WOMEN and OCCUPATIONAL HEALTH

دکتر فائزه دهقان
متخصص طب کار

Women at work

In the past 15 years, almost 50% of the workforce in many countries

significant job: services sector, agriculture.

industry: micro-electronics, food , textile footwear, chemical and pharmaceutical industries and handicraft workshops.

In the service sector :teaching, office work, hospitals, banks, commerce, hotels, domestic

Work offers many economic and social advantages to a woman and her family,

It has been shown that women work outside of the home live longer than women who do not

4/000/000

تعداد شاغلین زن در ایران

بیشترین سهم زنان بخش خدمات با 53/4%

کمترین بخش کشاورزی19/7%

سهم اشتغال در بخش خصوصی بیش از 77/3%

1% زنان شاغل بعنوان کارفرما هستند

segregated on the basis of gender

Inequality

low paid

unpaid workers

women differ from men in the jobs they do, the hours and patterns of work, and even their rates of pay.

These factors impact on women's health and fitness for work.

normal physiological changes such as pregnancy, menopause, as well as specific health problems related to menstrual, cervical, ovarian, or uterine conditions.

Some of these have associated psychological consequences, require adjustments at work

All women work, perform dual roles of production and reproduction

WHO

Occupational and Environmental Health of Women- WHO

The so-called housewife is already doing a single shift.

If a woman works outside home, she is consistently working a double shift.

When children or family members are ill, she does three shifts day after day.

On an average, women work much longer hours than men.

ILO, 2/3rd of the working hours around the world are worked by women because of the combination of various roles in the workplace, in the family and in the society. Most often, the women's work remains invisible

Even in countries like Sweden, a role model in nearly all aspects of the well-being of mankind, *Monica Boethius*, who heads the Swedish Work Environment Fund's equality programme, writes: "Despite decades of campaigning for equality, women still earn less than men, have less chance of promotion, often given work not up to their qualifications and are more exposed to health hazards than men."

It is an unequal world, more so for the women workers in developing countries who stand very little chance of equality

Women and absenteeism

2.9 per cent of all female versus 2.1 per cent of male employees were absent from work.

For men, the top reason was musculoskeletal problems followed by back pain, while for women, was stress, depression, and anxiety followed by musculoskeletal problems.

The differential is greatest at ages 25- 34 and next ages 35-44- For emergency child care

sickness absence

Causes of sickness absence in women

- minor illnesses (33%)
- musculoskeletal problems (14%)
- other (13%).

genitourinary problems (urine infections and pregnancy- related problems) were for 5% of sickness absences

need to sickness absence

women often have significant additional commitments and responsibilities in the

home and outside of work.

There is evidence that differences in sickness absence rates between men and women reflect the need to manage other,immediate and domestic responsibilities.

Male- female differences structural

women are smaller in all dimensions except hip breadth:

stature :13 cm shorter

eye height when sitting : 5 cm lower

Grip reach when standing :15 cm less

sitting: 10 cm less

forward reach :7 cm less.

Male- female differences structural

Wider female pelvis, decreases the lateral angel between femure and tibia, enhances likelihood of patella and knee disclocation.

The female spine is longer for size than is the male spine; and in combination with the ligamentous relaxation and the change in weight distribution caused pregnancy, it incraese the probability of L5- S1 disk herniation.

Male- female differences
strenght

male–female differences in body size and function but that there is considerable variation and overlap.

For example, women on average have 61% of male muscle strength, but there is still a 10 per cent ‘chance encounter of female exceeding male’ strength in physica strenght, aerobic capacity , there is a wide range of capability in men and women, there is much overlap.

Working conditions and the working environment are sources of health hazards for both men and women.

In general there is no great difference between men's and women's biological response to physical, biological or chemical hazards.

The average strength of men is not so different from that of women, some women can be even stronger than men.

- At age 20 the average woman has 65% of the lifting strenght of average man.
- The push- pull sternght is 75% of man.

Pulmonary cosideration

- The lung- surface to body- volume ratio is larger in men than in the women.
- Men absorbe larger dose of substances inhaleded over shoeter time period , blood level of these will rise rapidly than womens, but also fall more rapidly when the substance is removed from environment

Energy expediture

- The male/ female maximum attainable energy expediture ratio is 1.42:1
- Vital capacity is 11% less
- Hb is approximately 20% less
- Larger skin area to circulating volume
- Smaller body -water to body - weight ratio
- Larger body fat - content

Tolerance of heat

women have larger body fat content.

