

BMJ Open Trends in age of tobacco use initiation over time in Bangladesh, India and Pakistan: analysis of cross-sectional nationally representative surveys

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ABSTRACT

Objective Tobacco use begins at an early age and typically leads to a long-term addiction. The age of initiation for tobacco use is not well studied in South Asia, where 22% of tobacco smokers and 81% of smokeless tobacco (SLT) users reside.

Methods Data from the nationally representative Global Adult Tobacco Surveys in India, Bangladesh and Pakistan were analysed to examine patterns of initiation among smokers and smokeless tobacco users.

Results Data on 94 651 individuals were analysed, of which 13 396 reported were ever daily smokers and 17 684 were ever SLT users. The proportion of individuals initiating tobacco use before the age of 15 years has increased over time. The rates of SLT initiation among those aged 15–24 years increased markedly in Bangladesh (by 7.8%) and Pakistan (by 37.7%) between 1983 and 1999–2000. Among males, the increase in SLT initiation was higher in individuals aged below 15 years compared with other age groups in India and Bangladesh. Smoking initiation among females aged below 15 years has also significantly increased in India over time. Compared with the initiation of tobacco smoking before the age of 15 years, a greater increase in the proportion of SLT users was observed in urban areas.

Conclusion Our findings indicate that the proportion of youth initiating tobacco (both smoking and smokeless) before the age of 15 years has increased over time in all three countries. Moreover, variations in age at initiation for different types of tobacco products across countries, and by rurality, were noticeable. Younger youths (aged up to 15 years) should therefore be a priority population for tobacco control interventions. Strategies such as raising the legal age of tobacco sale and use to 21 years, and, other measures under WHO Framework Convention on Tobacco Control (FCTC), may prevent underage use and avert lifelong addiction to tobacco products.

INTRODUCTION

Preventing tobacco initiation and promoting cessation require timely interventions to avoid preventable diseases, disabilities and its associated deaths. Tobacco use often begins in adolescence or young adulthood and has long-term detrimental health, social and

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This is the first comparative study on the age of initiation for smoking tobacco (ST) and smokeless tobacco (SLT) use in Bangladesh, India and Pakistan based on nationally representative datasets.
- ⇒ Findings showed that the proportion of tobacco use initiation before the age of 15 years has increased over time in all three countries. This increase was evident in both ST and SLT products.
- ⇒ The increase in the proportion of people who initiated SLT before the age of 15 years was higher in urban areas in all three countries. This signifies the importance of accelerating tobacco control efforts in urban areas among adolescents.
- ⇒ This study does not examine the trends in tobacco initiation by socioeconomic categories due to the limited sample size. The age of initiation may differ in specific population subgroups.

economic consequences.^{1–3} Effective prevention of tobacco use requires a better understanding of the patterns of tobacco initiation and its causes. Understanding these can inform the development of effective counterstrategies and allocation of resources that support tobacco deterrence in minors and youth and promote cessation among users. Monitoring of tobacco use patterns among youths is crucial as the risks of health effects posed by tobacco are highest among those who start early and continue its use until later into adulthood, leading to lifelong addiction.⁴ Understanding these dynamics can assist policymakers and identify priority populations for interventions.⁵

Studies have reported the prevalence of tobacco use,^{6,7} identified different subgroups with propensity to initiate tobacco use, namely smoking tobacco (ST) and smokeless tobacco (SLT) with respect to onset and patterns of use over time. Various forms of ST exist across the world, including, but not

limited to, cigarettes, cigars, pipes, *bidis*, etc.⁸ Whereas, the SLT, which is prevalent in the Indian subcontinent, includes many forms such as betel quid with tobacco, *gutkha*, *khaini*, etc.⁹ Studies conducted across developed as well as developing nations vary in terms of the populations, sample size, length of follow-up and constituted trajectories based on longitudinal as well as cross-sectional datasets.^{10–24} Many of these studies have also used study samples^{16 25 26} at the regional level; therefore, those estimates are not truly nationally representative and have limited generalisability.

Studies indicate that peer use,^{10 13} higher depressive symptoms^{13 22 23} and maternal smoking^{23 27} are associated with initiation at early adolescence. Other individual and community-level factors, in addition to factors such as tobacco advertising, taxation, etc., also influence initiation patterns.^{28 29} Most studies report a declining age of initiation, pointing towards an alarming global trend. Furthermore, initiation patterns of SLT use remain understudied in South Asia, which constitutes a disproportionately higher percentage of the global SLT use burden.^{1 13 17} India, Pakistan and Bangladesh have higher rates of ST and SLT use with lower mean age of initiation accounting 17.8 years, 18.7 years and 18.8 years, respectively.^{6 30}

The research questions that the present study examines are the following: (1) what is the trend of age at initiation of tobacco use in Bangladesh, India and Pakistan?, (2) how does the pattern of tobacco use initiation vary between ST and SLT?, and (3) how do the trends and patterns of tobacco use initiation vary between men and women, and between rural and urban areas, separately for ST and SLT? This is crucial as children and youths are vulnerable to ever-evolving marketing strategies of tobacco companies aimed at increasing and sustaining tobacco consumption.²⁹ In India, Bangladesh and Pakistan, the proportion of the youth who use tobacco is high, and these patterns point to a deeper concern of potentially increasing risk of non-communicable diseases and mortality in future. In accordance to the WHO Framework Convention on Tobacco Control (WHO-FCTC), this study offers a unique viewpoint, by identifying the priority populations, and advocates for the development of tailored policies and targeted interventions to prevent exposure and initiation of tobacco use.³¹ Such practices need to be customised to local sociocultural settings and adopted across all developing countries to prevent early initiation and reduce the lifespan of tobacco use among users who are recalcitrant to cessation.

METHODS

Study design

This study used data from the Global Adult Tobacco Survey (GATS) conducted in India, Pakistan and Bangladesh. As part of the Global Tobacco Surveillance System (GTSS), GATS was launched to obtain nationally representative data in low-income and middle-income

countries for tobacco use and associated behaviours, including initiation, in non-institutionalised individuals aged 15 years and older. GATS is considered to be the global standard for monitoring adult tobacco use and a standard protocol with respect to the questionnaire, sample size, data management and quality is applied in all participating countries.

A multistage, geographically clustered sampling survey, GATS has been conducted in two rounds in India, from 2009 to 2010³² and from 2016 to 2017.³³ It was conducted from 2014 to 2015 in Pakistan³⁴ and from 2017 to 2018 in Bangladesh.³⁵ In India, both rounds of GATS were carried out in all states and union territories (except one in GATS 2009–10). In Bangladesh, the survey captured information from all eight administrative units. In Pakistan, the survey was carried out in all urban and rural areas of Punjab, Sindh, Khyber Pakhtunkhwa and Baluchistan provinces. The sample size for India included 84 047 households with a response rate of 92.90% (n=74 037). Correspondingly, the sample size for Pakistan and Bangladesh was 9856 and 14 880 households with response rates of 81.0% (n=7831) and 90.8% (n=12 783), respectively. Further details on GATS can be found on <https://www.who.int/tobacco/surveillance/guide/en/>.

This study used an anonymised publicly available dataset and was therefore exempted from an institutional ethics review. We followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline for cross-sectional studies to guide our methodology and reporting.³⁶ The present study examined a combined sample of 94 651 participants who provided information on age at first use of ST or SLT. Using these data, cohort analysis of age at initiation of ST and SLT use was conducted over five decades among ever daily users. The missing information of age at initiation of tobacco use (both ST and SLT) was 6.2% (n=138) in Bangladesh, 7.5% (n=561) in India and 6.6% (n=76) in Pakistan. We excluded participants with missing information.

Measures

We assessed two categories of tobacco products—smoking tobacco (includes smoking of any tobacco product, such as manufactured cigarettes, hand-rolled cigarettes, *bidis*, cigar, cheroots, cigarillos, pipe-tobacco and others) and smokeless tobacco (includes any SLT product such as betel quid with tobacco/*zarda*, *zarda*, *zarda* with *supari*, *naswar*, *paan masala* with tobacco, *naas*, snuff, *mainpuri*, *khaini*/tobacco lime mixture, *gutkha*, areca nut-tobacco lime mixture, *mawa*, *mishri*, *gudakhru*, *gul* and others)—use for ever daily users, that is, individuals who currently use tobacco daily or former daily tobacco users. We defined initiation as first use of the product, for daily consumption, based on the following questions: (1) ‘How old were you when you first started smoking tobacco daily?’, (2) ‘How many years ago did you first start smoking tobacco daily?’, (3) ‘How old were you when you started using smokeless tobacco daily?’, (4) ‘How many years ago did you first start using smokeless tobacco daily?’ This definition of

Table 1 Respondents providing information on age of initiation of smoking and smokeless tobacco (SLT) use

	Bangladesh	India	Pakistan
Full sample	12 783	74 037	7831
Overall response rate	90.8%	92.9%	81.0%
Person-level response rate	93.8%	96.0%	91.2%
Smoking			
Ever daily smokers	2943	9472	981
Male	2862 (96.6%)	8448 (90.6%)	898 (91.8%)
Female	81 (3.4%)	1024 (9.4%)	83 (8.2%)
Urban	1416 (24.3%)	2479 (26%)	413 (32%)
Rural	1527 (75.7%)	6993 (74%)	568 (68.0%)
Smokeless tobacco (SLT) use			
Ever daily SLT users	3018	14 006	660
Male	1131 (38.3%)	8843 (70.1%)	509 (76.9%)
Female	1887 (61.7%)	5163 (29.9%)	151 (23.1%)
Urban	1342 (18.8%)	3294 (24.7%)	292 (34.9%)
Rural	1676 (81.2%)	10 712 (75.3%)	368 (65.1%)

Note: Weighted percentage is shown in the parentheses.

initiation covered users who were either only smokers or SLT users and dual users, where the event of initiation of ST or SLT have been considered as separate events. Age at tobacco initiation was divided into five categories: <15 years, 15–17 years, 18–19 years, 20–34 years and ≥35 years. The sample description is provided for ST and SLT use in [table 1](#). Demographic characteristics included sex (male/female) and residential status (urban/rural). Current age was divided into five categories from 15 to 24 to ≥55 in intervals of 10 years. These data were disaggregated and age of initiation across five decades was examined based on these indicators.

