational level of the participants' father.

Results: The age at first menstruation varied from 7 to 19 years, with a mean age of 12.3 years (± 1.64 SD). The reduction in age at menarche was 2.4 months per decade for all women. Among daughters of fathers with less than 8 years of schooling this reduction was 3.6 months per decade, and among daughters of fathers with 8 years or more of study it was 1.2 months per decade.

Conclusion: Improvements in living conditions in Brazil over the last decades seem to have had a stronger effect on the reduction of the age at menarche among women who lived their childhood in worse socio-economic standards.

1. Introduction

In developed countries, a downward secular trend in the age at menarche has been observed during the last century (Wyshak and Frisch 1982). Hauspie *et al.* (1997) associated this tendency with the reduction of the age at menarche with the improvements in living and health standards observed in these countries. This association has also been noted over the past 50 years in developing countries (Farid-Coupal *et al.* 1981, Rao *et al.* 1998).

In Brazil, at least one author has also observed a temporal trend in anticipating the age at menarche (Kac *et al.* 2000). In addition, several Brazilian studies have also reported a later age for the first menstruation for females belonging to the worse-off socio-economic groups (Horta and Santos 1991, Tavares *et al.* 2000).

Thus, it is plausible to hypothesize that the temporal trend for the age at menarche might have behaved differently among different socio-economic groups. Studies conducted in Brazil have not focused on the differences in the temporal trends in age at menarche of females who have been brought up under different socio-economic conditions. The aim of this paper was to investigate these possible differences in secular trends among university employees in Rio de Janeiro, Brazil, using the educational level of the study participants' father as an indicator of their socio-economic status during childhood.

2. Subjects and methods

The Pró-Saúde Study is a prospective cohort of technical and administrative staff of a university located in Rio de Janeiro, Brazil. From a total of 4552 eligible employees, 522 (11.5%) did not participate (refusals, long leaves of absence). Among the 4030 participating employees, 2240 (55.6%) were females and were included in the current analyses.

Variables were obtained from a multidimensional self-administered questionnaire filled out by the participants at the workplace. A pilot study and a test–retest reliability analyses were carried out, and the process of data collection was considered to follow good quality standards (Faerstein *et al.* 1999). Regarding the information on age at menarche, the test–retest reliability study involving 192 females showed an intraclass correlation coefficient of 0.89 (95% confidence interval (CI): 0.76–1.0).

The variables selected for this study were: age at menarche, year of birth and respondents' father's educational level. The age at menarche was obtained by an open question to be answered in years, with a closed alternative ('Never menstruated'). Information on the age of the first menstruation has been obtained by means of a recall method, as done by other authors, and it is agreed to be a valid strategy (Van Noord and Kaaks 1991, Morabia and Costanza 1998, Must *et al.* 2002).

The respondents' father's educational level was obtained from a pre-coded question with eight options for response; the year of birth as reported when filling out of the questionnaire. In countries like Brazil, where marked social inequalities still determine unequal educational attainment, the fathers' education might represent a reasonable indicator of individuals' socio-economic situation during childhood, and it has been utilized as such in several studies (Lee *et al.* 1995, Silva *et al.* 2000).

Out of 2240 participants, 2068 reported their father's educational level. For the purpose of these analyses, the educational attainment was dichotomized into less than 8 years (43% of the respondents) and 8 years or more of schooling.

Data were initially analysed by employing a simple linear regression model with age at menarche as the dependent variable, and year of birth as the only covariate. To investigate a possible influence of the socio-economic background of the family on the temporal trend in age at menarche, two similar linear regression models were fitted, one for each category of the father's educational level. The STATA 6TM software was utilized for the statistical analyses.

3. Results and discussion

The age of the first menstruation was obtained for 2217 women born between 1932 and 1977, varying from 7 to 19 years, with mean age of 12.3 years (± 1.64 SD).

Table 1 shows that there was a negative association between the employees' year of birth and their age at menarche, indicating the existence of a downward temporal trend of 2.4 months per decade for the age at menarche. It is also possible to observe that the downward temporal trend for the age at menarche was 3.6 months per decade for women whose fathers had less than 8 years of schooling, and 1.2 months per decade for those whose fathers had 8 years or more of schooling. The study of Kac *et al.* (2000) suggests that this secular trend in the age of menarche has been taking place in Brazil for at least 50 years.

