

Occupation and breast cancer: fitness for work is an aspect that needs to be addressed

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PAROLE CHIAVE

Cancro della mammella; lavoro a turni; idoneità al lavoro

SUMMARY

Much progress has been made in breast cancer prevention, treatment and rehabilitation and there is evidence that the majority of breast cancer survivors are able to continue working. Although several studies suggest that environmental and occupational factors (certain chemicals and circadian rhythm changes) contribute to the onset of breast cancer, current management of individuals susceptible to breast cancer and breast cancer survivors does not focus on either occupational exposure or working conditions. A more active role of physicians in informing patients about occupational hazards and of occupational health physicians in making appropriate fitness for work judgments would lead to a more complete assessment of the health risk of susceptible workers and workers resuming their activity after sick leave for breast cancer treatment.

RIASSUNTO

«Occupazione e cancro della mammella: l'idoneità al lavoro è un aspetto da valutare». Molti progressi sono stati fatti nella prevenzione, nel trattamento e nella riabilitazione del cancro alla mammella ed è stato osservato che i soggetti trattati e riabilitati sono in grado di continuare nella loro attività lavorativa. Malgrado numerosi studi indichino che diversi fattori ambientali e occupazionali (quali alcune sostanze chimiche e alterazioni del ritmo circadiano) possono contribuire all'insorgenza del cancro mammario, l'attuale gestione degli individui suscettibili e dei soggetti trattati e riabilitati non focalizza sempre con sufficiente attenzione esposizione professionale e condizioni di lavoro. Un ruolo più attivo del medico nell'informare i propri pazienti sui rischi professionali e del medico del lavoro nel formulare giudizi di idoneità maggiormente appropriati potrebbe garantire una migliore valutazione del rischio individuale nei lavoratori suscettibili e nei lavoratori che riprendono il lavoro dopo il trattamento e la riabilitazione.

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OCCUPATION AND BREAST CANCER

In the developed world, breast cancer is the most common cancer diagnosed in women and the most common cause of death from cancer (13). Breast cancer is caused by several uncontrollable factors (such as age and gender), by a variety of controllable factors and by a number of factors with uncertain or controversial effect. Although knowledge about the complexity of breast cancer continues to progress, the influence of environmental exposure (which includes factors that are not directly inherited through DNA, such as physiological development of an individual, influence of external stressors on metabolic processes, diet, physical activity, microbial agents, physical and chemical agents, medical treatments, social and cultural factors) still needs to be further elucidated. A recent review focused on the relationship between breast cancer and a variety of specific factors or conditions (12). Based on the available evidence found in the peer-reviewed literature and in reports by respected agencies, especially the International Agency for Research on Cancer (IARC) and the World Cancer Research Fund, the report shows a clear association of increased risk of breast cancer with hormone therapy products, use of oral contraceptives, overweight and obesity among postmenopausal women, alcohol consumption and exposure to ionizing radiations, whereas the available evidence is less strong with other environmental factors (table 1).

An association between working environment and breast cancer was first described at the end of the seventeenth century. At that time Bernardino Ramazzini (6) observed the absence of cervical cancer and a high frequency of breast cancer in nuns, suggesting a relationship with their abstinence from sex (2). Since then, a number of studies showed that several chemicals used in working environments, such as certain organic solvents (19), pesticides (5), polychlorobiphenyls (23) and other endocrine disruptors (1), play a role in the occurrence of female breast cancer. Furthermore, a variety of chemicals (including gasoline and endocrine disruptors) were suspected to play a role also in male breast cancer (29). In addition to environ-

mental chemicals, there is evidence that the alteration of circadian rhythm during night-work increases the risk of female breast cancer (26). On the basis of available data, presently supported by consideration of both rationale and mechanisms (including circadian disruption with melatonin suppression through light at night) (4) and more recent evidence (15), the IARC classified shift work as a probable human carcinogen (27).