Data analysis

We assessed the distribution of reported age of initiation of first daily-use among ever daily smokers and SLT users by type of tobacco, namely, ST and SLT, estimating weighted proportions with 95% CIs. We also estimated the proportion of ever daily smokers and SLT users for different age of initiation across birth cohorts for each tobacco type by sex (male/female) and residential status (urban/rural).

In order to obtain birth cohorts, we generated a new variable, which was created by subtracting the age of participants from the survey year. For instance, the first birth cohort of Pakistan was obtained by subtracting the current age of 55 from the year to survey, 2014, to obtain the year 1959, indicating a cohort of individuals born before 1959. Similarly, the most recent cohort was from Bangladesh obtained by subtracting the current age of 15–24 from the survey year of 2017 to those individuals born between 1993 and 2002. We also calculated the difference in initiation between subsequent age cohorts. The data were weighted to provide national estimates

considering the survey design. All analyses were carried out using STATA V.14.³⁷

Patients and/or the participants were not involved in the development of research question, design, conduct, reporting or dissemination plans of this research as this study involves secondary analysis of the data collected in the GATS. The information collected in the GATS was used primarily for research where the personal identifiers were not disclosed and informed consent was obtained before the survey was carried out. The datasets used in this study are also available in the public domain from the Global Tobacco Surveillance System Data (<https://www.cdc.gov/tobacco/global/gtss/gtssdata/index.html>).

RESULTS

In a total sample of 94 651 adults aged 15 years and above from India, Bangladesh and Pakistan, 14.1% (13 396) and 18.7% (17 684) of individuals reported being daily smokers and daily SLT users ever, respectively, and provided information on age at initiation ([table 1](#)). Among these, 91.1% (12 208) were male smokers and 8.9% (1188) were reported to be females smokers. Furthermore, 59.3% (10 483) were male SLT users and 40.7% (7201) were female SLT users. Among the urban population, 32.2% (4308) were smokers and 27.9% (4928) were SLT users. The corresponding figures for rural population were 67.8% (9088) and 72.1% (12 756), respectively.

Initiation of tobacco smoking

[Figure 1](#) presents the distribution of the proportion of individuals who initiated smoking at different ages (including <15 years, 15–17 years, 18–19 years, 20–34 years and >34 years) across birth cohorts in Bangladesh,

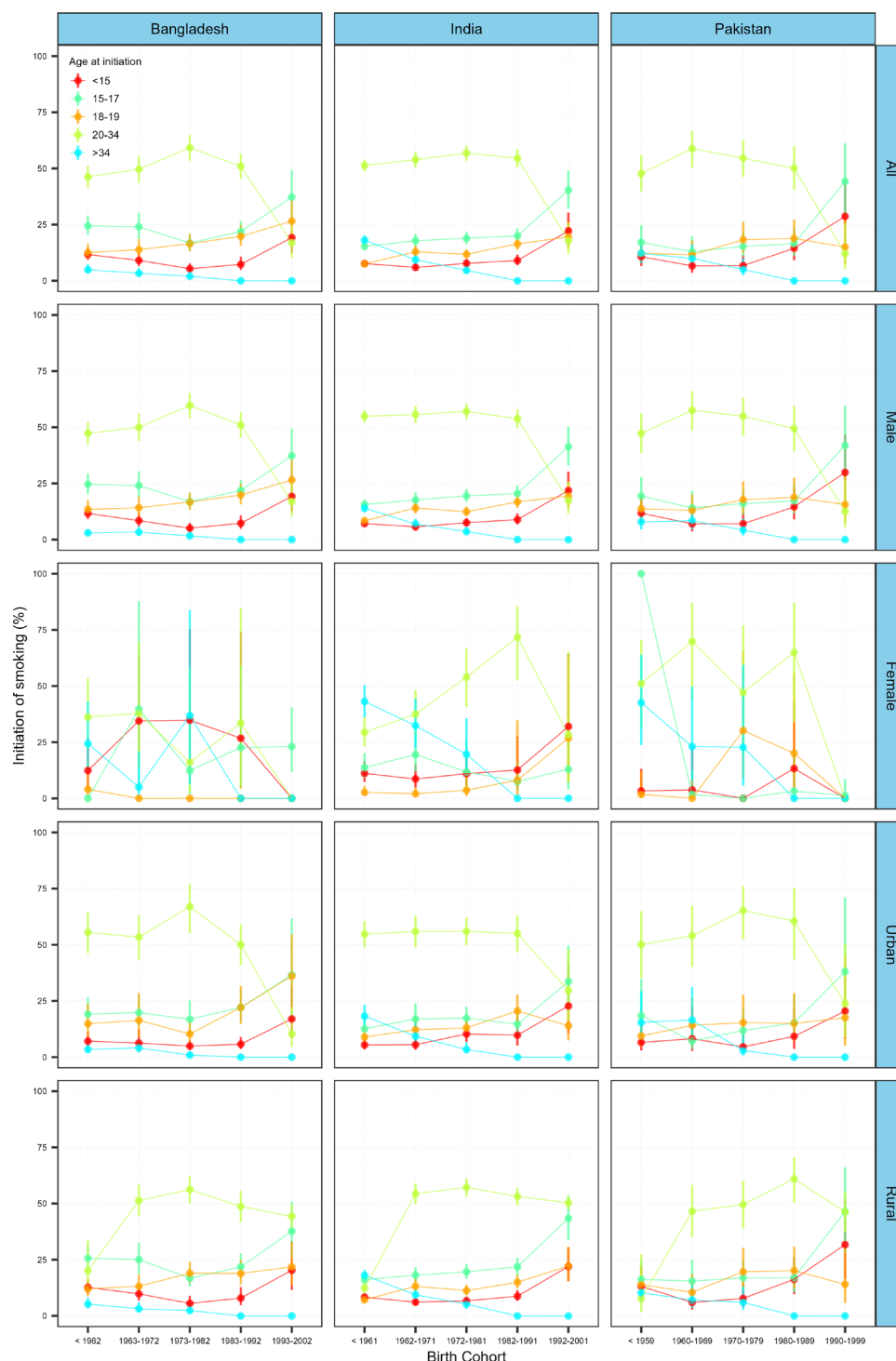


Figure 1 Initiation of smoking among population by sex and place of residence in India, Pakistan and Bangladesh.

India and Pakistan. Marked crude decline in the age of initiation is evident among ever daily smokers as the proportion of individuals initiating smoking before the age of 15 years is increasing with each progressive birth cohort across the three South Asian countries.

Nearly 28.7% (95% CI 16.4% to 45.2%) of individuals aged 15–24 years at the time of the survey, in Pakistan, 22.2% (15.8% to 30.3%) in India and 19.2% (12.3% to 28.8%) in Bangladesh initiated smoking before the age of 15 years. In Bangladesh and Pakistan, a slight decline

in the proportion of individuals initiating smoking before 15 years was observed among the earlier cohorts; however, there has been a gradual increase among the Indian population. For instance, in India, among those born between 1982 and 1991, about 20.0% (17.0% to 23.4%) initiated smoking during ages 15–17 years; however, among those born between 1992 and 2001, 40.3% (32.2% to 49.0%) initiated daily smoking before reaching adulthood. However, such change in the proportion was observed the sharpest in Pakistan, where between the birth cohort of

1980–89 (16.5% (11.1% to 23.8%)) and 1990–99 (44.2%, (28.5% to 61.2%)), there was an increase of 168% in the proportion of individuals who initiated smoking between the ages 15–17.

Among those individuals who initiated smoking in the ages of 20–34 years and ≥35 years (online supplemental table S1), there was a reduction in the relative change in initiation in all three countries. With each progressive cohort, a lesser proportion of individuals initiated smoking in the ages of 20–34 years and ≥35 years. This points to a rapid decline in the age of initiation of tobacco smoking, mostly initiated before adulthood or in early adolescence.

Initiation of tobacco smoking by sex

While an increase in the proportion of those who initiated smoking before the age of 15 years is apparent in all the three countries, the increase in proportion among males of recent birth cohorts in Bangladesh was higher compared with males of recent birth cohorts in India and Pakistan (online supplemental table S2). A relative increase of 164.7% was observed in the proportion of male individuals who initiated smoking before the age of 15 years in the 1983 to 1992 cohort (7.3%, (4.9% to 10.7%)) and 1993 to 2002 cohort (19.2% (12.3% to 28.8%)) in Bangladesh. Among Indian women who reported smoking, a prominent proportion of them initiated smoking before the age of 15 years (32% (11.0% to 64.2%)), whereas most Indian males initiated smoking between the ages of 15–17 years (41.3% (32.9% to 50.3%)).

Among earlier cohorts, the rates of initiation were higher even among those in the ages of 18–34 years and ≥35 years; however, a drastic decline was observed in the most recent cohorts across the three countries as most initiation occurred by the age of 18 years among both males and females.

Initiation of smoking by residential status

The trend of smoking initiation before the age of 18 years in urban and rural regions followed a similar pattern with an apparent increase in the latest cohort and a higher proportion of rural individuals engaged in early smoking initiation. Even though in the latest, 1992 to 2001 cohort, 43.4% (33.8 to 53.6) rural Indians initiated smoking between the ages 15–17 years, a higher relative increase of 129.3% in smoking initiation among urban Indians was observed from 14.7% (9.9% to 21.2%) in the 1982 to 1991 cohort to 33.6% (20.6% to 49.7%) in the 1992 to 2001 cohort (online supplemental table S3).