They have lower heat tolerance and greater cold tolerance.

The greater body fat serves as an insulator in both heat and cold.

Tolerance of heat- pregnancy

- A pregnant womans body dissipates both fetal body heat, about 1 degree higher than hers, and the heat produced by her own increased metabolic rate.
- The pregnant cardiac is even less able to cope with the increased circulatory demands produced by this exposure.
- Dizziness and syncope are reported in pregnant women when exposed to extreme heat or humidity or when first exposed to heat.

Sex specific factors

- The breast is a very fatty organ and quite metabolically active. The difference in breast cancer rates between men and women is known to all.
- The potential for fat- soluble carcinogens to cause differential rates of breast cancer is obvious.
- Some chemicals are known to have estrogen- like effects.
- Incresead DDT in women with breast cancer.

Health hazards of women workers have been traditionally **under-estimated** because

occupational safety and health standards and exposure limits to hazardous substances are based on male populations and laboratory tests

Snook

Maximum Acceptable Weight of Carry (kg)

Height	Percent	2.1 m carry: One carry every 6 s	12 s	1 min	2 min	5 min	30 min	8 hr	4.3 m carry: One carry every 6 s	12 s	1 min	2 min	5 min	30 min	8 hr	8.5 m carry: One carry every 6 s	12 s	1 min	2 min	5 min	30 min	8 hr
Males																						
	90	10	14	17	17	19	21	25	9	11	15	15	17	19	22	10	11	13	13	15	17	20
	75	14	19	23	23	26	29	34	13	16	21	21	23	26	30	13	15	18	18	20	23	27
111	50	***19***	25	30	30	33	38	44	17	20	27	27	30	34	39	17	19	23	24	26	29	35
	25	***23***	30	37	37	41	46	54	***20***	25	33	33	37	41	48	***21***	***24***	29	29	32	36	43
	10	***27***	***35***	43	43	48	54	63	***24***	29	38	39	43	48	57	***24***	***25***	34	34	38	42	50
	90	13	17	21	21	23	26	31	11	14	18	19	21	23	27	13	15	17	18	20	22	26
	75	18	23	28	29	32	36	42	16	19	25	25	28	32	37	17	20	24	24	27	30	35
79	50	***23***	30	37	37	41	46	54	***20***	25	32	33	36	41	48	***22***	***25***	31	31	35	39	46
	25	***28***	***37***	45	46	51	57	67	***25***	30	40	40	45	50	59	***27***	***32***	38	38	42	48	56
	10	***33***	***43***	53	53	59	66	78	***29***	***35***	47	47	52	59	69	***32***	***39***	44	45	50	56	65
Females																						
	90	11	12	13	13	13	13	18	9	10	13	13	13	13	18	10	11	12	12	12	12	16
	75	***13***	14	15	15	16	16	21	11	12	15	15	16	16	21	***12***	***13***	14	14	14	14	19
105	50	***15***	16	18	18	18	18	25	***12***	13	18	18	18	18	24	***14***	***15***	16	16	16	16	22
	25	***17***	***18***	20	20	21	21	28	***14***	15	20	20	21	21	28	***15***	***17***	18	18	19	19	25
	10	***19***	***20***	22	22	23	23	31	***16***	17	22	22	23	23	31	***17***	***19***	20	20	21	21	28
	90	***13***	14	16	16	16	16	22	10	11	14	14	14	14	20	***12***	12	14	14	14	14	19
	75	***15***	***17***	18	18	19	19	25	11	13	16	16	17	17	23	***14***	***15***	16	16	17	17	23
72	50	***17***	***19***	21	21	22	22	29	***13***	16	19	19	20	20	26	***16***	***17***	19	19	20	20	26
	25	***20***	***22***	24	24	25	25	33	***15***	17	22	22	22	22	30	***18***	***19***	21	22	22	22	30
	10	***22***	***24***	27	27	28	28	37	***17***	***19***	24	24	25	25	33	***20***	***21***	24	24	25	25	33

Notes:
1. Height is vertical distance floor to hands

2. Percent pertains to industrial population

3. Italicized values exceed 8 hr physiological criteria

The differential response of women to health hazards is essentially due to the various workrelated risks that women face according to the specific type of work they do and on the multiple roles they have in society.

