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(REVIEW ARTICLE)

Occupational exposures and women reproductive health

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Abstract

Occupational exposures in different industries may pose serious health impacts. A number of epidemiological studies have focused on the association of these occupational exposures and adverse health effects. The need of the hour is to focus on the reproductive health of female workers working at different jobs in varied industries. Increasing environmental as well as occupational exposures have led to serious effects on the reproductive health of women and have also endangered the life of future generations. The present paper attempts to focus the impacts of occupational exposures on female reproductive health. Future health based researches are recommended so as to assess the impact of occupational exposures on reproductive capabilities of women workers in different industries.

Keywords: Women workers; Reproductive health; Occupational exposures; Pregnancy; Workplace; Smoking

1. Introduction

Women health is a priority area and various studies have been done so far [1-4]. Some recent studies also emphasize on different aspects of women health [5-9]. Occupational exposures may lead to serious health impacts [10-14]. Epidemiological studies focusing relation between occupational exposures and adverse reproductive health effects among women are need of the hour. Increasing environmental [15-17] as well as occupational exposures have led not only to an adverse effect [18-25] on the reproductive health of women but also endangered the life of future generations. There is an urgent need to spectate the trends of occupational exposures and their effects in relation to different industries. Early detection of reproductive complications during pregnancy and their timely management are important components of the safe motherhood programme for any of the country.

2. Pre-conception health and research

Pre-conception health refers to the health of women during their reproductive years in which they can bear a child. Women workers which are in this period of life may be affected in different ways due to their exposures at their respective workplaces. Researchers have investigated over the different aspects of women reproductive health including depression among infertile women [26]; pelvic inflammatory disease [27]; gonorrhoea and tuberculosis transmission [28]; infertility treatment [29]; HIV infection and sexual behavior [30]; Industrial differences in female fertility treatment rates [31]; fertility preservation in women with breast cancer [32]; Chlamydia [33]; and effect of alcohol and tobacco consumption [34]. Workers who worked in shifts have serious reproductive health issues, the occurrence of abnormal menstruation, reproductive system infection and infertility [35].

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3. Effects of different industries

Plastic chemicals are known to adversely affect reproductive ability [36]. Women workers employed in plastic industries may get affected due to exposures to different sets of chemicals being used. Components used in plastics, such as phthalates, bisphenol A, polybrominated diphenyl ethers and tetrabromobisphenol-A are detected in humans [37]. These endocrine disruptors or thyroid-disrupting chemicals (TDC) are widely used as plastic additives in consumer products which affect reproductive health. Moreover, studies suggest the mixed, significant (alpha = 0.05) TDC associations with natural thyroid hormones [38]. The pregnancy outcome for 305 female plastic welders during 1974-1984 did not show any significant differences with the Swedish average concerning malformation or prenatal mortality [39]. Styrene has been shown to cross the placenta. Some early reports revealed that exposure to styrene can induce spontaneous abortions, menstrual disturbances and congenital malformations. But in more recent studies, no risk was observed among workers exposed to styrene in the reinforced-plastics industry [40-42].

Miners, and those living in communities surrounding mines in developing countries, are vulnerable populations with a high sexual and reproductive health burden [43]. The determinants of reproductive health and quality of life among Indian women in mining communities were examined in a study. A descriptive correlational research design with 145 randomly selected married women in a rural mining region of India was used between January and April 2006. Reproductive health and quality of life was found to be low among Indian women in mining communities. Higher age group, better economic status, higher age at menarche, fewer number of children, absence of long-term illness, reproductive illness and domestic violence were found as important determinants of reproductive health and quality of life among these women [44]. Poor literacy and mobility, low employment and income generating opportunities, poor reproductive health choices and preferences; and poor quality of martial relationships have also been found among women in mining industry [45]. The reproductive profile and frequency of genital infections among women living in the Serra Pelada, a former mining village in the Para state, Brazil was examined. Of the 209 participants, 30% did not have access to health care services during the preceding year. Risk behaviors included alcohol abuse, 24.4%; illicit drug abuse, 4.3%; being a sex worker, 15.8%; and domestic violence, 17.7%. Abnormal Pap smear was found in 8.6%. Prevalence rates of infection were found to be: HIV, 1.9%; trichomoniasis, 2.9%; bacterial vaginosis, 18.7%; candidiasis, 5.7%; Chlamydial-related cytological changes, 3.3%; and HPV-related cytological changes, 3.8% [46].