However, in Bangladesh and Pakistan, a reverse pattern was observed as most initiation of tobacco smoking was found to occur up to the age of 34 years and a higher relative increase in early initiation in lower ages among recent cohorts was found among rural households. A reverse U-shaped pattern was observed in rates of smoking initiation among rural households between the ages 20 and 34 years. Among earlier cohorts, such as those born before

1962, a lower proportion of initiation was observed in this age group, and it steadily increased among those born between 1963 and 1983 and then sharply declined among those in the recent cohorts, indicating earlier initiation.

Furthermore, a higher proportion of individuals from urban Bangladesh initiated smoking before the age of 35 years compared with urban populations from India and Pakistan and rural populations from all three countries.

Initiation of SLT use

Figure 2 illustrates the distribution of the proportion of individuals who initiated SLT use at different ages (including <15 years, 15–17 years, 18–19 years, 20–34 years and >34) across birth cohorts in Bangladesh, India and Pakistan. A clear distinction in the rates of initiation among the latest cohort is evident with higher proportion of SLT use initiation below the age of 18 years. While there is subsequent increase in rates of initiation by each decade of birth cohorts, most apparent in the recent cohort, initiation of SLT use was mainly dispersed across adolescence and adulthood. For instance, in the case of Pakistan, among those born between 1990 and 1999, 38.6% (95% CI 24.7% to 54.6%) initiated SLT use before reaching the age of 15 years, 33.4% (19.8% to 50.5%) initiated SLT use in the age range 15–17 years, followed by 12.8% (7.0% to 29.9%) initiating in the age range of 18–19 years (online supplemental table S4).

In contrast to Bangladesh, the proportion of SLT use initiation compared with smoking initiation at age below 15 years was considerably higher among the population of recent birth cohort in Pakistan. The proportional increase in initiating SLT use before the age of 15 years among population of recent two birth cohorts was three times higher compared with those initiating smoking below the age of 15 years in Pakistan, while it was half in the case of Bangladesh, and not of much difference in the Indian context.

Initiation of SLT use by sex

Among males, a higher relative increase in SLT use initiation before the age of 15 years has been observed in India and Bangladesh. For instance, between the male birth cohorts of 1983–1992 and 1993–2002 in Bangladesh who initiated SLT use before the age of 15 years, an increase of 118.9% was observed from 6.2% (2.6% to 14.1%) to 13.5% (3.4% to 41.0%), compared with an increase of 58.0% between the female birth cohorts of the same periods (online supplemental table S5). However, a tremendous increase in the proportion of recent female birth cohorts has been observed in Pakistan who initiated SLT use before age of 15 years, far more than that observed between recent male birth cohorts. In the Indian context, such gender disparities were not evident, although the proportion of females born between 1992 and 2001 who initiated SLT use (35.8% (27.6% to 45.0%)) before the age of 15 years was relatively high compared with their male counterparts (23.2% (18.7% to 28.4%)).

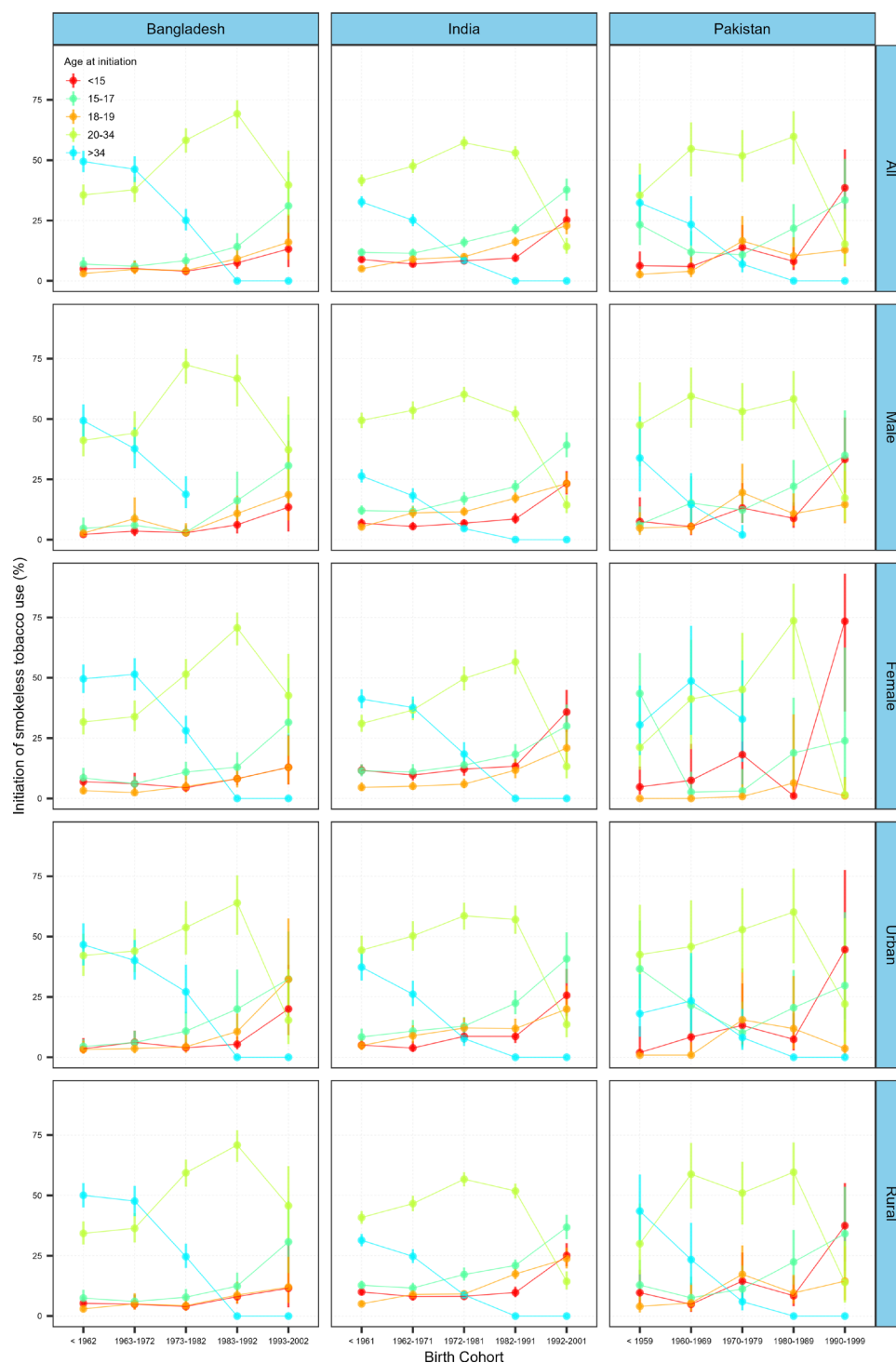


Figure 2 Initiation of smokeless tobacco use among population by sex and place of residence in India, Pakistan and Bangladesh.

There has been a sharp decline in the proportion of population who initiated SLT use in the ages 20–34 years and ≥ 35 years, between the recent birth cohorts of both males and females. For instance, the prevalence of females initiating SLT use at or after the age of 35 years in Bangladesh declined by 45.4% (from 51.5% (44.7% to 58.1%) to 28.1% (22.7% to 34.3%)) between the birth cohort 1963–1972 and 1973–1982, and it declined by

50.1% (from 37.7% (29.6% to 46.5%) to 18.8% (13.0% to 26.4%)) among their male counterparts.

Initiation of SLT use by residential status

SLT initiation among urban and rural populations in all three countries shows a comparable upward trend with respect to the proportion of individuals initiating SLT use before the age of 15 years (online supplemental table S6).

Among the recent cohorts, the rates of SLT use initiation before the age of 15 years have been consistently higher in both urban and rural areas across all three South Asian countries. Compared with the smoking initiation, higher increase in the proportion of population initiating SLT use before the age of 15 years among the recent birth cohorts was observed in urban Pakistan, Bangladesh and India. Similar trends were observed in rural India (25.1% (20.6% to 30.2%)) and Pakistan (37.5% (22.6% to 55.1%)) among the recent birth cohorts, where higher proportion of populations initiated SLT use before the age of 15 years compared with smoking. Majority of the population among the recent birth cohort was found initiating SLT use during the ages 15–17 years in both urban and rural India and during the ages 20–34 years in urban and rural Bangladesh.

A contrasting shift in the proportion of population initiating SLT use in the ages 18–19 years in a recent birth cohort was observed in urban Pakistan compared with the patterns observed in India and Bangladesh. The trend of SLT use initiation in the ages 18–19 years was upward between two recent birth cohorts in Bangladesh (10.6% to 32.3%) and India (11.9% to 20.0%), while a decline was observed in Pakistan (11.9% to 3.6%). However, the proportion of population born between 1980 and 1989 and between 1990 and 1999 who initiated smoking in the ages 18–19 years in urban Pakistan recorded a marginal increase of 17% (online supplemental table S3).