In figure 1, it is possible to observe a more noticeable temporal trend for the age at menarche among daughters of fathers with little or no schooling. Veronesi and Guerresi (1994) also observed a more marked temporal trend in reduction of the age at menarche among Italian females coming from lower socio-economic

Table 1. Regression coefficient and 95% CI for the effect of year of birth on age at menarche for women with different family socio-economic backgrounds as indicated by their father's educational level.

Variable	Model stratified by the father's educational level			
	Simple model ($n = 2053$)		8 years or more of schooling ($n = 1170$)	
	Regression coefficient (β)	CI 95%	Regression coefficient (β)	CI 95%
Year of birth	-0.02	-0.03, -0.02	-0.03	-0.05, -0.02
		p -value <0.01		p -value <0.01
				p -value 0.08

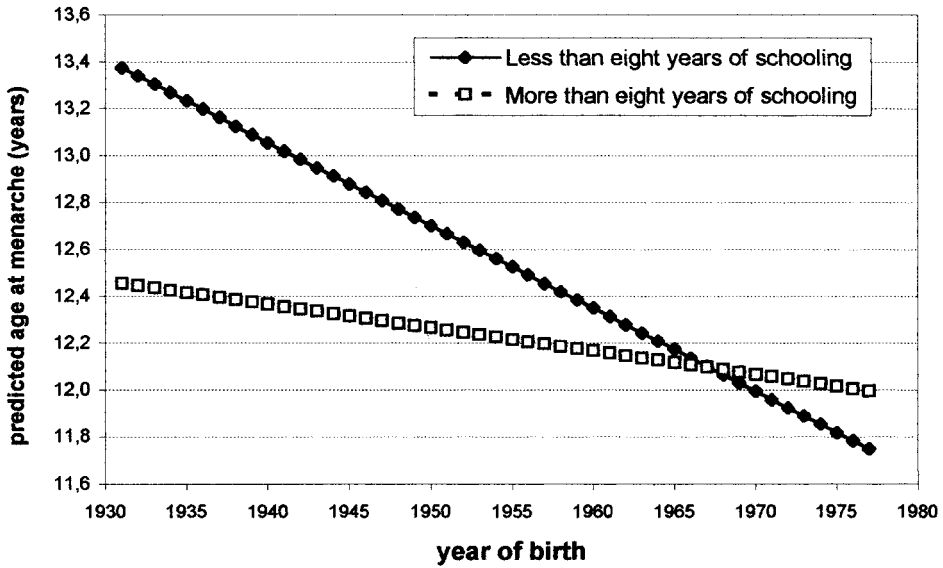


Figure 1. Secular trends in age at menarche for women with different family socio-economic backgrounds as indicated by their father's educational level.

groups. These authors consider that the improvement of living conditions resulted in more evident benefits for the poor.

In Zagreb (Croatia), Prebeg (1998) observed that girls belonging to the worse-off social strata showed a temporal trend to reduce the age at menarche. In the same study period, a trend to increase the age at menarche was observed among the better-off strata of the population.

It was not possible to identify other Brazilian studies that investigated differences in the temporal trend for the age at menarche for females coming from different socio-economic groups. It is possible that a phenomenon similar to that observed by Veronesi and Guerresi (1994) in northern Italy, and by Prebeg (1998) in Croatia, has also taken place in our study population. After the Second World War, Brazil experienced significant improvement in living standards, e.g. those related to education and health condition (Monteiro *et al.* 1994). Daughters of fathers with average or high education attainment might have already benefited from better living standards during their childhood, and therefore their age at menarche showed lesser impact of these social gains.

