

Breast Cancer in Healthcare Shift- and Night-Workers – Preliminary Results of a Case Control Study and Risk Management

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Abstract

Shift work, in particular the night shift, has a significant impact on health, especially increasing the onset of digestive, cardiovascular and oncological pathologies. In 2019, IARC confirmed the shift and night work as a probable carcinogen for humans (Group 2A), due to its association with breast cancer. Mechanisms involved are genetic predisposition, de-synchronization of circadian rhythms due to sleep losses with alterations in the cell cycle' regulation and immunological deficiencies. Nevertheless, epidemiological evidences are still limited. The purpose of this case-control study was to estimate breast cancer risk due to night shift work in health settings also considering some possible confounders such as personal and organizational factors. Data were collected by a dedicated questionnaire investigating shift work exposure, along with other personal risk factors for breast cancer. Overall 433 subjects (79 cases and 354 controls) were recruited from two large health settings in central Italy. The preliminary results showed an increased risk of developing breast cancer in female workers who have used oral contraceptives for a period from 5 to 20 years, compared to the subpopulation that does not use it (OR 2.70, IC 95% 1.21 – 6.01). No significant association was found with shift work exposure. The prolonged use of oral contraceptives as birth control method could have relevant health and organizational implications in health care settings. Further efforts are warranted to clarify the role shift work and contraceptive use on the development of breast cancer.

Keywords: shift work; breast cancer; healthcare workers; preventive medicine; organizational factors.

1. Introduction

In June 2019, IARC confirmed the previous 2007 classification of Shift and Night Work, placing this risk in Group 2A, as a probable carcinogen for humans, due to correlation with the development of certain cancers. In particular, the IARC working group concluded that there was sufficient evidence for breast, particularly among premenopausal workers, prostate and colorectal cancer, based on sufficient evidence in animal experiments and limited evidence in epidemiological studies (IARC, 2019; Salamanca-Fernandez et al., 2018). Associations were more evident in cases of high-intensity and long-lasting night shifts (IARC, 2019).

Shiftwork, in particular the night shift, has a significant impact on many aspects of a worker's life. According to several authors, this work organization can interfere on four main aspects: 1) on biological structure (changes in sleep/wake rhythm disrupt the normal circadian rhythmicity of biological functions and psychophysical conditions), 2) on work capacity, due to fluctuations in performance over 24 hours with a greater likelihood of accidents (Kecklund and Axelsson, 2018), 3) on health, especially consequent sleep disorders, digestive (Jung and Lee, 2016), anxiety, irritability, autonomic cardiac deregulation (Lecca et al, 2019) and oncological pathologies (Liu et al., 2018), 4) social context, with negative interference in family life (Costa, 2015a). In particular, it is found that women employed on night

shifts have more frequent menstrual irregularities with dysmenorrhea, reduced fertility, increased miscarriages, pre-term births and low birth weight of the child (Nurminen, 1998; Mozurkewich et al., 2000; Lim et al 2016).

About the development of tumors, the pathophysiological mechanisms linked to circadian desynchronization involving carcinogens are various (Shi et al., 2020; Bhatti et al., 2014); for example, for breast cancer, the researchers argue that, in the case of genetic predisposition or not, repeated sleep losses resulting in de-synchronization of circadian rhythms lead to alterations in the cell cycle' regulation with effects on estrogen-sensitive breast cells, in addition to immunological deficiencies (Costa G, 2010a; Erren et al., 2019; Bracci et al, 2019).

The latest European surveys showed that only 27% of employees and 8% of self-employed people work in daily hours, for example from Monday to Friday between 7am and 5pm. Most workers are employed in non-traditional hours, including shiftwork, night shifts, weekends, part-time, telework, on-call or on extended flexible hours (Costa, 2010b).

Such a scenario must be considered also in the light of the "future of work". Organization are deeply changing by both the development of new skills and the growth of opportunities, but not all the workforce is ready to face these changes (Giorgi et al., 2019)

According to Eurostat sources, the percentage of Italian workers employed at atypical hours stands at 41.8% compared