DISCUSSION

This study suggests that early age at initiation of tobacco use has increased in all three South Asian countries (Bangladesh, India and Pakistan) for both ST and SLT. Furthermore, the age at initiation of tobacco use has increased in both men and women and in urban and rural areas across all three South Asian countries. It is evident from the analyses that there was absence of gender disparity in the initiation of SLT use at early age (during adolescence and early adulthood, up to 19 years) among the recent birth cohorts across all three South Asian countries. In contrast, higher proportions of recent cohorts of males in Pakistan and Bangladesh reported initiating smoking during adolescence and early adulthood, compared with their female counterparts. Urban and rural areas

show similar trends in the proportion of population of recent birth cohorts initiating tobacco use during early adulthood in all three South Asian countries, with slightly higher proportion of SLT users initiating before the age of 15 years in urban Pakistan, and urban Bangladesh, compared with their rural counterparts. Our findings are consistent with recent patterns of tobacco use initiation as observed in longitudinal as well as cross-sectional studies across several countries, including countries in South East Asia.^{1 14 18 38 39}

This study presents that the initiation of SLT use among recent female cohorts was dispersed across ages up to mid-adulthood, especially in Bangladesh and India. We speculate that this behaviour could be due to increased exposure to various forms of tobacco products, their easy accessibility, affordability and surrogate advertisements besides stress and demand from various roles and responsibilities shouldered by women in early and middle adulthood such as child-rearing, farm labour and familial responsibilities.^{40 41} Women may also initiate SLT use during pregnancy due to myths associated with the falsely ascribed positive health effects of SLT products,⁴² such as relief from constipation. On the other hand, tobacco companies often market these substances as a ‘torch of freedom’ and as a symbol of an emancipated and a progressive woman.^{43 44} Women often opt for SLT products as SLT enjoys a social sanction due to its ritualistic importance and perception of it being less harmful than smoking, especially in South East Asia.⁴⁵ It is especially crucial to understand tobacco use among women as it invariably affects the coming generations and may lead to morbidities and mortalities as maternal smoking has been identified as a significant predictor of tobacco use in the child.¹⁰ To bolster the efforts towards tobacco control, including declarations by political leaders such as Mrs. Sheikh Hasina Prime Minister of Bangladesh towards achieving a tobacco-free Bangladesh by the year 2040, an in-depth understanding of factors associated with tobacco use initiation is essential.⁴⁶ Our findings suggest that youth aged below 15 years and between the ages 15 and 17 years, especially females, in addition to individuals from urban households are a priority population for tobacco prevention interventions. Delaying the age of initiation is crucial to prevent long-term tobacco addiction, as

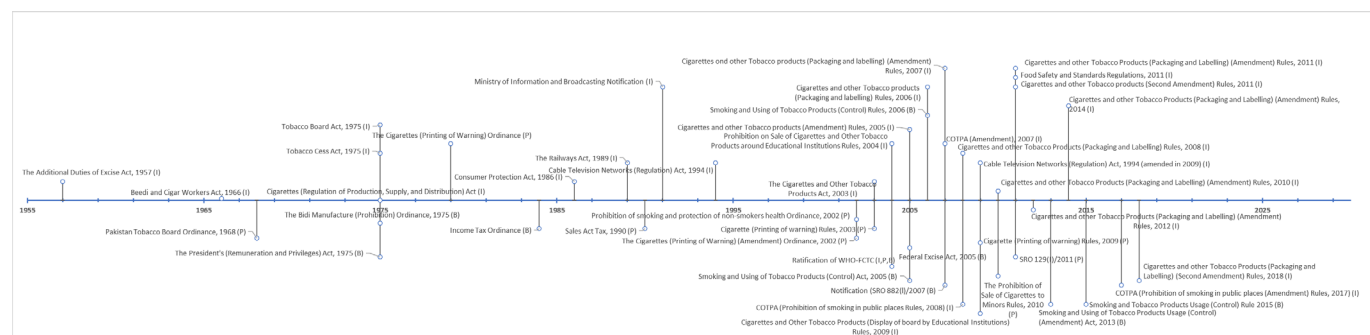


Figure 3 Policy progress in tobacco control in Bangladesh, India and Pakistan.

exposure during adolescence and childhood may potentially lead to a lifetime of persistent tobacco use.

A timeline of major tobacco control legislation in India, Pakistan and Bangladesh is illustrated in figure 3. Until 1947, common regulations were there in all three countries before the creation of independent nations. The earliest legislation in all three countries viewed tobacco as a viable source of revenue from taxes and exports and instituted laws on excise duties and conditions of employment and encouraged tobacco cultivation with limited regulation and control.^{47–55} Early tobacco control efforts, however, focused primarily on tobacco products (*bidi* in Bangladesh,⁵⁶ cigarettes and *zarda* in India⁵⁷ and cigarettes and *bidi* in Pakistan).⁵⁸ Bangladesh banned the manufacture of *bidi* and trade of *tendu* leaves used for making bidis in 1976, eliminating the single largest smoking product then in the country. India ushered text warnings for cigarettes and *zarda* in 1975. Several attempts were undertaken in India including the strengthening of consumer rights' and instituting legislation on mandatory display of quality, content and manner of use of any product in 1986,⁵⁹ the banning of smoking or spitting in public vehicles in 1988 and 1989^{60 61} and regulating the depiction and display of tobacco products in media, including advertisements in 1991 and 1994.^{62 63} In 2003, the Indian Parliament passed a landmark bill, namely 'Cigarettes and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply and Distribution) Bill', which formed the foundation for all future tobacco control actions. Pakistan also developed strategies on tobacco control by printing Health Warning Labels (HWLs) and advertisements in the early 2000s.^{64 65}

In 2004, India, Bangladesh and Pakistan ratified the WHO-FCTC, a global tobacco control instrument of primary importance as it provides strategies and measures for reduction in tobacco demand and supply and enables effective tobacco control.⁶⁶ As signatories to the WHO-FCTC, these countries have undertaken significant steps towards tobacco control, especially for SLT by using existing laws and norms to implement bans, such as the Food Safety and Standards (Prohibition and Restrictions on Sales) Regulations in India,⁶⁷ and by devising various subnational policies and taxation laws to undertake robust tobacco control.^{66 68–76}

Until the beginning of the 21st century, tobacco control policies were limited and did not enforce restrictions on sale to and by minors. The recent age cohorts have also witnessed marketing strategies aimed at glamourising tobacco use due to globalisation and increased internet usage. Moreover, the environment of widespread direct and indirect advertising of tobacco products and other violations of tobacco control laws^{77 78} appears to contribute to early initiation of tobacco use among adolescents and young adults in the region. However, an important facet of tobacco use is its social and cultural impact, which remains largely amiss from policy discourse. The social context built by tobacco use where an individual may be

exposed to use during their formative years via parental consumption and the influence of their peers may affect their sensitivity towards initiation. Policies must focus on addressing familial and societal tobacco use when nudging an individual towards cessation.

It is pertinent to understand the history of substance use and that of the users, in which case the social and cultural characteristics of a substance need to be understood in addition to the societal position of an individual.⁷⁹

Our findings reinforce the importance of robust and comprehensive laws and frameworks to reduce and regulate tobacco availability, affordability, advertisement and marketing, in addition to strengthening high-impact youth-centric tobacco education campaigns.

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Patient consent for publication Not applicable.

Ethics approval All rounds of Global Adult Tobacco Survey obtained ethical clearance from their respective implementation agencies in all three countries. No ethics clearance was required for this study, as we performed a secondary data analysis using publicly available data.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Dataset used for the countries under study are available in public domain. They can be accessed from the Global Tobacco Surveillance System Data (<https://www.cdc.gov/tobacco/global/gtss/gtssdata/index.html>).

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Trends in age of tobacco use initiation over time in Bangladesh, India, and Pakistan: analysis of cross-sectional nationally representative surveys

Supplementary Tables

Table No.	Title	Page
Table S1	Initiation of smoking among overall population across different birth cohorts at different ages in Bangladesh, India, and Pakistan	2
Table S2	Initiation of smoking among male and female populations across different birth cohorts at different ages in Bangladesh, India, and Pakistan	3-4
Table S3	Initiation of smoking among urban and rural populations across different birth cohorts at different ages in Bangladesh, India, and Pakistan	5-6
Table S4	Initiation of smokeless tobacco use among overall population across different birth cohorts at different ages in Bangladesh, India, and Pakistan	7
Table S5	Initiation of smokeless tobacco use among male and female populations across different birth cohorts at different ages in Bangladesh, India, and Pakistan	8-9
Table S6	Initiation of smokeless tobacco use among urban and rural populations across different birth cohorts at different ages in Bangladesh, India, and Pakistan	10-11

Table S1. Initiation of smoking among overall population across different birth cohorts at different ages in Bangladesh, India, and Pakistan

Age at initiation	Bangladesh			India			Pakistan		
	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)
<15	Before 1962	11.7	(9.2, 14.7)	Before 1961	7.7	(6.4, 9.2)	Before 1959	10.7	(6.6, 16.9)
<15	1963-1972	9.1	(6.5, 12.5)	1962-1971	6.0	(4.7, 7.6)	1960-1969	6.7	(3.5, 12.1)
<15	1973-1982	5.4	(3.7, 7.8)	1972-1981	7.8	(6.2, 9.7)	1970-1979	6.8	(3.8, 11.7)
<15	1983-1992	7.3	(4.9, 10.8)	1982-1991	9.0	(7.0, 11.7)	1980-1989	14.5	(9.1, 22.3)
<15	1993-2002	19.2	(12.3, 28.8)	1992-2001	22.2	(15.8, 30.3)	1990-1999	28.7	(16.4, 45.2)
15-17	Before 1962	24.5	(20.5, 29.0)	Before 1961	15.3	(13.5, 17.4)	Before 1959	17.1	(11.5, 24.7)
15-17	1963-1972	24.0	(18.8, 30.2)	1962-1971	17.8	(15.1, 20.9)	1960-1969	12.9	(8.2, 19.8)
15-17	1973-1982	16.8	(13.4, 20.8)	1972-1981	18.9	(16.4, 21.8)	1970-1979	15.3	(10.8, 21.4)
15-17	1983-1992	21.9	(17.8, 26.7)	1982-1991	20.0	(17.0, 23.4)	1980-1989	16.5	(11.1, 23.8)
15-17	1993-2002	37.3	(26.7, 49.4)	1992-2001	40.3	(32.2, 49.0)	1990-1999	44.2	(28.5, 61.2)
18-19	Before 1962	12.6	(9.6, 16.4)	Before 1961	7.6	(6.3, 9.0)	Before 1959	12.2	(8.2, 17.8)
18-19	1963-1972	13.9	(10.2, 18.6)	1962-1971	12.9	(10.6, 15.7)	1960-1969	11.6	(7.3, 18.0)
18-19	1973-1982	16.5	(13.1, 20.7)	1972-1981	11.8	(9.9, 13.9)	1970-1979	18.3	(12.3, 26.3)
18-19	1983-1992	19.8	(15.6, 24.8)	1982-1991	16.4	(13.8, 19.5)	1980-1989	18.9	(12.6, 27.3)
18-19	1993-2002	26.5	(19.0, 35.8)	1992-2001	19.6	(14.3, 26.2)	1990-1999	15.0	(7.3, 28.3)
20-34	Before 1962	46.3	(41.5, 51.2)	Before 1961	51.4	(48.7, 54.0)	Before 1959	47.7	(39.8, 55.8)
20-34	1963-1972	49.7	(43.7, 55.6)	1962-1971	53.9	(50.4, 57.4)	1960-1969	58.9	(50.4, 66.9)
20-34	1973-1982	59.3	(53.5, 64.8)	1972-1981	56.9	(53.5, 60.2)	1970-1979	54.6	(46.2, 62.7)
20-34	1983-1992	51.0	(45.3, 56.6)	1982-1991	54.5	(50.5, 58.5)	1980-1989	50.1	(40.4, 59.9)
20-34	1993-2002	16.9	(10.2, 26.8)	1992-2001	17.9	(12.1, 25.7)	1990-1999	12.1	(5.2, 25.5)
≥35	Before 1962	4.9	(3.3, 7.4)	Before 1961	18.1	(16.1, 20.3)	Before 1959	12.2	(7.9, 18.4)
≥35	1963-1972	3.4	(1.9, 5.8)	1962-1971	9.4	(7.4, 11.8)	1960-1969	10.0	(6.0, 16.1)
≥35	1973-1982	2.0	(0.9, 4.3)	1972-1981	4.7	(3.1, 6.9)	1970-1979	5.1	(2.5, 10.0)
≥35	1983-1992	0.0	(0, 0)	1982-1991	0.0	(0, 0)	1980-1989	0.0	(0, 0)
≥35	1993-2002	0.0	(0, 0)	1992-2001	0.0	(0, 0)	1990-1999	0.0	(0, 0)