OCCUPATIONAL HAZARDS AMONG WOMEN WORKERS

OCCUPATIONAL HAZARDS AMONG WOMEN WORKERS

- Occupational stress
- Ergonomic
- reproductive

Sources of occupational stress

- Problem of multiple roles
- structure: parttime, temporary
- Violence
- Discrimination
- sexual harassment

Problem of multiple roles

Working mothers sleep less, get sick more, less leisure time

These women talked about sleep the way a hungry person talks about food

Child care, house work, household shop

structure: parttime, temporary

Paid , insurance, sick leave , vacation less

Crunch periods

No protection safety, health regulation, unemployment insurance

violence

- Violence is about power and control
- Processe that involves using force or deliberately trying to intimidate somene
- Include verbal intimidation, assault
- Fatal: retail trader- service occupation
- Nonfatal:caregiver in nursing home,hospital
- Kicking, hitting
- Main risk factor is working with “the public”

Discrimination

- Racial, gender, age
- Economic term : Lower pay than men
- Social term: isolation from supervisor and coworkerd
- Personal terms: low self esteem, reduced creative growth
- Unwelcome indusrtries- the most men
- Part of racial or ethnic minorities

sexual harassment

- Women is predominant target
- Any unwanted verbal or physical sexual advance
- Studies: 40-80% women have experience some
- Not only harmful to health, it is costly to business, turnover, sick time, impaired productivity, cost of legal claim

Psychosocial risks

- fear of unknown situations
- role overload
- monotonous and repetitive
- fear of losing a job
- relationship problem
- less qualified jobs
- lower wages

- *non-occupational factors*, family problems, multiple roles, health anxieties, financial worries

Research has found that, women's stress levels remain high after work, particularly if they have children living at home.

Men, however, generally unwind rapidly at the end of the working day.

partly due to the unequal

Ergonomic

design of machinery and equipment anthropometric data

- Repetitive
- Foeceful
- static effort
- Awkward
- Lifting
- Tenosynovitis,CTS
- PPE were developed for average men

ILO

Musculoskeletal disorders are the most common health impairments in the workplace.

Women tend to suffer more from pain in the upper back and upper limbs as a result of repetitive work in both manufacturing and office work, this is accentuated during pregnancy.

They also often have jobs which require prolonged standing; while men tend to suffer more from lower-back pain from exerting high force at work

Specific occupations

- Office work
- Hospital work
- Microelectronic
- Household work

Office work

- Chemical building, cleaning product, photocopier (ozone uv)duplicating machine (methanol, ethanol, ammonia), formaldehyde(carbonless paper, material) Pesticide- radon- smoke- biologic.
- NIOSH recommended 15 minute breake /2h VDT work or 15 m/ h if workload or visual demands are high

Hospital work

Stress is major problem for HCW for:

- Overwork
- Responsibility for human life
- Shift work

High Injury rate- violence

chemical: cleaning, sterilizing, lab, chemotherapy

Biologic , radiation

Latex allergy (5-12%) frequent exp may lead to development of allergy and worsening of reaction in those already sensitized

Microelectronic

- Chemical: soldering, solvents, metals arsenic, antimony boron, phosphrus, acid, electroplating, etching
- Ergonomic- repetitive motion
- Abortion
- Respiratory symptoms
- dermatitis

HOUSEHOLD work

Chemical: cleaning fluids,
bleach, detergents, insecticides and pesticides
psychosocial
monotonous, boring and repetitive
little satisfaction from their routine tasks
physical problems, child care

OCCUPATIONAL MORBIDITY

- WHO report on women's health in Central and Eastern Europe (1994), occupational diseases develop mainly in women between the ages of 31 and 50, with between 11 and 20 years of work of exposure to the particular hazard. cancers, skin diseases, stress-related conditions and diseases of the muscles and joints

Interactive health hazards

interactive and synergistic nature of health hazards.

poor sanitation, inadequate water supply and garbage disposal, heavy indoor air pollution and crowding small children and a heavy housework burden

.