BREAST CANCER AND RETURN TO WORK

Breast cancer has a major impact on the daily life of women affected by it. Diagnosis involves several issues regarding prognosis, rehabilitation, occurrence of physical and psychological problems and a number of individual life aspects, including work (17). Although it has been observed that cancer survivors show declining work ability and are at increased risk of unemployment and early retirement (16), only limited attention is usually paid to the factors influencing return to work (RTW). The need to adapt working conditions for cancer survivors was emphasized and it was maintained that a suitable job is an important element in facilitating RTW, thus avoiding prolonged sickness absence leading to loss of income and social exclusion. A number of reasons may justify the delay in resuming working activity. Work overload, heavy lifting, manual tasks and work that requires physical effort are negatively associated with RTW and cause higher unemployment rates (25). Moreover, individual factors are negatively associated with RTW: values may have changed the attitude of individuals towards work thus reflecting a reduced importance of work and a decrease in career aspirations (14). On the contrary, RTW is positively associated with a flexible job (adaptation of work task, amount of work, working schedules) (3). The adaptation of jobs to the capabilities of individuals is easier and more frequent in large companies, where cancer survivors resume working earlier (20).

Different stakeholders are involved in treatment and rehabilitation of breast cancer survivors. Although patients receive some advice concerning RTW from their physician, employers play an im-

Table 1 - Review of evidence of an association between environmental factors and breast cancer. Table built on the data reported by the Institute of Medicine in 2012 (12).

Factor	Review of the evidence
Oral contraceptives	Use of certain exogenous hormones affects breast cancer risk, in particular the use of combined estrogen and progestin menopausal hormone therapy increases breast cancer risk
Body fatness and abdominal fat	Increased body fatness and increased risk of post-menopausal breast cancer presents a convincing causal association. More data are needed to assess the differences of body fatness with regard to pre- and post-menopausal breast cancer
Adult weight gain	Adult weight gain is a probable cause of post-menopausal breast cancer
Physical activity	Physical activity is a probable preventive factor against post-menopausal breast cancer
Dietary factors (Alcohol consumption)	Evidence of a modest relationship between alcohol consumption and breast cancer
Dietary supplements and vitamins	More research is needed
Zeranol and zearalenone	Area for further study
Active smoking	Clear evidence of an increased risk for breast cancer
Passive smoking	Evidence shows a gene-environment interaction involving women genetically predisposed to inefficient detoxification of carcinogenic exposures to tobacco smoke
Radiation - Ionizing	An established risk factor for breast cancer
Radiation - Non-ionizing	A potential area for future research
Alkylphenols	Given the widespread exposure and hazards identified in animal studies, further investigation is required
Bisphenol A (BPA)	Research should address additive or other cumulative actions of estrogenic compounds and their roles in overall health
Hair dyes	Based on available human evidence, personal use of hair dyes is unlikely to be an important risk factor for breast cancer
Perfluorinated compounds (PFOA, PFOS)	Evidence of biologic plausibility of increased risk for breast cancer
Phthalates	Further studies are needed on the potential mechanisms of effects
Benzene	Evidence in animals suggests grounds for concern regarding increased risk for breast cancer Suggestive evidence also from human studies
1,3-Butadiene	Evidence in animals suggests biologic plausibility of increased risk for breast cancer
PCBs	Further research on early-life exposures are required
Ethylene oxide	Data are insufficient to establish a role in affecting breast cancer risk
Vinyl chloride	Animal evidence shows a potential for induction of breast cancer from vinyl chloride
DDT/DDE	Unclear role of DDT in breast cancer risk. Possible role of early-life exposures
Atrazine and S-chloro triazine	Atrazine role in modulating steroidogenesis is an area for further study

(continued)

Table 1 (continued) - Review of evidence of an association between environmental factors and breast cancer. Table built on the data reported by the Institute of Medicine in 2012 (12).

Factor	Review of the evidence
Polycyclic aromatic hydrocarbons (PAHs)	Mechanistic evidence supports the biological plausibility that they influence breast cancer risk. Animal studies have not sufficiently addressed breast cancer. Further investigation is required
Dioxins	Neither human nor animal evidence suggests that exposure to TCDD or other dioxin-like chemicals is directly associated with an increased risk for breast cancer
Metals	Evidence for metals as risk factors for breast cancer shows biologic plausibility for increased risk of breast cancer for certain metals (cadmium, arsenic)
Shift-work	The available epidemiologic evidence suggests a probable association with increased risk. Further studies are needed on women exposed to light at night in their homes

portant role in promoting and supporting early RTW of patients (28). In fact, employers and their staff can support employees by recognizing their ability and providing them with a job to meet workplace demands. However, some negative aspects are found in the concern expressed by employers about the ability of patients to meet workplace demands and the concern of patients to disclose the diagnosis to human resources personnel and supervisors (11). In some cases, company physicians or insurance physicians provide advice to the patients, mostly by letting them decide about resuming work. However, employers or physicians do not usually take workplace hazards into account. Although several studies suggest that environmental factors contribute to the onset of breast cancer, current management of individuals susceptible to breast cancer and breast cancer survivors does not focus on either occupational exposure or working conditions (16).