Table S2. Initiation of smoking among male and female populations across different birth cohorts at different ages in Bangladesh, India, and Pakistan

Age at initiation	Bangladesh			India			Pakistan		
	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)
Male									
<15	Before 1962	11.6	(9.1, 14.8)	Before 1961	7.1	(5.9, 8.7)	Before 1959	11.8	(7.1, 18.8)
<15	1963-1972	8.4	(5.9, 11.9)	1962-1971	5.7	(4.3, 7.4)	1960-1969	7.0	(3.6, 13.1)
<15	1973-1982	5.1	(3.4, 7.5)	1972-1981	7.5	(5.9, 9.6)	1970-1979	7.1	(4.0, 12.2)
<15	1983-1992	7.3	(4.9, 10.7)	1982-1991	8.9	(6.8, 11.6)	1980-1989	14.6	(9.0, 22.7)
<15	1993-2002	19.2	(12.3, 28.8)	1992-2001	21.9	(15.3, 30.2)	1990-1999	29.9	(17.1, 46.8)
15-17	Before 1962	24.6	(20.4, 29.4)	Before 1961	15.6	(13.6, 17.8)	Before 1959	19.4	(13.1, 27.8)
15-17	1963-1972	24.1	(18.7, 30.4)	1962-1971	17.7	(14.8, 20.9)	1960-1969	14.1	(8.9, 21.7)
15-17	1973-1982	16.9	(13.5, 20.9)	1972-1981	19.5	(16.8, 22.5)	1970-1979	16.0	(11.3, 22.4)
15-17	1983-1992	21.9	(17.7, 26.7)	1982-1991	20.5	(17.4, 24.0)	1980-1989	17.2	(11.6, 24.8)
15-17	1993-2002	37.3	(26.7, 49.4)	1992-2001	41.3	(32.9, 50.3)	1990-1999	41.9	(26.1, 59.6)
18-19	Before 1962	13.4	(10.2, 17.5)	Before 1961	8.4	(7.0, 10.0)	Before 1959	13.7	(9.2, 20.0)
18-19	1963-1972	14.2	(10.4, 19.1)	1962-1971	14.1	(11.6, 17.1)	1960-1969	13.0	(8.2, 20.1)
18-19	1973-1982	16.7	(13.2, 20.9)	1972-1981	12.4	(10.4, 14.7)	1970-1979	17.7	(11.7, 26.0)
18-19	1983-1992	19.8	(15.6, 24.8)	1982-1991	16.8	(14.1, 19.9)	1980-1989	18.8	(12.4, 27.6)
18-19	1993-2002	26.5	(19.0, 35.8)	1992-2001	19.3	(13.9, 26.1)	1990-1999	15.6	(7.6, 29.3)
20-34	Before 1962	47.3	(42.3, 52.4)	Before 1961	54.9	(52.1, 57.7)	Before 1959	47.3	(38.6, 56.1)
20-34	1963-1972	50.0	(43.9, 56.0)	1962-1971	55.6	(51.9, 59.3)	1960-1969	57.5	(48.5, 66.1)
20-34	1973-1982	59.7	(53.9, 65.3)	1972-1981	57.1	(53.6, 60.5)	1970-1979	54.9	(46.3, 63.2)
20-34	1983-1992	51.0	(45.3, 56.7)	1982-1991	53.8	(49.7, 57.9)	1980-1989	49.4	(39.3, 59.6)
20-34	1993-2002	16.9	(10.2, 26.8)	1992-2001	17.5	(11.6, 25.5)	1990-1999	12.6	(5.4, 26.5)
≥35	Before 1962	3.0	(1.9, 4.6)	Before 1961	14.0	(12.1, 16.2)	Before 1959	7.9	(4.5, 13.5)
≥35	1963-1972	3.3	(1.9, 5.9)	1962-1971	7.0	(5.2, 9.2)	1960-1969	8.4	(4.6, 14.8)
≥35	1973-1982	1.6	(0.7, 3.8)	1972-1981	3.6	(2.2, 5.7)	1970-1979	4.2	(1.9, 9.3)
≥35	1983-1992	0.0	(0, 0)	1982-1991	0.0	(0, 0)	1980-1989	0.0	(0, 0)
≥35	1993-2002	0.0	(0, 0)	1992-2001	0.0	(0, 0)	1990-1999	0.0	(0, 0)

Age at initiation	Bangladesh			India			Pakistan		
	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)
Female									
<15	Before 1962	12.4	(5.1, 27.0)	Before 1961	11.1	(7.3, 16.5)	Before 1959	3.3	(0.8, 13.1)
<15	1963-1972	34.4	(13.5, 63.8)	1962-1971	8.6	(4.8, 15.1)	1960-1969	3.8	(0.5, 23.8)
<15	1973-1982	34.8	(8.6, 75.3)	1972-1981	11.0	(5.8, 20.0)	1970-1979	0.0	(0, 0)
<15	1983-1992	26.8	(4.5, 74.0)	1982-1991	12.6	(5.2, 27.6)	1980-1989	13.3	(3.0, 43.0)
<15	1993-2002	0.0	(0, 0)	1992-2001	32.0	(11.0, 64.2)	1990-1999	0.0	(0, 0)
15-17	Before 1962	0.0	(0, 0)	Before 1961	13.7	(9.1, 20.1)	Before 1959	-	-
15-17	1963-1972	39.7	(5.7, 87.7)	1962-1971	19.5	(12.0, 30.0)	1960-1969	1.7	(0.2, 12.7)
15-17	1973-1982	12.4	(1.5, 57.1)	1972-1981	11.8	(5.0, 25.6)	1970-1979	0.0	(0, 0)
15-17	1983-1992	22.7	(5.6, 59.2)	1982-1991	7.5	(3.4, 15.8)	1980-1989	3.3	(0.4, 21.2)
15-17	1993-2002	23.1	(11.7, 40.5)	1992-2001	12.9	(4.0, 34.8)	1990-1999	1.2	(0.2, 8.6)
18-19	Before 1962	4.0	(0.8, 17.6)	Before 1961	2.7	(1.3, 5.6)	Before 1959	1.8	(0.2, 12.3)
18-19	1963-1972	0.0	(0, 0)	1962-1971	2.1	(0.9, 4.9)	1960-1969	0.0	(0, 0)
18-19	1973-1982	0.0	(0, 0)	1972-1981	3.6	(1.2, 10.9)	1970-1979	30.2	(8.9, 65.7)
18-19	1983-1992	0.0	(0, 0)	1982-1991	8.1	(1.4, 34.8)	1980-1989	20.1	(4.8, 55.7)
18-19	1993-2002	0.0	(0, 0)	1992-2001	26.9	(7.3, 63.0)	1990-1999	0.0	(0, 0)
20-34	Before 1962	36.2	(22.0, 53.3)	Before 1961	29.4	(23.2, 36.5)	Before 1959	51.1	(31.3, 70.6)
20-34	1963-1972	37.9	(14.0, 69.7)	1962-1971	37.5	(27.9, 48.2)	1960-1969	69.9	(44.1, 87.2)
20-34	1973-1982	16.0	(2.5, 58.3)	1972-1981	54.0	(40.7, 66.7)	1970-1979	47.1	(19.1, 77.0)
20-34	1983-1992	33.5	(4.3, 84.9)	1982-1991	71.8	(52.5, 85.4)	1980-1989	64.9	(33.9, 87.0)
20-34	1993-2002	0.0	(0, 0)	1992-2001	28.2	(7.6, 65.3)	1990-1999	0.0	(0, 0)
≥35	Before 1962	24.4	(12.0, 43.2)	Before 1961	43.1	(36.1, 50.4)	Before 1959	42.6	(23.8, 63.9)
≥35	1963-1972	5.0	(1.0, 20.9)	1962-1971	32.4	(22.3, 44.4)	1960-1969	23.1	(8.3, 49.8)
≥35	1973-1982	36.8	(6.1, 83.9)	1972-1981	19.6	(9.8, 35.6)	1970-1979	22.7	(5.6, 59.4)
≥35	1983-1992	0.0	(0, 0)	1982-1991	0.0	(0, 0)	1980-1989	0.0	(0, 0)
≥35	1993-2002	0.0	(0, 0)	1992-2001	0.0	(0, 0)	1990-1999	0.0	(0, 0)

