

THE INTERNATIONAL JOURNAL OF SCIENCE & TECHNOLEDGE

Occupational Risk Factors for Women during Pregnancy

Surabhi Singh

Assistant Professor, Department of Family Resource Management,
ASPEE College of Home Science & Nutrition, Sardarkrushinagar Dantiwada Agricultural
University, S. K. Nagar, Gujarat, India

Sarita Sanwal

Assistant Professor, Department of Human Development and Family Studies, ASPEE College of
Home Science & Nutrition, Sardarkrushinagar Dantiwada Agricultural University, S. K. Nagar,
Gujarat, India

Santosh Ahlawat

Professor & Head, Department of HECM,
ASPEE College of Home Science & Nutrition, Sardarkrushinagar Dantiwada Agricultural
University, S. K. Nagar, Gujarat, India

Abstract:

Many factors affect reproductive health of women such as chemical, biological, physical, ergonomical and even working schedule of women. Women may expose to various chemicals, biological substances and other harmful things at their workplace, which affect their reproductive health. Many research papers were examined and only those published in the international scientific literature were included to formulate this review paper. Research papers were identified through the search of relevant data banks using selected keywords.

There is a need to counsel women by health professionals that they should avoid exposure to the occupational risk factors, while researchers should pursue ergonomic interventions for women to avoid occupational risk during pregnancy. Policy makers should formulate rules and norms for employers to keep the women safe during their pregnancy at their work place.

1. Introduction

It is evident from various researches that risk factors are present in a variety of workplaces. Working women may be exposed to a number of occupational hazards on a daily basis. Many of these risk factors have the potential to adversely affect the reproductive health of both male and female workers. There are some identified occupational hazards which can affect a woman's reproductive health, her ability to become pregnant, or the health of her unborn children. Substances or agents that affect the reproductive health of women or the ability of women to have healthy children are called reproductive hazards.

Many research papers were examined and only those published in the international scientific literature were included to formulate this review paper. Research papers were identified through the search of relevant data banks using selected keywords.

On the basis of review, many factors were identified which affect reproductive health of women such as-

- Chemical factors
- Biological factors
- Ergonomic factors
- Physical factors
- Effects of Work Schedule

2. Chemical Factors

Women may expose to various types of chemicals at her work place or somewhere else. This chemical exposure may impinge on their reproductive health in different manner. For example-

- Berylliosis, a progressive chronic lung disease resulting from exposure to beryllium. Women with berylliosis may experience rapid deterioration and death once they become pregnant (Chavkin, 1986).
- Exposure to chemicals such as carbon disulfide may disrupt the balance between the brain, pituitary and the ovaries, leading to menstrual disturbances (NIOSH, N.d.).
- Female infertility has been linked to exposures to lead, mercury, cadmium, and textile dyes (Filkins and Kerr, 1993; Paul, 1997).

- Cancer treatment drugs (e.g., methotrexate) has been found associated with Infertility, miscarriage, birth defects, low birth weight
- Fetal loss has been linked to occupations involving waste treatment, metal work, farming, working with chemicals, and nursing that involved antineoplastic drugs.
- Stillbirths have been linked to those employed in pharmaceutical laboratories, and congenital malformations have been linked to the chemical 2,4 -D. Increased rates of stillbirth were seen in agriculture, horticulture, and leather work (Filkins and Kerr, 1993; Paul, 1997).
- Ethylene oxide (a mutagen) is used for sterilization of hospital equipment and may be associated with miscarriage (Stellman, 2000).
- Exposure to organic solvents, tetrachloroethylene, glycol ethers, anaesthetic gases, antineoplastic drugs has been linked to spontaneous abortion.
- Carbon disulfide (CS₂) is linked to changes in menstrual cycle of women, mostly who are viscose rayon workers (NIOSH, 1999).

3. Biological Factors

3.1. Rubella or German Measles

Rubella (German measles) is an infection caused by the rubella virus. It is usually a mild illness causing a rash, sore throat and swollen glands. Exposure to rubella is a concern during the first trimester and could result in defects of the eyes, ears and heart of the fetus. There is a high chance that the virus will cause severe damage to your developing baby. Other defects may include a decreased head circumference, mental retardation, poor childhood growth, and delayed language and motor development. Transmission occurs by direct contact with urine, stool or nose and throat secretion. Teachers, childcare workers, hospital workers, those who work in personal care centres and the biotech industries may be at higher risk for exposure to rubella (Paul, 1997).

3.2. Parvovirus B19 or Fifth Disease

Fifth disease is a mild rash illness caused by parvovirus B19. This disease, also called erythema infectiosum. This virus can cause an acute infection during pregnancy. Prenatal infection with human parvovirus B19 is associated with non-immune fetal hydrops and fetal death (Paul, 1997).

3.3. Cytomegalovirus

Cytomegalovirus (CMV) is a known teratogen. The infection is transmitted through contact with saliva, tears, urine, cervical secretions and breast milk. Congenital cytomegalovirus infection, especially during the first 20 weeks, is associated with mental retardation, cerebral palsy, epilepsy and problems with vision and hearing (Youngkin and Davis, 1994). Neonates with symptomatic congenital CMV infection have a multi-system disease with significant morbidity and mortality (Ornoy and Diav-Citrin, 2006). Day care workers, teachers and hospital workers are at risk for this infection (Misner et al., 1999).

