



MYOPIA CONTROL

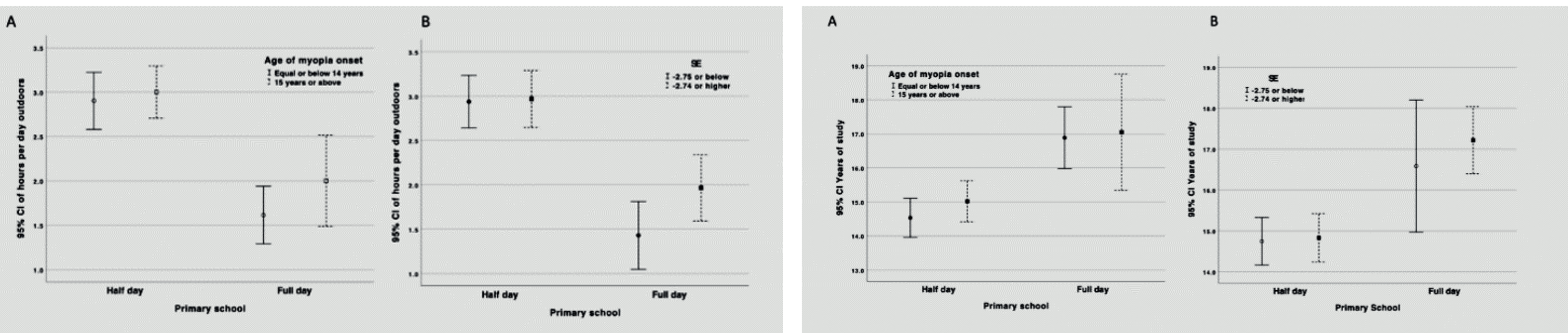
The Full-Day School Hours and/or Tutorial Classes in Childhood, may be Associated with Earlier Myopia Onset

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PURPOSE

The aim of this study was to investigate, through consultation in young adults, the effect on the age of onset of myopia in childhood of the educational charge and/or tutoring classes.



METHODS

Study population

The historical refractive data of myopic subjects aged 18 years or above were collected in 8 opticians or ophthalmological offices in Argentina during the winter months in 2021. The data obtained included especially, the age of the first prescription of their glasses and the refraction achieved at the time of the survey, which was conducted in several locations, including Salta, Marcos Juárez, Leones, San Pedro, Lobos, Rosario, Buenos Aires and Mendoza. The study was conducted in accordance with the principles of the Declaration of Helsinki and the study pro-tocol was submitted to the ethics committee of the Argentine Council of Ophthalmology. Verbal consent was obtained from all subjects after explaining the nature of the study.

Refractive error and age of myopia onset

The evaluation of the refractive error was carried out by different visual health professionals, opticians, orthoptists and ophthalmologists at the request of updating their prescriptions in the different places destined to carry out the study. The opticians or ophthalmologists recorded the spherical equivalent (SE) for both eyes and the age of myopia onset using a specific questionnaire. Myopia was defined by an SE of prescribed glasses of -0.75 D or worse. Patients with blindness in one eye or other ocular pathologies, such as keratoconus, cataracts or glaucoma, were excluded from the study. Subjects with astigmatism of -2.00 diopters (D) or worse were also excluded.

Questionnaire for risks factors

Argentina has an obligatory education system, which consists of 6 years of primary school beginning at ages 6-7 years, and 6 years of secondary school (from age 12-13 years on). In the public education sector, schooling schedule includes 4 hours per day attending school in the morning or in the afternoon, but in the other hand, most private schools have a full day of schooling scheduling consisting of 8 hours per day. A questionnaire was administered on site (on line google docs form) by the opticians or ophthalmologists to the myopic subjects. The questionnaire obtained demographic data, including age, gender, age of first spectacle prescription (defined as age of onset of myopia), and environmental risks factors such as number of years of education, schooling schedule (half day or full day schedule, both in primary and secondary school), tutorial classes (yes, no), time spent on near work (hours per day using computers or performing other near vision tasks), time outdoors (hours per day) and time of day spent on studying and outdoors in childhood.

Statistical analysis

Myopic eyeglass prescriptions with refractive SE error between - 0.75 and - 6.00 D were eligible for analysis as high myopic subjects are likely primarily early-onset genetic cases in this country with low population prevalence of myopia. The SE of the right and left eyes was highly correlated (r=0.81, p<0.001), so the analysis was performed only with the SE of the right eyes. Using multiple linear regression models, we examined childhood factors (tutoring classes, years of education, time of day attending school, daily hours of reading, and time spent outdoors) associated with age of myopia onset and the adult SE. The results of the regression models are reported as β and p values. In all analyses, statistical significance was defined as p < 0.05. All statistical analyzes were performed with SPSS (IBM, United States, version 26).