Table S3. Initiation of smoking among urban and rural populations across different birth cohorts at different ages in Bangladesh, India, and Pakistan

Age at initiation	Bangladesh			India			Pakistan		
	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)
Urban									
<15	Before 1962	7.1	(4.5, 11.1)	Before 1961	5.5	(3.4, 8.6)	Before 1959	6.6	(3.0, 13.7)
<15	1963-1972	6.3	(3.1, 12.4)	1962-1971	5.5	(3.3, 9.2)	1960-1969	8.2	(2.7, 22.1)
<15	1973-1982	4.9	(3.1, 7.8)	1972-1981	10.3	(6.8, 15.3)	1970-1979	4.6	(1.8, 11.1)
<15	1983-1992	5.8	(3.7, 9.0)	1982-1991	9.8	(5.2, 17.6)	1980-1989	9.3	(3.7, 21.3)
<15	1993-2002	17.0	(8.5, 31.2)	1992-2001	22.8	(10.6, 42.3)	1990-1999	20.5	(8.4, 42.2)
15-17	Before 1962	19.1	(13.3, 26.7)	Before 1961	12.6	(9.1, 17.2)	Before 1959	18.5	(8.8, 34.8)
15-17	1963-1972	19.8	(14.1, 27.2)	1962-1971	17.0	(11.7, 23.9)	1960-1969	7.2	(3.6, 13.8)
15-17	1973-1982	16.9	(10.9, 25.2)	1972-1981	17.3	(13.2, 22.5)	1970-1979	11.9	(6.1, 21.8)
15-17	1983-1992	22.1	(15.7, 30.2)	1982-1991	14.7	(9.9, 21.2)	1980-1989	15.2	(7.7, 27.7)
15-17	1993-2002	36.6	(17.0, 61.8)	1992-2001	33.6	(20.6, 49.7)	1990-1999	38.1	(13.3, 71.1)
18-19	Before 1962	14.9	(8.9, 23.7)	Before 1961	8.9	(6.0, 13.1)	Before 1959	9.4	(4.6, 18.4)
18-19	1963-1972	16.4	(8.7, 28.6)	1962-1971	12.2	(8.3, 17.5)	1960-1969	14.2	(7.0, 26.5)
18-19	1973-1982	10.3	(6.4, 16.3)	1972-1981	13.0	(9.7, 17.3)	1970-1979	15.4	(7.9, 27.8)
18-19	1983-1992	22.1	(14.8, 31.7)	1982-1991	20.5	(14.7, 28)	1980-1989	15.0	(7.2, 28.6)
18-19	1993-2002	36.1	(20.9, 54.7)	1992-2001	14.0	(7.4, 24.8)	1990-1999	17.5	(5.2, 45.5)
20-34	Before 1962	55.5	(46.3, 64.4)	Before 1961	54.8	(48.8, 60.6)	Before 1959	50.1	(35.2, 65.0)
20-34	1963-1972	53.4	(43.4, 63.2)	1962-1971	56.0	(48.9, 62.8)	1960-1969	54.0	(40.2, 67.3)
20-34	1973-1982	67.0	(55.1, 77.0)	1972-1981	56.0	(49.8, 62.0)	1970-1979	65.3	(52.5, 76.2)
20-34	1983-1992	50.1	(41.1, 59.1)	1982-1991	55.0	(46.7, 63.1)	1980-1989	60.6	(43.5, 75.3)
20-34	1993-2002	10.3	(4.5, 22.2)	1992-2001	29.6	(16.2, 47.8)	1990-1999	23.9	(8.8, 50.5)
≥35	Before 1962	3.4	(1.7, 6.6)	Before 1961	18.2	(14.1, 23.4)	Before 1959	15.5	(7.5, 29.3)
≥35	1963-1972	4.1	(2.1, 8.0)	1962-1971	9.3	(5.5, 15.5)	1960-1969	16.5	(7.9, 31.2)
≥35	1973-1982	0.9	(0.3, 2.7)	1972-1981	3.4	(1.7, 6.6)	1970-1979	2.9	(0.8, 10.8)
≥35	1983-1992	0.0	(0, 0)	1982-1991	0.0	(0, 0)	1980-1989	0.0	(0, 0)
≥35	1993-2002	0.0	(0, 0)	1992-2001	0.0	(0, 0)	1990-1999	0.0	(0, 0)

Age at initiation	Bangladesh			India			Pakistan		
	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)
Rural									
<15	Before 1962	12.7	(9.8, 16.3)	Before 1961	8.3	(6.9, 10.1)	Before 1959	13.2	(7.4, 22.4)
<15	1963-1972	9.8	(6.8, 14.0)	1962-1971	6.1	(4.6, 8.1)	1960-1969	6.0	(2.8, 12.4)
<15	1973-1982	5.6	(3.4, 8.9)	1972-1981	6.7	(5.1, 8.7)	1970-1979	7.8	(3.9, 14.8)
<15	1983-1992	7.9	(4.8, 12.8)	1982-1991	8.8	(6.7, 11.5)	1980-1989	16.3	(9.6, 26.2)
<15	1993-2002	20.3	(11.6, 33.3)	1992-2001	22.0	(15.4, 30.4)	1990-1999	31.7	(16.4, 52.4)
15-17	Before 1962	25.7	(21.0, 31.0)	Before 1961	16.1	(14.0, 18.4)	Before 1959	16.3	(10.4, 24.6)
15-17	1963-1972	25.1	(18.8, 32.6)	1962-1971	18.1	(15.1, 21.6)	1960-1969	15.5	(9.1, 25.1)
15-17	1973-1982	16.8	(12.9, 21.6)	1972-1981	19.6	(16.5, 23.2)	1970-1979	16.9	(11.1, 25.0)
15-17	1983-1992	21.8	(16.8, 27.9)	1982-1991	21.9	(18.3, 25.9)	1980-1989	17.0	(10.5, 26.2)
15-17	1993-2002	37.7	(26.1, 50.9)	1992-2001	43.4	(33.8, 53.6)	1990-1999	46.5	(27.9, 66.1)
18-19	Before 1962	12.1	(8.7, 16.4)	Before 1961	7.2	(5.9, 8.6)	Before 1959	13.9	(8.7, 21.6)
18-19	1963-1972	13.2	(9.2, 18.6)	1962-1971	13.2	(10.5, 16.5)	1960-1969	10.5	(5.6, 18.7)
18-19	1973-1982	19.0	(14.7, 24.1)	1972-1981	11.3	(9.1, 13.8)	1970-1979	19.7	(12.1, 30.3)
18-19	1983-1992	18.9	(14.0, 24.9)	1982-1991	15.0	(12.2, 18.3)	1980-1989	20.2	(12.6, 30.8)
18-19	1993-2002	21.9	(13.8, 32.8)	1992-2001	22.2	(15.5, 30.8)	1990-1999	14.0	(5.7, 30.6)
20-34	Before 1962	20.1	(11.2, 33.6)	Before 1961	12.4	(7.7, 19.4)	Before 1959	7.7	(1.8, 27.5)
20-34	1963-1972	51.4	(44.3, 58.3)	1962-1971	54.4	(49.7, 58.9)	1960-1969	46.6	(35.2, 58.3)
20-34	1973-1982	56.2	(50.0, 62.2)	1972-1981	57.2	(53.1, 61.2)	1970-1979	49.6	(39.0, 60.2)
20-34	1983-1992	48.7	(41.8, 55.7)	1982-1991	53.2	(49.1, 57.2)	1980-1989	61.0	(50.4, 70.6)
20-34	1993-2002	44.3	(38.8, 49.9)	1992-2001	50.4	(47.4, 53.3)	1990-1999	46.3	(37.5, 55.4)
≥35	Before 1962	5.3	(3.3, 8.2)	Before 1961	18.0	(15.8, 20.5)	Before 1959	10.3	(6.1, 16.7)
≥35	1963-1972	3.2	(1.6, 6.3)	1962-1971	9.4	(7.2, 12.1)	1960-1969	7.1	(3.5, 13.7)
≥35	1973-1982	2.4	(1.0, 5.8)	1972-1981	5.2	(3.3, 8.3)	1970-1979	6.1	(2.7, 13.1)
≥35	1983-1992	0.0	(0, 0)	1982-1991	0.0	(0, 0)	1980-1989	0.0	(0, 0)
≥35	1993-2002	0.0	(0, 0)	1992-2001	0.0	(0, 0)	1990-1999	0.0	(0, 0)

Table S4. Initiation of smokeless tobacco use among overall population across different birth cohorts at different ages in Bangladesh, India, and Pakistan