The epidemiology of occupational morbidity

sickness leave from work

- respiratory diseases
- musculo-skeletal disorders
- Digestive
- cardivascular

Early retirement due to illness

musculoskeletal 31 %

Psychiatric problems 22%

circulatory system 13.3% (including strokes and heart attacks)

neoplasms 12.4%

Early retirement due to reduced earning capacity following illness

Disease	Number	Percent
infective and parasitic	694	0.64
neoplasms	13,532	12.44
endocrine, nutrition, immune system	3,136	2.88
blood and bloodforming organs	190	0.17
psychiatric diseases	24,055	22.11
nervous system	7,210	6.63
circulatory system	14,568	13.39
respiratory system	3,463	3.18
digestive system	2,418	2.22
genito-urinary system	1,105	1.02
complications of pregnancy	31	0.03
skin	459	0.42
skeleto-muscular system	32,710	30.07
congenital anomalies	905	0.83
diseases originating in perinatal period	40	0.04
inadequately described conditions	2,044	1.88
injuries and poisonings	2,118	1.95

Infectious and parasitic diseases

in poor rural women - work in agriculture. Long hours spent in water while weeding and transplanting rice, which here is essentially a female occupation, increases susceptibility to vaginal infections, infectious and parasitic diseases, and insect bites.

in Pakistan, Rural women are also described as being affected by parasitic and other infections, tetanus and heat exhaustion

بیماری قالی بافان

- بیماریهای اسکلتی عضلانی زنان و دختران از دوران کودکی و قبل بلوغ مدت زمان بسیار طولانی را در طول روز نشسته می مانند که مانع از توسعه طبیعی استخوان لگن می شود. تنگ شدن لگن خاصره در خانم ها که باعث اشکال در زایمان، سزارین اجباری یا حتی مرده زایی و سقط جنین
- ورم مفاصل و کیفوز کمر
- بیماریهای پوستی و تنفسی
- مکان های بدون نور کافی آفتاب در معرض خطر کمبود ویتامین دی از عوامل خطرساز پوکی استخوان
- کم نوری و سردرد و خستگی

Toxic chemicals and carcinogens

The WHO report on women's health in Eastern and Central Europe identifies exposure to

pesticides in agricultural work, women, fetus .

in China ,smoky coal in domestic cooking is lung cancer amongst women

US Industries which process coir, jute and cashew nuts, or involve cotton, tea or rubber, as well as the textile industry, expose women to toxic chemical carcinogens. 'women are, indeed, employed in hazardous occupations'.

Respiratory problems

rural kitchens of pollutants averaging 100 times the levels acceptable to WHO.

women's exposure to cooking fumes was calculated as equivalent to smoking 20 packs of cigarettes a day (World Bank, 1996).

respiratory infections and tuberculosis, asthma linked to smoke and dust levels.

Respiratory problems

- rural Southern African women, Domestic smoke, combined with the inhalation of silica particles whilst hand-grinding maize between rocks, has been linked to a form of pneumoconiosis,

'Transkei silicosis‘

- Sweden amongst women working in potteries, Silicosis has been diagnosed.
- developing countries, WHO report, women pots or are engaged in ceramics work and pottery industries, Silicosis has also been diagnosed.

The designation of silicosis as a 'male disease', coupled with the long latency period, enhances the risk of it remaining undiagnosed in women, especially where the women are rural and living indeveloping countries

Musculo-skeletal disorders

Fruit pickers in Chile report repetitive motion injury and associated tendonitis.

Indian women working in agriculture suffer arthritis and rheumatism, with back pain and osteoarthritic complaints also common.

Women in the carpet industry suffer ankyloses and chronic postural defects which may result in difficult pregnancies or even sterility.

Indian women workers in the garment and embroidery industry complain of chronic back pain and eye problems due to poor workplace conditions and lighting.

Special needs

nutrition, lifestyle and reproductive health.

Special health problems can arise from this situation including stress, chronic fatigue, premature aging and other psycho-social and health effects.

Marriage, work and health

Marriage has long been recognised to have a protective effect upon the health – including mental health - of men.

studies clearly showed that more married women than married men had mental ill-health problems.

because of emotional problems.

Unemployment

contributing factor in increased rates of suicide among women, as well as men, during the period.

Pregnant women and mothers of young children who are unemployed also have higher rates of anxiety and depression than employed women.

Reproductive hazard

Reproductive hazard

in general, men's OSH has received more attention than women's, this is not true for reproductive health.