Table 1. Tutorial classes and school scheduling and the association with age of myopia onset and SE (n=274)

	n	Age of onset (years)	p	n	SE (D)	p
AULAS TUTORIAL						
No	198	14.66 ± 5.23	0,008	206	-2.96 ± 1.44	0,92
Yes	68	12.65 ± 5.60		68	-2.93 ± 1.50	
SCHOOL SCHEDULING IN PRIMARY SCHOOL						
Half-day (4 hours)	211	14.66 ± 5.41	0,002	218	-3.02 ± 1.48	0,13
Whole day (8 hours)	55	12.16 ± 4.82		56	-2.69 ± 1.29	
SCHOOL SCHEDULLING IN SECONDARY SCHOOL						
Half-day (4 hours)	206	14.45 ± 5.23	0,081	213	-3.03 ± 1.49	0,1
Whole day (8 hours)	60	13.10 ± 5.81		61	-2.68 ± 1.28	

Table 2. Multiple linear regression analysis for age of myopia onset (n=274)

	b	p
Age (years)	-0.03	0,28
Gender	-0.32	0,65
School scheduling in primary school	-1.07	0,035
School scheduling in secondary school	-0.09	0,85
Years of study	0.13	0,24
Tutorial Classes	-2.23	0,005
Hours per day reading	-0.7	0,01
Hours per day outdoors	0.21	0,39
Studying at night or afternoon	-0.38	0,48

RESULTS

A total of 274 myopic adults with myopia between -0.75 and -6.00 D participated in the study. The mean age of the subjects was 36.9±14.5 years (range 18-83) and 168 (61.3%) were females. Their mean SE was -2.95 ± 1.45 D and the mean age of myopia onset was 14.2 ± 5.4 years. There were no significant differences in mean SE or age of onset between genders. The mean years of education for these subjects was 15.2 ± 3.2 years. The mean hours (h) of reading per day was 2.6 ± 1.3 h and the mean time spent outdoors per day was 2.7 ± 1.5 hs in childhood. There were no significant differences in mean time spent reading or outdoors between genders in childhood. Tutorial classes after school in childhood were taken by 24.8%. Most spent their time outdoors in the afternoon (83.6% of cases) in childhood. The majority spent time studying in the afternoon (46.4%) and at night (44.5%; only 9.1% studied in the morning) in childhood. Nearly 60% of the subjects attended school 4 hours in the morning and 20% in the afternoon, both in primary and secondary schools, while only about 20% had full day schedule of 8 hours.

There were no significant differences in time spent reading for children who went to school either morning, afternoon, or full day. However, adults who spent the full day at school in childhood had less time outdoors than their peers in primary or secondary schooling (p<.001). Adults attending tutorial classes in childhood also tended to spend less time outdoors than their peers (2.37±1.49 h versus 2.79±1.49; p=.059).

The total years of education of the subjects was greater in those attending full schedule schooling (p<.001). Adults who went to school 4 hours a day (morning or afternoon) in childhood had approximately 15 years of study/education and the ones that had full day scheduling school had 17 years of education (p's<.001) in either primary or secondary school, but there were no significant differences in numbers of years of education by tutorial classes.

Children who went to school only 4 h per day spent more time outdoors compared to those with full schedule (p<.001). There were no significant differences in mean adult SE according to time of day attending school or tutorial classes, but the mean age of myopia onset was more than two years before for adults who took tutorial classes or went to school full day schedule compared with those who went to school only 4 hours per day (Table 1).

Adults who spent the full day at school and that spent less time outdoors had a younger age of myopia onset and a more myopic SE (Figure 1 a & b). The number of years of study was greater in those attending full schedule schooling (p<.001). Adults who went to school 4 hours a day (morning or afternoon) in childhood had approximately 15 years of study and the ones that had full day scheduling school had 17 years of education (p's<.001) in either primary or secondary school, but there were no significant differences in numbers of years of study by tutorial classes. The number of years of study was similar between adults who spent the full and half day at school by groups of age of myopia onset and SE (Figure 2 a & b).

Children with later age of onset spent less time reading (ANOVA p<.001). There were no significant differences in mean SE or age of myopia onset by time-of-day subjects studied (morning, afternoon or at night) or time-of-day outdoors (morning or the afternoon).

The multiple linear regression analysis for age of onset and SE in adulthood as linear variables is shown in Table 2. Adults that attended after-school tutorial classes (p=.005) or a full day school scheduling (p=.035) or that spent more time reading (p=.010) in childhood had younger age of myopia onset. Age of myopia onset was the only risk factor associated with adult SE (p<.001).