References

- DUARTE, M. F. S., 1993, Maturação física: uma revisão da literatura, com especial atenção à criança brasileira. *Cadernos de Saúde Pública*, **9**, 71–84.
- FAERSTEIN, E., LOPES, C. S., VALENTE, K., PLÁ, M. A. S., and FERREIRA, M. B., 1999, Pré-testes de um questionário multidimensional autopreenchível: a experiência do Estudo Pró-Saúde UERJ. *PHYSIS: Revista de Saúde Coletiva*, **9**, 117–130.
- FARID-COUPAL, N., CONTRERAS, M. L., and CASTELLANO, H. M., 1981, The age at menarche in Carabobo, Venezuela with a note on the secular trend. *Annals of Human Biology*, **8**, 283–288.
- HAUSPIE, R. C., VERCAUTEREN, M., and SUSANNE, C., 1997, Secular changes in growth and maturation: an update. *Acta Paediatrica Supplement*, **423**, 20–27.
- HORTA, R. L., and SANTOS, I., 1991, Idade da menarca em Pelotas: estudo-piloto. *Revista AMRIGS*, **35**, 83–87.

- KAC, G., COEL, A. S. C., and VELASQUEZ-MELENDZ, G., 2000, Secular trend in age at menarche for women born between 1920 and 1979 in Rio de Janeiro, Brazil. *Annals of Human Biology*, **27**, 423–428.
- LEE, P. R., MOSS, N., and KRIEGER, N., 1995, Measuring social inequalities in health: report on the conference of the National Institutes of Health. *Public Health Reports*, **110**, 302–305.
- MONTEIRO, C. A., BENICIO, M. H., and GOUVEIA, N. DA C., 1994, Secular growth trends in Brazil over three decades. *Annals of Human Biology*, **21**, 381–390.
- MORABIA, A., and CONSTANZA, M. C., 1998, International variability in ages at menarche, first livebirth, and menopause. World Health Organization Collaborative Study of Neoplasia and Steroid Contraceptives. *American Journal of Epidemiology*, **148**, 1195–1205.
- MUST, A., PHILLIPS, S. M., NAUMOVA, E. N., BLUM, M., HARRIS, S., DAWSON-HUGHES B., and RAND, W. M., 2002, Recall of early menstrual history and menarcheal body size: after 30 years, how well do women remember? *American Journal of Epidemiology*, **155**, 672–679.
- PREBEG, Z., 1998, Changes in growth patterns in Zagreb school children related to socioeconomic background over the period 1973–1991. *Annals of Human Biology*, **25**, 425–439.
- RAO, S., JOSHI, S., and KANADE, A., 1998, Height velocity, body fat and menarcheal age of Indian girls. *Indian Pediatrics*, **35**, 619–628.
- SILVA, N. N., PEDROSO, G. C., PUCCINI, R. F., and FURLANI, W. J., 2000, Desigualdades sociais e uso de serviços de saúde: evidências de análise estratificada. *Revista de Saúde Pública*, **34**, 44–49.
- TAVARES, C. H. F., HAEFFNER, L. S. B., BARBIERI, M. A., BETTIOL, H., BARBIERI, M. R., and SOUZA, L., 2000, Idade da menarca em escolares de uma comunidade rural do Sudeste do Brasil. *Cadernos de Saúde Pública*, **16**, 709–715.
- VAN NOORD, P. A. H., and KAAKS, R., 1991, The effect of wartime conditions and the 1944–45 'Dutch Famine' on recalled menarcheal age in participants of the DOM breast cancer screening project. *Annals of Human Biology*, **18**, 54–70.
- VERONESI, F. M., and GUERESI, P., 1994, Trend in menarcheal age and socioeconomic influence in Bologna (Northern Italy). *Annals of Human Biology*, **21**, 187–196.
- WYSHAK, G., and FRISCH, R. E., 1982, Evidence for a secular trend in age of menarche. *New England Journal of Medicine*, **306**, 1033–1035.

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Zusammenfassung. *Hintergrund:* Seitdem das Alter beim Eintritt der Menarche mit dem sozioökonomischen Status (SES) verknüpft wird, kann das Absinken des Menarchalters als ein Ausdruck des säkularen Trends in Abhängigkeit von den unterschiedlichen SES-Levels der Familie, in welcher die Frauen ihre Kindheit verbracht haben, gesehen werden.

Ziel: Die vorliegende Studie versucht, die säkularen Trends des Menarchalters von brasilianischen Frauen mit Vätern unterschiedlicher Bildungsniveaus zu beschreiben.