Distribution of shift work of female workers in different industries and the relationship between shift work and reproductive health was investigated. A cluster sampling questionnaire survey was performed among female workers from 11 industries including electronics, medicine and health, pharmacy from June to September 2016. Usable questionnaires were collected, resulting in a response rate of 96.94%. Workers worked in shifts, accounting for 21.26%, the highest proportion was in the medical industry 30.61%, metallurgy 30.81%, petrochemical engineering 26.78% respectively. Workers who worked in shifts had significantly higher rate of abnormal menstruation, rate of reproductive system infection in married workers and the rate of infertility as compared with the workers who did not work in shifts [35]. Another study investigated the status of reproductive health among the female medical staff in a provincial maternal and child health hospital to provide a scientific basis for developing related intervention measures and promoting the reproductive health of professional females. The study analyzed the occupational influencing factors for reproductive health, particularly the effects of high-intensity work, work shift, chemical poisons, and physical and biological factors on reproductive health. A reproductive health questionnaire was designed according to age, type of work, professional title, education level, working hours, working strength, and the reproductive health of female staff. It was used to analyze the current status of reproductive health, occupational hazardous factors and working strength. Out of all respondents, 5.90% visited the hospital due to infertility, 19.46% had a history of miscarriage, 21.31% had irregular menstruation within the last 3 months and 30.57% had reproductive system disease. Other observations included night working in 72.28% of the investigated medical staff, 47.25% often worked overtime (more than 3 days a week) and 22.27% worked over 8 hours daily. The study revealed that occupational hazard factors can be avoided by reasonably arranging the work schedule. Creating a supportive environment may also improve the reproductive health of female medical staff [47].

The reproductive health status of female workers was investigated in the machinery industry and to find the effect of workload on their reproductive health. Female mechanical workers (N= 5732) were selected and investigated by the Female Workers' Reproductive Health Questionnaire. The questionnaire was printed by the occupational health and poisoning control institute of China. The study collected the required information about the reproductive health status of workers from March to December, 2016. The rate of abnormal menstruation was 27.15%, and the rate of gynecological diseases of female workers was 34.39%. The menstruation abnormality and gynecological diseases rate of female workers with high workload was higher than that female workers with low workload (both $p<0.01$) [48]. Another study investigated reproductive health status of female workers engaged in administrative management, and to provide a reference for protecting the reproductive health of female workers. A cross-sectional survey was performed

for 2717 female workers, aged 18-60 years and engaged in administrative management from 13 cities and provinces in China. A questionnaire was used to investigate their general information, occupational hazards in workplace, and reproductive health status, and the reproductive health status of female workers was analyzed. Of all 2717 female workers, 1170 had gynecological diseases or symptoms, resulting in an incidence rate of 43.06%, and among these workers, 11.15% had abnormal menstruation, 34.64% had infertility, and 38.76% had a history of abortion [49]. In a study on female migrant farmworkers in Mendoza, the results showed that the work processes impacting their health include both employment and reproductive labor, and describe the harm, diseases, and illnesses linked to combined work in farms, factories and homes [50].

4. Effect of alcohol intake and smoking

Alcohol intake, smoking and tobacco consumption is also up surging among women workers in developing countries with women becoming addicts. This puts a negative impact on their social relationship, financial status and reproductive as well as overall health. Tobacco is responsible for more than 50 percent of the cancers. Apart from this it can also aggravate the problem of low birth weight, stillbirths and miscarriages. There is a dire need for research in the field of reproductive health of women so that they may not face cultural hate.

5. Conclusion

Occupational exposures may impose serious health impacts in different industries. Increasing environmental as well as occupational exposures have been reported to seriously affect the reproductive health of women and have endangered the life of future generations. Researchers have investigated over different aspects of women reproductive health including depression among infertile women, pelvic inflammatory disease, gonorrhoea, infertility treatment, HIV infection, sexual behavior and fertility preservation. Other problems faced by women workers include menarche related conditions, fewer number of children, reproductive illness. Alcohol intake and tobacco addiction aggravates the problem of low birth weight, stillbirths and miscarriages. Conclusively, occupational health and safety studies should be undertaken in future to safeguard reproductive health of women workers.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no competing interest.

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