FITNESS FOR WORK AND BREAST CANCER

Job adaptation, in some countries within a legal framework, is a responsibility or a co-responsibility of the occupational health physician, who provides workers with a fitness for work judgment (22). The assessment of fitness for work is based on the evaluation of worker ability and worker's health risk in relation to the working environment and organization. In other words, the decision is taken with the aim of ensuring that workers are fit to effectively

perform the task without any risk to them. Fitness for work assessment of susceptible individuals or breast cancer survivors raises a number of issues that need to be addressed by focusing on the different aspects of the decision-making process (evidence for the decision, individual and societal values, legal framework). The growing evidence of a relationship between shift-work and risk of developing breast cancer can mean that the company physician has to address a number of dilemmas when requested to provide a fitness for work judgement for a night-shift nurse returning to work after sick absence for breast cancer. Therefore, an ethical analysis of the dilemma could be made (7). The analysis should help to answer a number of questions such as (i) What information should be provided to the worker? (ii) How to deal with uncertainty in decision-making by taking into account scientific evidence and ethical values. (iii) If a judgement of "fit to work" is made, what is the professional's liability in case of recurrence of the disease? (iv) Is the available evidence on shift-work risk sufficient to support the "unfit for shift/night work" judgement? (v) What further investigations should be performed to better assess the risk? (vi) Are there markers which can identify occupational hazards for breast cancer? (vii) Which genetic tests can be used to screen susceptible women? (viii) What benefits and what costs should be considered for the different stakeholders? Although some of these dilemmas can be addressed within a legal framework (8), some aspects are difficult to deal with.

The occupational health physician, who should be encouraged to interact with family doctors, has the responsibility of deciding whether an individual (either susceptible to breast cancer or a breast cancer survivor) is fit or unfit for work. The decision must be based on detailed knowledge of the current clinical condition of the worker (including information about hormone therapy, use of oral contraceptives, overweight and obesity, alcohol consumption, smoking) and of current (and past) environmental exposure. As an example, an “unfit for shift/night work” judgement for a breast cancer survivor, aiming at preventing the recurrence of the disease, is based on the evidence provided by IARC (27). However, the “unfit for shift/night work” judgement involves a number of ethical and non-ethical problems (such as discrimination, difficult job accommodation, worker’s dissatisfaction due to loss of salary, individual risk perception), which should be openly analysed and discussed with the employee. Therefore, the occupational physician should deal with the uncertainties by taking into account the need to balance (i) the available evidence of adverse health effects and (ii) the ethical aspects of the dilemma. A variety of ethical costs should be focused if limited evidence of health risk (for example from alkylphenols or perfluorinated compounds) is available. Ethical costs include (but are not limited to) the following: possible harm due to invasive tests, false sense of confidence after an examination, psychological stress following an abnormal test result, type of information about adverse health effects of exposure that the employee should receive (9, 10). Finally, because any decision aimed at finding suitable job adjustments (change in duties and working hours, workplace adaptations) should be supported by line managers and human resources personnel, the occupational health physician should take into account issues such as disclosure of privacy and discrimination (18).

CONCLUSION

Many advances in breast cancer prevention, treatment and rehabilitation have been made (21).

Although increasing evidence exists that high-quality mammographic screening is an effective strategy to reduce the incidence of advanced breast cancer, over-diagnosis of breast cancer leads to considerable harmful effects. In fact, in the last decade, different interpretations of the evidence from randomized and observational studies resulted in different screening guidelines and academic debates on the assessment of certain benefits and potential harm from breast cancer screening (24). In spite of these controversies, little attention is presently paid to occupation as a possible risk factor. Although it was suggested that environmental factors (such as individual habits, workplace hazards, social context) contribute to the onset of breast cancer and can be an obstacle to safe work for susceptible workers and breast cancer survivors, current management of individuals susceptible to breast cancer and breast cancer survivors does not always focus on either occupational exposure or working conditions. With the aim of preventing the occurrence of the disease in susceptible individuals or the recurrence of the disease in survivors, more attention should be paid to occupational hazards (such as shift-work or exposure to specific chemicals), whose role in causing breast cancer has been reported.

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