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## Sheesha smoking reduces the expressions of cancer related genes

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**Background and objectives:** Sheesha is a new trend of smoke in western countries. It is a global health issue with more than 100 millions smokers daily. The adverse health effect of sheesha smoking has not been well addressed in the literature. Our aim is to assess the temporary effect of sheesha Massal smoking on the expression of cancer related genes in salivary cells among young sheesha smokers in Ottawa.

**Methods and Results:** In this before-after comparison study, the city of Ottawa was selected to be the geographic area of study. A snowball sampling technique was adopted. The main inclusion criteria were that the individual was between the age of 18 and 25 and reported that they smoked sheesha. In total 15 volunteers were identified to be eligible for this study. After providing the saliva samples participants were asked to smoke Massal (double apple = altifahtain) for one hour and a half. Then, they were asked to provide their second saliva samples. We assessed the short term effect of sheesha Massal smoking on level of expression of xenobiotic metabolism genes and other genes known to have altered expression in tobacco related cancers, in salivary cells. RNA extracted from the saliva samples using custom-made microarray (RT-PCR) assays to measure gene expressions. All 16 genes investigated showed decreases in gene expressions with substantial differences in the magnitude of the decrease. A meta-analysis conducted to integrate the fold change of each genes across the 15 samples, between before and after smoking sheesha, showed a range of reduction in expression level between 1.7 times and 55 *STAT3*, *PTGS2*, *CYP1A1* and *GSTP1* show fold changes that lie within the variance of fold change of housekeeping genes *CDKN2A*, *NMI*, *BAK1*, *ERBB2*, *EGFR*, *CNTD1*, *NOS2*, *FAS*, *CCDN1*, *CYP1B1*, *GSTT1*, and *GSTM2* present fold changes that are outside the range of variability observed for the housekeeping genes.

**Conclusion:** Sheesha smoking has short-term effects on the expressions of genes known to be involved in tobacco-related cancers. Tobacco smoking, regardless of its mode of delivery, affects susceptibility to develop cancer diseases.

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