Material und Methoden: Ein eigens auszufüllender Fragebogen wurde an 2053 Frauen ausgegeben, welche zwischen 1931 und 1977 geboren wurden. Multiple lineare Regressionsmodelle wurden verwendet, um die Trends des Alters der Menarche in Abhängigkeit von den Bildungskategorien der Väter der Teilnehmerinnen einzuschätzen.

Ergebnisse: Das Menarchealter variierte von 7 bis 19 Jahren, bei einem mittleren Menarchealter von 12.3 (+/-1.64) Jahren. Die Reduzierung des Alters beim Eintritt der Menarche betrug für alle Frauen im Mittel 2.4 Monate pro Dekade. Unter den Töchtern von Vätern mit weniger als achtjähriger Schulbildung betrug die Reduktion 3.6 Monate/Dekade, bei Töchtern, deren Väter 8 und mehr Jahre die Schule besuchten, waren es 1.2 Monate/Dekade.

Schlussfolgerungen: Die Verbesserungen der Lebensbedingungen in Brasilien in den letzten Jahrzehnten scheinen einen größeren Einfluss auf die Reduktion des Menarchalters bei Frauen zu haben, welche ihre Kindheit in schlechten sozioökonomischen Verhältnissen verbracht haben.

Résumé. *Arrière-plan:* Etant donné que l'âge aux premières règles est associé au statut socio-économique (SSE), sa régression séculaire pourrait varier en fonction des divers niveaux de SSE des familles dans lesquelles les femmes ont vécu pendant leur enfance.

But: Cette étude cherche à décrire les changements séculaires de l'âge des premières règles de femmes brésiliennes dont les pères ont atteint différents niveaux éducatifs

Sujets et méthodes: Un auto-questionnaire a été rempli par 2053 femmes nées entre 1931 et 1977. Des modèles de régression linéaire ont été employés pour estimer les tendances de l'âge aux premières règles selon les catégories de niveau éducatif de leurs pères.

Résultats: L'âge des premières menstruations varie de 7 à 19 ans avec une moyenne à 12,3 ans ($\pm 1,64$). La diminution de l'âge aux premières règles est de 2,4 mois par décennie pour toutes les femmes. Cette diminution atteint 3,6 mois par décennie chez les filles dont le père a moins de huit ans de scolarité, tandis qu'elle n'est que de 1,2 mois par décennie chez celles dont le père a plus de huit années d'école ou plus.

Conclusion: Les améliorations des conditions de vie au cours des récentes décennies au Brésil, paraissent avoir eu un effet plus marqué sur la réduction de l'âge aux premières règles des femmes qui avaient vécu leur enfance dans les conditions socio-économiques les plus défavorables.

Resumen. *Antecedentes:* Dado que la edad de menarquia se asocia con el nivel socioeconómico (SES), su tendencia secular a la disminución puede variar según los diferentes niveles del SES de la familia en la que viven las mujeres durante su infancia.

Objetivo: Este estudio pretende describir las tendencias seculares en la edad de menarquia de mujeres brasileñas cuyos padres tenían diferentes niveles educativos.

Sujetos y métodos: Se aplicó un "auto-cuestionario" a 2053 mujeres nacidas entre 1931 y 1977. Para estimar las tendencias de la edad de menarquia según las categorías del nivel educativo del padre de las participantes, se utilizaron modelos de regresión lineal múltiple.

Resultados: La edad de la primera menstruación variaba entre 7 y 19 años, con una edad media de 12,3 años ($\pm 1,64$). La reducción en la edad de menarquia fue de 2,4 meses por década para el total de las mujeres. Entre las hijas cuyos padres contaban con menos de 8 años de escolarización, esta reducción fue de 3,6 meses por década, y entre las hijas de padres con 8 o más años de estudios, fue de 1,2 meses por década.

Conclusión: Las mejoras en las condiciones de vida en Brasil durante las últimas décadas parecen haber tenido un mayor efecto sobre la disminución de la edad de menarquia entre las mujeres que pasaron su infancia en peores niveles socioeconómicos.