Age at initiation	Bangladesh			India			Pakistan		
	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)
<15	Before 1962	5.0	(3.5, 7.0)	Before 1961	8.9	(7.6, 10.3)	Before 1959	6.3	(3.1, 12.2)
<15	1963-1972	5.1	(3.2, 8.3)	1962-1971	7.0	(5.7, 8.5)	1960-1969	6.0	(2.7, 12.9)
<15	1973-1982	4.0	(2.7, 5.7)	1972-1981	8.3	(7.0, 9.8)	1970-1979	13.9	(8.0, 23.1)
<15	1983-1992	7.4	(5.1, 10.8)	1982-1991	9.5	(7.8, 11.5)	1980-1989	8.1	(4.5, 14.0)
<15	1993-2002	13.2	(5.7, 27.6)	1992-2001	25.2	(21.2, 29.8)	1990-1999	38.6	(24.7, 54.6)
15-17	Before 1962	7.0	(4.9, 9.8)	Before 1961	11.8	(10.3, 13.5)	Before 1959	23.3	(14.8, 34.6)
15-17	1963-1972	6.1	(4.3, 8.5)	1962-1971	11.4	(9.7, 13.4)	1960-1969	11.9	(6.6, 20.6)
15-17	1973-1982	8.4	(6.1, 11.4)	1972-1981	16.0	(13.9, 18.3)	1970-1979	10.8	(6.3, 17.9)
15-17	1983-1992	14.2	(10.0, 19.8)	1982-1991	21.3	(19.2, 23.6)	1980-1989	21.8	(14.3, 31.8)
15-17	1993-2002	31.1	(19.9, 45.0)	1992-2001	37.7	(33.2, 42.4)	1990-1999	33.4	(19.8, 50.5)
18-19	Before 1962	3.0	(1.9, 4.8)	Before 1961	5.0	(4.0, 6.2)	Before 1959	2.6	(1.1, 6.1)
18-19	1963-1972	4.8	(2.7, 8.3)	1962-1971	8.9	(7.4, 10.7)	1960-1969	4.0	(1.6, 9.7)
18-19	1973-1982	4.3	(2.4, 7.6)	1972-1981	10.0	(8.6, 11.6)	1970-1979	16.5	(9.6, 26.9)
18-19	1983-1992	9.1	(6.1, 13.5)	1982-1991	16.2	(14.3, 18.2)	1980-1989	10.3	(5.7, 18.0)
18-19	1993-2002	16.0	(8.8, 27.4)	1992-2001	22.9	(19.3, 27.0)	1990-1999	12.8	(6.0, 25.1)
20-34	Before 1962	35.6	(31.4, 40.0)	Before 1961	41.6	(39.2, 44.1)	Before 1959	35.5	(24.2, 48.7)
20-34	1963-1972	37.8	(32.7, 43.2)	1962-1971	47.6	(44.7, 50.5)	1960-1969	54.7	(43.3, 65.7)
20-34	1973-1982	58.3	(53.2, 63.2)	1972-1981	57.3	(54.6, 59.9)	1970-1979	51.8	(41.0, 62.5)
20-34	1983-1992	69.3	(63.1, 74.8)	1982-1991	53.1	(50.3, 55.8)	1980-1989	59.8	(48.3, 70.3)
20-34	1993-2002	39.7	(27.0, 54.0)	1992-2001	14.2	(11.2, 17.8)	1990-1999	15.2	(7.0, 29.9)
≥35	Before 1962	49.5	(45.0, 53.9)	Before 1961	32.7	(30.4, 35.1)	Before 1959	32.3	(22.5, 44.0)
≥35	1963-1972	46.2	(40.9, 51.6)	1962-1971	25.1	(22.7, 27.7)	1960-1969	23.4	(14.7, 35.1)
≥35	1973-1982	25.1	(20.9, 29.9)	1972-1981	8.5	(7.0, 10.2)	1970-1979	6.9	(3.5, 13.1)
≥35	1983-1992	0.0	(0, 0)	1982-1991	0.0	(0, 0)	1980-1989	0.0	(0, 0)
≥35	1993-2002	0.0	(0, 0)	1992-2001	0.0	(0, 0)	1990-1999	0.0	(0, 0)

Table S5. Initiation of smokeless tobacco use among male and female populations across different birth cohorts at different ages in Bangladesh, India, and Pakistan

Age at initiation	Bangladesh			India			Pakistan		
	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)
Male									
<15	Before 1962	2.2	(1, 4.6)	Before 1961	6.8	(5.4, 8.7)	Before 1959	7.5	(3, 17.5)
<15	1963-1972	3.6	(1.4, 8.7)	1962-1971	5.5	(4.1, 7.3)	1960-1969	5.4	(1.9, 14.7)
<15	1973-1982	2.8	(1.4, 5.6)	1972-1981	6.8	(5.5, 8.5)	1970-1979	13.1	(6.9, 23.5)
<15	1983-1992	6.2	(2.6, 14.1)	1982-1991	8.6	(6.6, 11)	1980-1989	8.8	(4.9, 15.5)
<15	1993-2002	13.5	(3.4, 41)	1992-2001	23.2	(18.7, 28.4)	1990-1999	33.3	(19.5, 50.6)
15-17	Before 1962	4.7	(2.4, 9.1)	Before 1961	12.1	(10.2, 14.2)	Before 1959	6.3	(2.8, 13.7)
15-17	1963-1972	5.9	(3.2, 10.9)	1962-1971	11.7	(9.6, 14.2)	1960-1969	15.2	(8.2, 26.3)
15-17	1973-1982	3.0	(1.5, 6.2)	1972-1981	16.8	(14.3, 19.7)	1970-1979	12.3	(7, 20.7)
15-17	1983-1992	16.2	(8.7, 28.2)	1982-1991	22.0	(19.6, 24.6)	1980-1989	22.1	(14, 33)
15-17	1993-2002	30.7	(15.4, 51.9)	1992-2001	39.2	(34.1, 44.5)	1990-1999	34.9	(19.9, 53.6)
18-19	Before 1962	2.7	(1.3, 5.7)	Before 1961	5.3	(4.1, 6.9)	Before 1959	4.8	(2, 11.4)
18-19	1963-1972	8.7	(4.1, 17.5)	1962-1971	11.1	(9, 13.6)	1960-1969	5.4	(2.1, 13)
18-19	1973-1982	2.9	(1.2, 6.9)	1972-1981	11.6	(9.8, 13.6)	1970-1979	19.5	(11.3, 31.5)
18-19	1983-1992	10.8	(6.2, 18.3)	1982-1991	17.2	(15.1, 19.5)	1980-1989	10.7	(5.8, 19.2)
18-19	1993-2002	18.6	(7.9, 37.8)	1992-2001	23.3	(19.2, 27.9)	1990-1999	14.6	(6.8, 28.5)
20-34	Before 1962	41.2	(34.6, 48.1)	Before 1961	49.4	(46.2, 52.7)	Before 1959	47.5	(30.4, 65.2)
20-34	1963-1972	44.1	(35.5, 53.1)	1962-1971	53.6	(49.9, 57.3)	1960-1969	59.4	(46.4, 71.3)
20-34	1973-1982	72.5	(64.6, 79.2)	1972-1981	60.2	(57, 63.3)	1970-1979	53.1	(41, 64.8)
20-34	1983-1992	66.8	(55.2, 76.7)	1982-1991	52.2	(49.1, 55.4)	1980-1989	58.3	(45.8, 69.9)
20-34	1993-2002	37.3	(19.5, 59.3)	1992-2001	14.4	(11, 18.5)	1990-1999	17.3	(7.9, 33.7)
≥35	Before 1962	49.3	(42.6, 56)	Before 1961	26.4	(23.7, 29.2)	Before 1959	33.8	(20, 51.1)
≥35	1963-1972	37.7	(29.6, 46.5)	1962-1971	18.2	(15.4, 21.4)	1960-1969	14.6	(7.1, 27.5)
≥35	1973-1982	18.8	(13, 26.4)	1972-1981	4.6	(3.6, 5.9)	1970-1979	2.0	(0.6, 6.1)
≥35	1983-1992	0.0	(0, 0)	1982-1991	0.0	(0, 0)	1980-1989	0.0	(0, 0)
≥35	1993-2002	0.0	(0, 0)	1992-2001	0.0	(0, 0)	1990-1999	0.0	(0, 0)

Age at initiation	Bangladesh			India			Pakistan		
	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)
Female									
<15	Before 1962	7.0	(4.7, 10.2)	Before 1961	11.7	(9.6, 14.2)	Before 1959	4.8	(1.6, 13.2)
<15	1963-1972	6.1	(3.4, 10.6)	1962-1971	9.7	(7.4, 12.6)	1960-1969	7.5	(2.2, 22.6)
<15	1973-1982	4.5	(2.9, 7)	1972-1981	12.2	(9.4, 15.6)	1970-1979	18.1	(5.8, 44.3)
<15	1983-1992	8.2	(5.5, 12)	1982-1991	13.4	(10.7, 16.6)	1980-1989	1.1	(0.1, 7.7)
<15	1993-2002	12.9	(5.8, 26.5)	1992-2001	35.8	(27.6, 45)	1990-1999	73.4	(36.1, 93.1)
15-17	Before 1962	8.5	(5.6, 12.7)	Before 1961	11.5	(9.2, 14.2)	Before 1959	43.5	(28.2, 60.2)
15-17	1963-1972	6.1	(4, 9.2)	1962-1971	11.0	(8.4, 14.3)	1960-1969	2.7	(0.6, 11)
15-17	1973-1982	10.9	(7.8, 15.2)	1972-1981	13.8	(11, 17.3)	1970-1979	3.1	(0.7, 12.2)
15-17	1983-1992	13.0	(8.6, 19.2)	1982-1991	18.3	(14.7, 22.5)	1980-1989	18.9	(7, 41.8)
15-17	1993-2002	31.6	(17.6, 49.8)	1992-2001	30.0	(22.4, 38.9)	1990-1999	23.9	(5.6, 62.6)
18-19	Before 1962	3.2	(1.8, 5.9)	Before 1961	4.6	(3.2, 6.7)	Before 1959	0.0	(0, 0)
18-19	1963-1972	2.4	(1.2, 5)	1962-1971	5.1	(3.6, 7)	1960-1969	0.0	(0, 0)
18-19	1973-1982	5.0	(2.5, 9.8)	1972-1981	5.9	(4.2, 8.3)	1970-1979	0.8	(0.1, 5.8)
18-19	1983-1992	8.2	(4.6, 14.2)	1982-1991	11.7	(8.4, 16.2)	1980-1989	6.4	(0.9, 34.8)
18-19	1993-2002	12.9	(5.9, 25.9)	1992-2001	20.9	(14.8, 28.8)	1990-1999	1.1	(0.1, 8.8)
20-34	Before 1962	31.7	(26.6, 37.4)	Before 1961	31.0	(27.6, 34.7)	Before 1959	21.2	(11.9, 34.8)
20-34	1963-1972	33.9	(27.8, 40.6)	1962-1971	36.7	(32.5, 41.1)	1960-1969	41.2	(20.4, 65.7)
20-34	1973-1982	51.5	(45.2, 57.8)	1972-1981	49.7	(44.8, 54.7)	1970-1979	45.1	(23.6, 68.7)
20-34	1983-1992	70.7	(63.4, 77)	1982-1991	56.6	(51.5, 61.6)	1980-1989	73.7	(49.3, 88.9)
20-34	1993-2002	42.7	(27.1, 59.9)	1992-2001	13.3	(8.4, 20.4)	1990-1999	1.6	(0.3, 8.6)
≥35	Before 1962	49.6	(43.7, 55.5)	Before 1961	41.2	(37.4, 45.2)	Before 1959	30.5	(18, 46.8)
≥35	1963-1972	51.5	(44.7, 58.1)	1962-1971	37.7	(33.3, 42.2)	1960-1969	48.7	(26.3, 71.5)
≥35	1973-1982	28.1	(22.7, 34.3)	1972-1981	18.4	(14.3, 23.3)	1970-1979	32.9	(15.2, 57.3)
≥35	1983-1992	0.0	(0, 0)	1982-1991	0.0	(0, 0)	1980-1989	0.0	(0, 0)
≥35	1993-2002	0.0	(0, 0)	1992-2001	0.0	(0, 0)	1990-1999	0.0	(0, 0)

