Early predictors of trajectories of tobacco smoking from adolescence to young adulthood

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Background

Adolescence is when most smokers initiate tobacco use. Individual and family characteristics, including socioeconomic characteristics, influence the likelihood of regular smoking in youths, but there role with regard to long-term tobacco smoking trajectories is not fully described.

Methods

o Population : 2,025 youths throughout France (12-26 years at baseline, 16 years of follow-up) participating in the longitudinal TEMPO cohort study, in four waves [1].
o Tobacco smoking : ascertained in 1999, 2009, 2011 and 2015 in TEMPO study. We modelled smoking trajectories from adolescence onwards using Group-Based Trajectory Modeling [2].
o Individual and family characteristics : ascertained by TEMPO and GAZEL epidemiological cohort study [1,3,4].
o We excluded participants who were never daily smokers (n=1,262) and used multinomial logistic regression in SAS 9.4 for test associations at smoking trajectories of smokers (n=763)

Characteristics of smokers

o We identified five trajectories of tobacco use (Figure): non-smokers (n=1,262), three trajectories of persistent smoking (low: n=218, intermediate: n=301 and high level: n=130) and a trajectory characterized by a high consumption that ceased (n=114). In sensitivity analyses implemented, the number and shape of smoking trajectories were unchanged.
o The average number of daily cigarettes smoked at 25 years was 2.7 (SD=2.3) in the low-level use group, 8.1 (SD=3.1) in the intermediate level group, 18.4 (SD=10.1) in the high-level group, 12.1 (SD=5.6) in the group characterized by smoking cessation.
o Among the 763 smokers, 55.6% are women, 18.7% initiated tobacco and cannabis early, 20% had juvenile behavioral problems, 6.4% had low academic attainment, 61.6% experienced grade retention, 17.2% had active smoking parents, 11% experienced parental separation and 8.5% had parents who were manual workers or clerks.

References

1. Redonnet B, Chollet A, Fombonne E, et al. Tobacco, alcohol, cannabis and other illegal drug use among young adults: the socioeconomic context. Drug Alcohol Depend 2012;121:231–9.
2. Nagin DS. Group-Based Modeling of Development. Cambridge, Massachusetts, USA: Har-vard University Press; 2005.
3. Fombonne E, Vermeersch S. Children of the GAZEL Cohort. Rev Epidemiol Sante Publique 1997;45:29–40.
4. Goldberg M, Leclerc A, Bonenfant S, et al. Cohort profile: the GAZEL Cohort Study. Int J Epidemiol 2007;36:32–9.

Results

Overall, participants' smoking trajectories were associated with individual characteristics (age of substance use initiation, juvenile behavioral problems, academic attainment and grade retention). The only familial characteristic associated was parental tobacco use.

