

# 4.6

## Tobacco Use and Reproductive Health Outcomes

This section presents a focused overview of the global and Indian research on adverse reproductive outcomes associated with tobacco use during pregnancy.

Smoking by mothers has been identified as the greatest single preventable cause of infant morbidity and mortality in the West and may have long term effects on surviving children. In addition, several complications in the mother have been associated with maternal cigarette smoking.<sup>134</sup>

Mounting evidence from India and elsewhere indicates that smoking men have a lower sperm count than non-smokers; the sperm quality of their semen is reduced and contains a higher proportion of malformed sperm, which also have reduced motility.<sup>135,136</sup> Smoking also increases the risk of impotence by around 50% for men in their thirties and forties. Thus, smoking also harms the sexual health of men.<sup>137</sup>

### Box 4.5 Pathogenetic pathways

Of more than 2000 compounds in tobacco, the most important for the pregnant woman and foetus appear to be nicotine, carbon monoxide, heavy metals and polycyclic aromatic hydrocarbons (PAHs). Carbon monoxide, which is generated during cigarette smoking, can cause reduced oxygen delivery to the foetal cells. Nicotine leads to decreased blood supply to the uterus and placenta. Nicotine has also been found to have a significant effect on the functions of the brain and on organ development during the sensitive period of development of the foetus. PAHs are known to be capable of inducing foetal toxemia, retard foetal growth and development,<sup>138</sup> and disrupt the endocrine system.

### Global evidence of tobacco-related association

The US Surgeon General's Report (2001) summarizes the following evidence on women and smoking:<sup>139</sup>

1. Smoking harms the sexual and reproductive health of both men and women.
2. Its damaging effects are seen throughout reproductive life—from puberty through young adulthood and into middle age.
3. Smoking can compromise the capacity to have a family by decreasing fertility, and parental smoking can have long term and serious consequences for child health.
4. The effects of maternal smoking during pregnancy encompass a wide spectrum—decreased foetal growth, spontaneous abortions, foetal deaths, pregnancy complications including those that predispose to preterm delivery, and long term effects on the surviving children.
5. Cigarette smoking by the mother during pregnancy has long been considered an important independent risk factor for decreased infant birth weight. This was first reported in 1957.<sup>140</sup> Since then, decrease in birth weight in cigarette-smoking mothers has been confirmed in more than half a million births; this overwhelming evidence confirms that cigarette smoking causes decreased growth in the infant.<sup>141</sup>
6. Babies of mothers who smoke during pregnancy are on average 200 g lighter than babies born to comparable non-smoking mothers. Smokers' babies are smaller than corresponding non-smokers' babies in all dimensions measured, including length, head circumference, chest circumference and shoulder circumference.
7. Foetal death rates are 35% higher among pregnant women who smoke cigarettes than among non-smokers.
8. Women smokers are less likely to breastfeed their infants than are women non-smokers.
9. If a woman gives up smoking by the fourth month of pregnancy, her risk of delivering a

low birth-weight baby is similar to that of a non-smoker.

10. Women who quit smoking before or during pregnancy reduce the risk for other adverse reproductive outcomes, including conception delay, infertility, premature rupture of membranes, and preterm delivery.

Reports on adverse reproductive outcomes associated with forms of smoking other than cigarettes are few. In one study, among hubble-bubble (*hookah*) smokers in Beirut, Lebanon, the risk of low birth weight was nearly two-fold (1.89) compared to non-smokers and, on an average, babies of smokers weighed 100 g less at birth.<sup>142</sup> *Beedi* smoking by the mother in Bangladesh was associated with a more than two-fold increase in perinatal mortality, from 122 to 270 per 1000 live-borns.<sup>143</sup>

### Indian evidence of tobacco-related association

The effects of *beedi*, cigarette and other forms of smoking prevalent among Indian women on reproductive outcomes are less researched in comparison to cigarette smoking in western pregnant women, which has been extensively researched.

Maternal exposure to second-hand smoke decreases the birth weight of the infant and increases the proportion of premature deliveries. The average reduction in infant birth weight due to mothers being exposed to second-hand smoke in comparison to non-exposed mothers was 63 g in a study from Vellore, Tamil Nadu<sup>144</sup> and 138 g in a study from Chandigarh.<sup>145</sup> Any birth weight differences that could arise between the women exposed to second-hand smoke and the unexposed group due to differences in maternal age, height, parity, social class, months at birth, anaemia and sex of the infant were taken into account in these studies for calculating this smoking-attributable decrease in birth weight. The babies of exposed women were also more likely to be delivered early in both these studies.

Women who use smokeless tobacco (ST) during pregnancy are more likely to have a low birth-weight baby (<2500 g at birth). The increased risk for this ranges from 40%<sup>146</sup> to about 90%.<sup>147</sup> In a case-control study carried out in Mumbai, differences between ST users and non-users on other aspects important to infant birth weight such as maternal body weight, socioeconomic status, and medical factors such as care during pregnancy, presence of anaemia and months at birth of the baby did not significantly alter the higher risk of low birth weight in children of tobacco users.<sup>146</sup>

The percentage of tobacco-user mothers was higher than non-user mothers in every category of birth weight below 2500 g. Eighty per cent of women ST users in this study used *mishri*, a burnt tobacco toothpowder.<sup>146</sup> In another study, the average birth weight was reduced by about 100–200 g in tobacco chewers, in all classes of maternal weight, social class and gestational age.<sup>148</sup> In another study, the average birth weight was decreased by 395 g in tobacco chewers.<sup>149</sup>

When mothers used ST less than five times a day, the risk of having a low birth weight baby was 50% higher, whereas in mothers who used ST five or more times daily, the risk was over 100% higher than in non-users.<sup>146</sup> The average decrease in birth weight increased with increasing ST use.<sup>146,149</sup>

A statistically significant reduction in birth length of 0.518 cm in tobacco chewers has been reported.<sup>149</sup> Babies born to ST-user mothers were more often growth retarded.<sup>150</sup>

It is well known that premature delivery (delivery before the ninth month) is associated with increased risk for foetal, neonatal and perinatal mortality. Preterm deliveries are more common in ST-user mothers; a greater proportion of chewing mothers, in each social class, were delivered at 36 weeks or earlier, and markedly fewer at 39 weeks or later in comparison to non-user mothers.<sup>148</sup> A 40% increased risk was observed for delivery before

the ninth month, after taking into account the differences in age, education, socioeconomic status, anaemia, body weight, and antenatal care of women tobacco users and non-users. The percentage of preterm deliveries increased with increasing use of ST. Such very early preterm births in settings where the neonatal care infrastructure is less developed can imply higher

death rates during delivery or in the first month of life.<sup>146</sup> A research study showed that women who chewed tobacco were 200% more likely to deliver a dead foetus (stillbirth).<sup>148</sup> Death of the foetus during pregnancy, delivery or within 7 days of delivery was greater by 57% in tobacco-user mothers in another study.<sup>151</sup>

#### 4.6 TOBACCO USE AND REPRODUCTIVE HEALTH OUTCOMES

### KEY MESSAGES

- Tobacco use has an adverse effect on the sexual and reproductive health of both men and women.
- Men who smoke have a lower sperm count and poorer sperm quality than non-smokers.
- The effects of maternal tobacco use (smoked and smokeless) during pregnancy include decreased foetal growth, spontaneous abortions, foetal deaths, pregnancy complications including those that predispose to preterm delivery, and long term effects on the surviving children.
- Exposure to second-hand smoke during pregnancy has been associated with lower infant birth weight.