Table S6. Initiation of smokeless tobacco use among urban and rural populations across different birth cohorts at different ages in Bangladesh, India, and Pakistan

Age at initiation	Bangladesh			India			Pakistan		
	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)
Urban									
<15	Before 1962	3.5	(1.5, 8.0)	Before 1961	5.0	(3.1, 8.0)	Before 1959	1.9	(0.3, 12.9)
<15	1963-1972	6.2	(3.4, 11.0)	1962-1971	3.8	(2.2, 6.6)	1960-1969	8.4	(2.3, 26.2)
<15	1973-1982	3.9	(2.4, 6.4)	1972-1981	8.7	(5.9, 12.4)	1970-1979	13.2	(5.0, 30.6)
<15	1983-1992	5.4	(3.3, 8.7)	1982-1991	8.6	(5.9, 12.5)	1980-1989	7.4	(2.8, 18.2)
<15	1993-2002	20.0	(9.2, 38.3)	1992-2001	25.7	(17.1, 36.6)	1990-1999	44.6	(15.8, 77.6)
15-17	Before 1962	4.5	(2.7, 7.4)	Before 1961	8.4	(5.9, 11.8)	Before 1959	36.6	(20.3, 56.7)
15-17	1963-1972	6.1	(3.3, 11.0)	1962-1971	10.9	(7.5, 15.4)	1960-1969	21.5	(9.5, 41.8)
15-17	1973-1982	10.8	(5.9, 18.9)	1972-1981	12.9	(9.9, 16.7)	1970-1979	10.2	(4.1, 23.1)
15-17	1983-1992	20.0	(9.8, 36.4)	1982-1991	22.4	(17.9, 27.7)	1980-1989	20.5	(10.5, 36.2)
15-17	1993-2002	32.4	(17.4, 52.1)	1992-2001	40.8	(30.6, 51.8)	1990-1999	29.7	(10.6, 60.1)
18-19	Before 1962	3.2	(1.5, 6.8)	Before 1961	4.9	(3.0, 7.9)	Before 1959	0.9	(0.2, 3.6)
18-19	1963-1972	3.6	(1.6, 7.9)	1962-1971	8.9	(5.9, 13.2)	1960-1969	0.9	(0.1, 6.3)
18-19	1973-1982	4.3	(1.8, 10.2)	1972-1981	12.1	(8.9, 16.4)	1970-1979	15.5	(5.5, 36.9)
18-19	1983-1992	10.6	(6.0, 18.1)	1982-1991	11.9	(8.7, 16.0)	1980-1989	11.9	(3.5, 33.6)
18-19	1993-2002	32.3	(14.4, 57.5)	1992-2001	20.0	(12.8, 29.7)	1990-1999	3.6	(0.8, 15.5)
20-34	Before 1962	42.2	(33.7, 51.1)	Before 1961	44.4	(38.5, 50.4)	Before 1959	42.5	(24.2, 63.2)
20-34	1963-1972	44.0	(35.2, 53.2)	1962-1971	50.3	(44.2, 56.4)	1960-1969	45.9	(27.8, 65.0)
20-34	1973-1982	53.8	(42.5, 64.7)	1972-1981	58.6	(52.9, 64.1)	1970-1979	52.9	(35.1, 70.1)
20-34	1983-1992	64.0	(50.8, 75.4)	1982-1991	57.1	(51.1, 62.8)	1980-1989	60.2	(39.0, 78.1)
20-34	1993-2002	15.4	(5.4, 36.5)	1992-2001	13.6	(8.2, 21.7)	1990-1999	22.1	(5.6, 57.6)
≥35	Before 1962	46.6	(38.0, 55.5)	Before 1961	37.3	(31.8, 43.2)	Before 1959	18.1	(8.5, 34.4)
≥35	1963-1972	40.1	(32.1, 48.6)	1962-1971	26.1	(21.2, 31.8)	1960-1969	23.4	(10.9, 43.2)
≥35	1973-1982	27.1	(18.2, 38.4)	1972-1981	7.7	(4.7, 12.6)	1970-1979	8.2	(3.1, 20.0)
≥35	1983-1992	0.0	(0, 0)	1982-1991	0.0	(0, 0)	1980-1989	0.0	(0, 0)
≥35	1993-2002	0.0	(0, 0)	1992-2001	0.0	(0, 0)	1990-1999	0.0	(0, 0)

Age at initiation	Bangladesh			India			Pakistan		
	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)	Birth Cohort	%	(95% CI)
Rural									
<15	Before 1962	5.3	(3.6, 7.7)	Before 1961	10.0	(8.5, 11.7)	Before 1959	9.7	(4.6, 19.2)
<15	1963-1972	4.9	(2.7, 8.8)	1962-1971	8.1	(6.5, 10.0)	1960-1969	4.9	(1.7, 13.1)
<15	1973-1982	4.0	(2.5, 6.2)	1972-1981	8.2	(6.9, 9.7)	1970-1979	14.5	(7.4, 26.3)
<15	1983-1992	8.0	(5.1, 12.4)	1982-1991	9.7	(7.8, 12.2)	1980-1989	8.4	(4.1, 16.6)
<15	1993-2002	11.5	(3.6, 31.2)	1992-2001	25.1	(20.6, 30.2)	1990-1999	37.5	(22.6, 55.1)
15-17	Before 1962	7.5	(5.0, 10.9)	Before 1961	12.8	(11.1, 14.7)	Before 1959	12.9	(6.7, 23.3)
15-17	1963-1972	6.0	(4.0, 9.0)	1962-1971	11.6	(9.8, 13.8)	1960-1969	7.6	(3.3, 16.3)
15-17	1973-1982	7.8	(5.4, 11.2)	1972-1981	17.2	(14.7, 20.1)	1970-1979	11.3	(5.7, 20.9)
15-17	1983-1992	12.4	(8.4, 18.0)	1982-1991	21.0	(18.7, 23.5)	1980-1989	22.4	(13.1, 35.7)
15-17	1993-2002	30.8	(17.8, 47.7)	1992-2001	36.8	(31.9, 41.9)	1990-1999	34.1	(18.9, 53.5)
18-19	Before 1962	3.0	(1.7, 5.2)	Before 1961	5.1	(4.0, 6.4)	Before 1959	4.0	(1.5, 10.3)
18-19	1963-1972	5.1	(2.7, 9.5)	1962-1971	9.0	(7.3, 10.9)	1960-1969	5.4	(2.0, 13.8)
18-19	1973-1982	4.3	(2.2, 8.4)	1972-1981	9.1	(7.8, 10.7)	1970-1979	17.3	(9.5, 29.3)
18-19	1983-1992	8.7	(5.2, 14.2)	1982-1991	17.5	(15.3, 19.8)	1980-1989	9.6	(5.2, 17.1)
18-19	1993-2002	12.0	(5.4, 24.5)	1992-2001	23.8	(19.8, 28.3)	1990-1999	14.5	(6.6, 28.9)
20-34	Before 1962	34.3	(29.6, 39.3)	Before 1961	40.8	(38.2, 43.5)	Before 1959	30.0	(17.3, 46.6)
20-34	1963-1972	36.4	(30.5, 42.6)	1962-1971	46.6	(43.4, 49.8)	1960-1969	58.8	(44.5, 71.7)
20-34	1973-1982	59.3	(53.6, 64.9)	1972-1981	56.7	(53.7, 59.7)	1970-1979	51.0	(37.9, 64.0)
20-34	1983-1992	70.9	(63.8, 77.0)	1982-1991	51.8	(48.8, 54.9)	1980-1989	59.6	(46.0, 71.9)
20-34	1993-2002	45.7	(30.2, 62.1)	1992-2001	14.4	(11.0, 18.5)	1990-1999	14.0	(5.5, 31.1)
≥35	Before 1962	50.0	(45.0, 55.1)	Before 1961	31.4	(28.9, 34.0)	Before 1959	43.5	(29.5, 58.6)
≥35	1963-1972	47.6	(41.4, 54.0)	1962-1971	24.7	(22.0, 27.8)	1960-1969	23.4	(12.9, 38.7)
≥35	1973-1982	24.6	(19.9, 30.0)	1972-1981	8.8	(7.3, 10.5)	1970-1979	6.0	(2.4, 14.3)
≥35	1983-1992	0.0	(0, 0)	1982-1991	0.0	(0, 0)	1980-1989	0.0	(0, 0)
≥35	1993-2002	0.0	(0, 0)	1992-2001	0.0	(0, 0)	1990-1999	0.0	(0, 0)