CONCLUSION

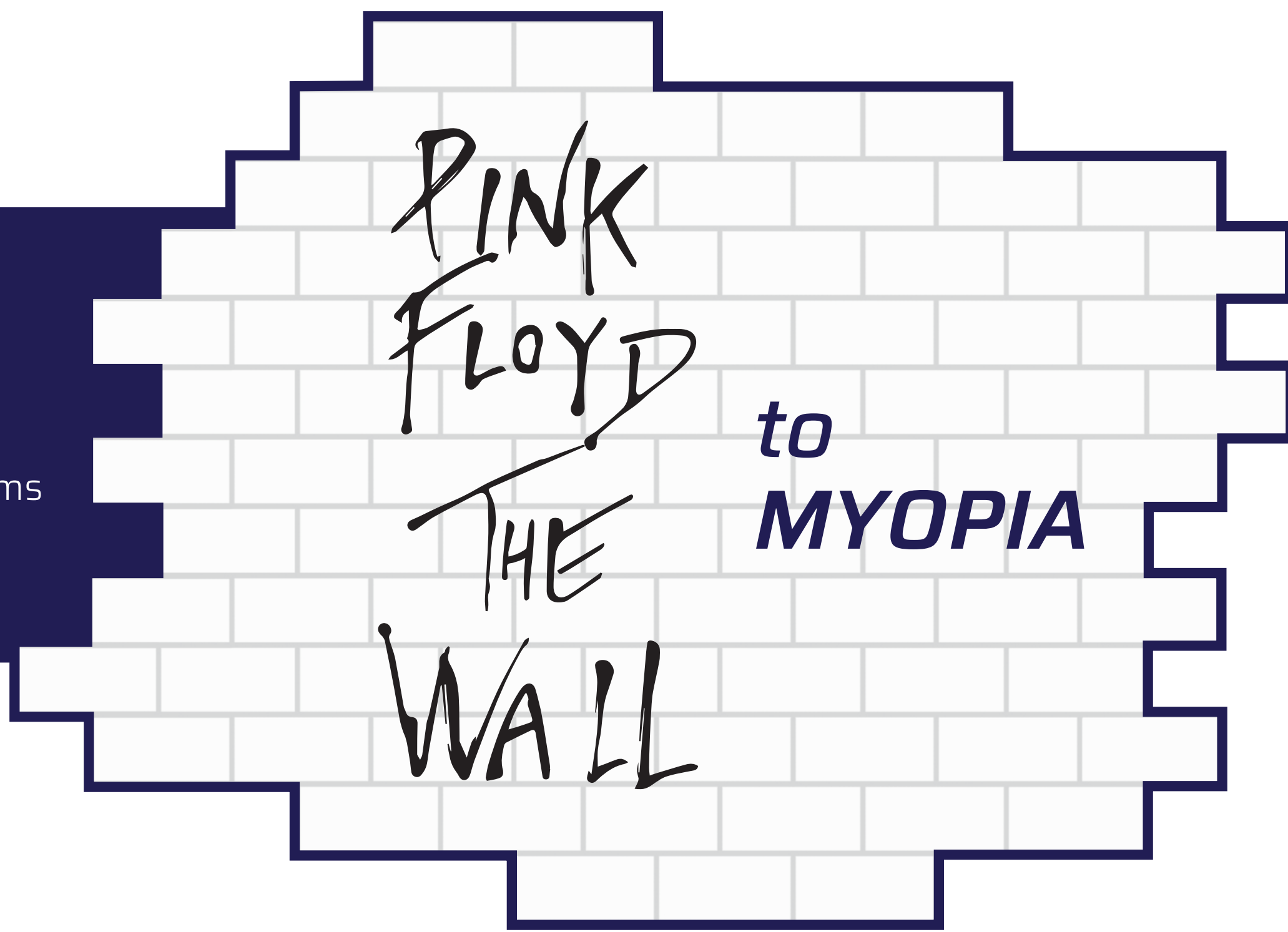
In conclusion, we found an independent association between the kind of educational system and the myopia onset. Full-day school hours, tutoring classes in early childhood, and the intensity of education and close work all play an important role in the development of myopia. Strategies to curb the early onset of myopia are important to prevent progression to high myopia.

Many countries, like Argentina, seek to extend the school day in a well-intentioned way from the classic 4 hours to the general 8 hours. However, quantity does not seem to be quality, and the intensity of near vision work carries a potential risk of generating early myopia onset.

The question is posed: full day schooling in initial education or better quality teaching time?

The Wall

We don't need more, Education
We really need, Myopia Control
Many more Windows in our Classrooms
Less time outdoors could be wrong...



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