3.4. Varicella or Chicken Pox

Pregnant women who come in close physical contact with children who have active chicken pox infections are at risk for developing varicella. Congenital anomalies associated with varicella are limb atrophy, microcephaly, cortical atrophy, motor and sensory manifestations and eye problems. Exposure in the first trimester can also result in miscarriage, muscular atrophy, clubbed foot, central nervous system disease and cataracts (Youngkin, and Davis, 1994).

3.5. Hepatitis

Hepatitis is an acute viral infection and the most common cause of jaundice during pregnancy. Prenatal exposure may result in prematurity, or psychomotor retardation (Youngkin and Davis, 1994). The Hepatitis A is transmitted by the contaminated food, particularly milk, shellfish and polluted water while Hepatitis B and C are transmitted through contaminated blood and blood products, and through sexual intercourse.

3.6. Toxoplasmosis

Toxoplasmosis is a common infectious disease caused by a parasite. Infection during pregnancy is associated with miscarriage, stillbirth or congenital infections in 10 -15% of pregnancies complicated by toxoplasmosis. About 10% of infected infants have central nervous system disorders, hydrocephaly and mental retardation (Youngkin and Davis, 1994). Risk factors include eating raw or undercooked meats, living in a rural area and working in occupations that require working with animals. Usual transmission is through ingestion of tissue cysts in contaminated meat or through contact with feces of infected cats or farm animals.

3.7. Listeria

Listeria monocytogenes is transmitted through skin and eyes, and is associated with a mild flu like illness. Veterinarians and animal handlers may be exposed when handling infected animals. Infection early in pregnancy can result in miscarriage. Infection later in pregnancy can result in stillbirth and preterm delivery (Clement, 1997).

4. Ergonomic Factors

It has been proved in many researches that men and women have different physiological, biological and social characteristics and are often required to do different tasks. For example, women mostly do such work that requires high repetition tasks and frequent lifting. These various ergonomic factors including poor workplace design, affect female reproductive health due to the physical and physiological changes that occur during pregnancy. A woman's ability to work while pregnant will vary depending on her own individual characteristics and the nature of the tasks.

While women can continue to perform most tasks during pregnancy, some tasks, such as standing and heavy lifting, may no longer be advisable. The impact of ergonomic stressors will vary considerably depending on the individual woman's physical fitness and strength, as well as her overall health status (Paul, 1993).

It was found through examining various research studies that ergonomic factors affect the reproductive health of women during pregnancy. Work in standing position for long hours significantly increased the risk for preterm birth in some studies. Supply of blood to the uterus seemed to significantly decrease, with negative impacts on the uterus in extended sitting. Risk to pregnant women also increases with heavy lifting. Frequent heavy lifting (such as loads greater than 10.5 kg lifted over 50 times per week) is associated with uterine contractions, miscarriages, preterm birth, small for gestational age and low birth weight. It was concluded in the studies that women exposed to long periods of standing had lower growth rates for foetal head circumference.

The consequences include preterm birth and low birth weight. Heavy lifting, repetitive work, prolonged standing, sitting and walking can negatively affect reproductive outcomes.

Pregnant workers are also more susceptible to repetitive stress injuries. There are risks associated with extended sitting, standing, heavy work and lifting. It is important to look at each worker's situation and how their individual risks can be minimized or eliminated.

Women who perform heavy work with a high energy expenditure and with frequent manual handling are at risk, hence, it is important here to identify risk factors and to change working condition to some extent to avoid or minimize risk, for example among health care personnel.

4.1. Muscles, Ligaments and Joints

Throughout pregnancy, the muscles and ligaments relax to enable an increase in pelvic size. Several joints, including the backbone, become less stable and show signs of separation.

4.2. Back

The increased size of the abdomen causes the center of gravity to change. Women may respond by throwing back their shoulders and/or leaning back on their heels. This may curve their back and result in back strain and pain. As pregnancy advances, the back muscles have to work harder to enable the woman to lift, stand and maintain balance.

4.3. Swelling

The swelling of hands and arms during pregnancy may increase the risk for carpal tunnel syndrome, or may aggravate a pre-existing problem. Some symptoms include pain, tingling, numbness and reduced hand strength.

4.4. Lungs

During the last few months of pregnancy, the expanding uterus causes pressure under the lungs, resulting in shortness of breath.

4.5. Physical Factors

Exposure to ionizing radiation, Noise (>90 dBA) have been found to be associated with Spontaneous abortion, low birth weight and pre-term birth. Health care personnel mostly expose to ionizing radiation and the women who work in noisy areas, may face such reproductive hazards.

5. Working Schedule and Stress Concerns

Irregular working schedule has been found associated with Spontaneous abortion and menstrual disturbances whereas, stress may cause Spontaneous abortion, pre-term birth.

6. Conclusion

Women may expose to various risk factors at their work place which may adversely affect their reproductive health and outcome of pregnancy. At workplaces, higher ups may not know that they have a pregnant worker until well into the second trimester as women often wait for their pregnancy to be well established before disclosing. Women may fear a negative reaction at work, may worry about early miscarriage or may feel the issue is a personal and private concern. Many women may be short of knowledge about the importance of health prior to pregnancy and in the early weeks of pregnancy.

There is a need to guide women by health professionals that they should avoid exposure to the occupational risk factors, while researchers should pursue ergonomic and other interventions for women to avoid occupational risk during pregnancy. Policy makers should formulate rules and norms for employers to keep the women safe during their pregnancy at their work place.

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