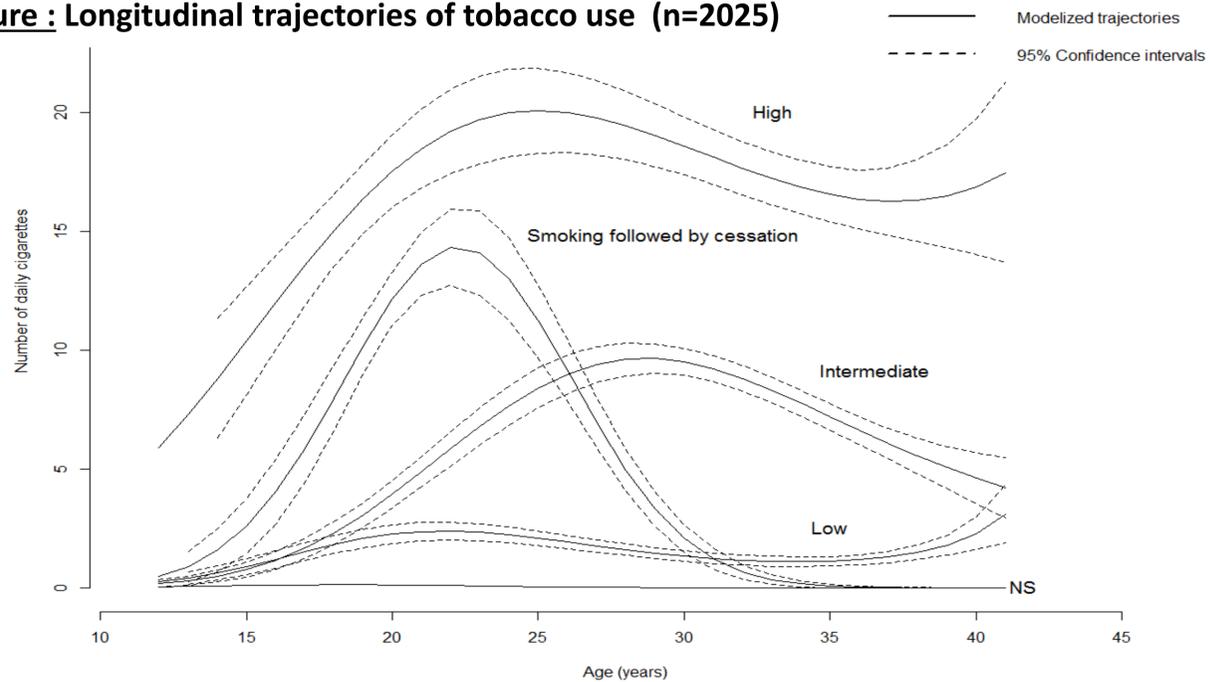**Figure : Longitudinal trajectories of tobacco use (n=2025)**

Table : Individual and familial factors associated with trajectories of tobacco use from adolescence to young adulthood: multivariate multinomial regression model (n=763)

	Low-level tobacco use n=218	Intermediate-level tobacco use n=301 OR (95% CI)	High-level tobacco use n=130 OR (95% CI)	Smoking followed by cessation n=114 OR (95% CI)
Age (in 2015)				
35-41 years	Ref.	0.88 (0.60-1.28)	1.46 (0.90-2.39)	0.66 (0.41-1.08)
22-34 years		1	1	1
Gender				
Men	Ref.	1.07 (0.74-1.55)	0.95 (0.60-1.51)	1.22 (0.76-1.97)
Women		1	1	1
Age of substance use initiation				
Early tobacco / Early cannabis		0.92 (0.54-1.56)	**2.29 (1.23-4.28)**	**2.99 (1.59-5.63)**
Early cannabis only	Ref.	0.85 (0.46-1.58)	1.22 (0.55-2.73)	1.68 (0.76-3.74)
Early tobacco only		0.97 (0.61-1.53)	1.67 (0.95-2.93)	**2.17 (1.19-3.96)**
Late tobacco / late cannabis		1	1	1
Juvenile behavioral problems				
Yes	Ref.	1.07 (0.66-1.72)	1.23 (0.69-2.18)	1.48 (0.83-2.64)
No		1	1	1
Academic attainment				
< High school degree		**4.03 (1.35-12.00)**	**5.29 (1.65-16.97)**	**4.09 (1.22-13.70)**
Vocational degree	Ref.	1.45 (0.81-2.61)	1.94 (0.99-3.80)	0.88 (0.38-2.01)
General or technological degree		1	1	1
Grade retention				
≥1 time	Ref.	**1.53 (1.05-2.22)**	**1.74 (1.07-2.85)**	0.94 (0.58-1.53)
Never		1	1	1
Parental tobacco smoking				
Persistent smoker		**1.74 (1.03-2.92)**	1.70 (0.91-3.18)	1.42 (0.73-2.76)
Former smoker	Ref.	1.24 (0.81-1.89)	0.86 (0.50-1.51)	0.99 (0.57-1.74)
Non-smoker		1	1	1

Conclusion

o Tobacco smoking trajectories from adolescence to adulthood are associated with early substance use initiation, parental smoking and academic difficulties. While early tobacco and cannabis initiation primarily predicts high smoking levels - which persist or not - academic difficulties are associated with lasting patterns of high-level smoking.
o This study highlights the emergence of social inequalities with regard to smoking early on in life, implying that their prevention should start in childhood and adolescence.