

## **PAPER ABSTRACTS**

### **Health, Gender, and Trafficking**

#### **Investigation of Pre-clinical Damage of Lens from Smoke (Biomass & Tobacco) Exposure in Nepalese Women: A Pilot Study**

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**Background:** Prolonged exposure to biomass and tobacco smoke can damage the lens of human eyes. Epidemiological studies conducted in developed and developing countries have established an association between smoke and lens opacity (cataracts). In our earlier epidemiological study conducted in the eye hospital at western Terai region of Nepal, we had found rate of lens damage (cataracts) two times higher among women who cooked with solid fuel (wood, dung cake, crop-residues) in unvented stoves than women who cooked with clean burning fuel-stove (LPG, biogas, kerosene and electric heaters). Damaged lens (lens opacity) or cataract is still the most important cause of blindness in Nepal despite the presence of a network of eye hospitals throughout the country. In Nepal compared to men, more women have cataracts but their access to cataract related services is lower. There is no medicine available to cure cataracts. Only cure is through surgery, but this is not equally available and affordable to all. Thus, benefits of cataract prevention are obvious in the country where its prevalence is very high and access to medical services is very low. To investigate how we can prevent and delay lens damage or cataract formation among women, we conducted a lens opacity study among women (n=20) who visited Regional Tuberculosis Center and Manipal Medical College in Pokhara. These participants had no previous diagnosis of cataracts or any lesion in the lens. The major objectives of this study were to investigate pre-clinical measures of lens damage among women with no diagnosis of lens opacity, to investigate their exposure level to cooking smoke and environmental tobacco smoke, and to investigate whether environmental tobacco smoke and cooking smoke correlate with severity of lens opacity/insult.

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**Method:** To measure and assign the severity of lens damage quantitatively, we used the Lens Opacity Classification System III (LOCIII). The LOCIII classifies the lens damage/opacity by types (nuclear opacity, nuclear color, cortical, posterior sub-capsular) and quantifies the opacity by the severity score/grade. For this work, first of all each participant's visual acuity was measured using improved version of Snellen chart (Bailey and Lovie visual acuity chart) followed by an examination of lens with a slit lamp biomicroscope by directing narrow vertical slit beam of light through the center of the lens of the participant. After preliminary evaluation, lenses of participants were photographed. The digital photographic records (six photographs of each participant) of the slit lamp cross-sectional view and the retro-illumination view were analyzed and severities of lens opacity were assigned at the School of Optometry at UC Berkeley.

To validate the present exposure status of study participants, an indoor air quality monitoring was conducted in the twenty houses (kitchens) of the participants. Similarly, to get an idea of exposure status in the community, indoor air pollution was measured in other ten households in Pokhara. Therefore, altogether indoor air pollution was measured in 30 households. Under indoor air pollution monitoring, particulate matters (<2.5 micron size), nicotine (environmental tobacco smoke) and naphthalene were measured. Particulate matters were measured using UCB particulate matter monitor. Minute-by-minute average particle levels in the kitchens were recorded for one week. Two pollutants, nicotine and naphthalene, were measured using passive samplers. These samplers were exposed for one week, which were later analyzed using gas chromatography technique in UC Berkeley. We measured naphthalene in the smoke as this compound is commonly used to induce cataracts in animal and is suspected compound for cataract formation in human. This may be the first time that naphthalene and nicotine level in kitchens and households were measured in Nepal.

**Results:** The data analysis is undergoing and will be presented during main conference or will be updated upon available before conference. The results will be helpful to launch an evidence based policy campaign on how reducing environmental insult (tobacco and biomass smoke) could prevent lens damage or reduce the incidence of lens opacity related blindness among women (as well as men) in Nepal.