Occupational research and measures to protect workers' reproductive health at work have focused primarily on protecting pregnant women and particularly the foetus.

Reproductive Hazards

Substances or agents that affect the reproductive health of women or men or the ability of couples to have healthy children.

A reproductive hazard could cause one or more health effects, depending on when the woman is exposed.

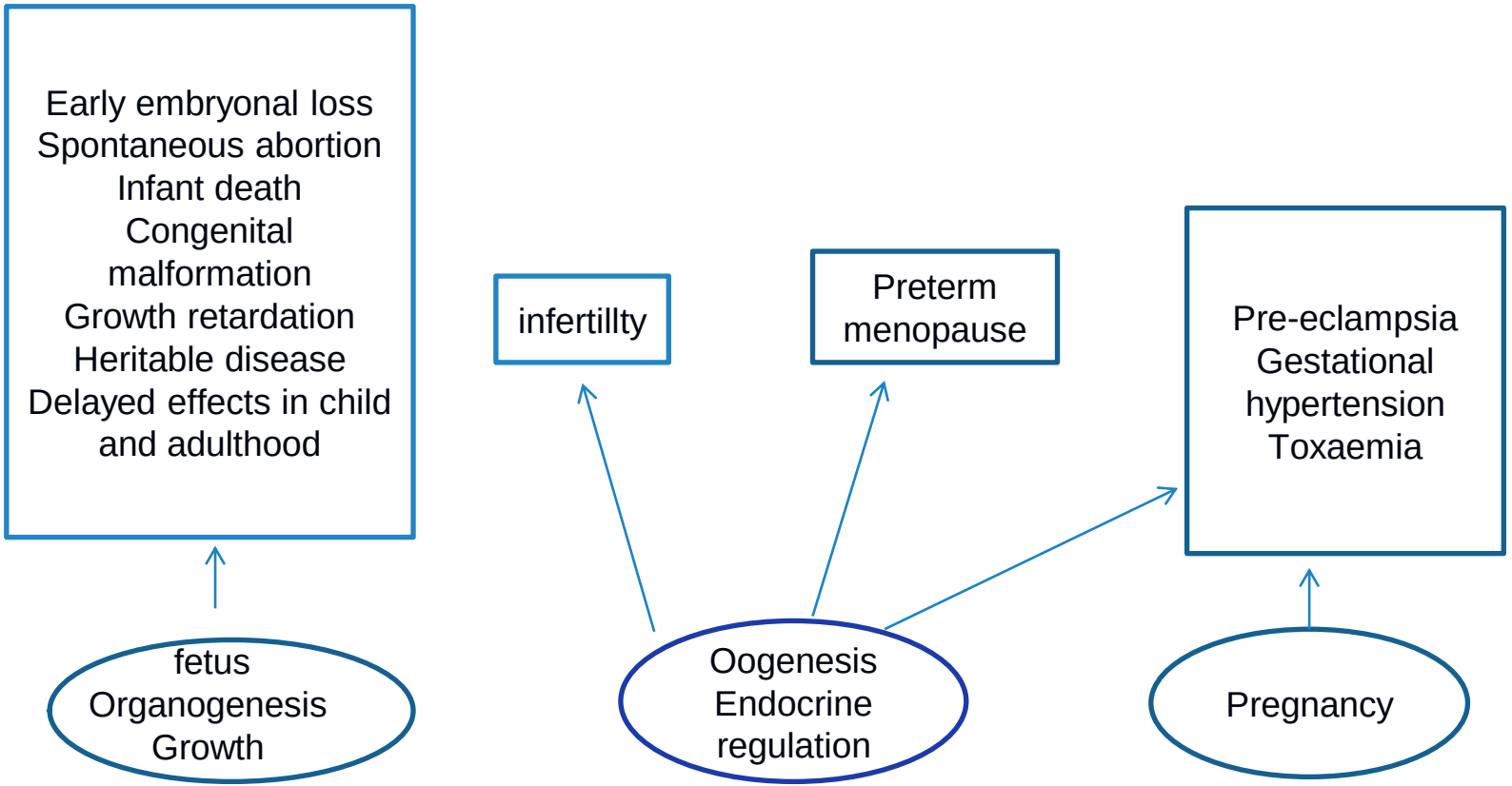
Reproductive health

- Chemical
- biological
- physical hazards noise and vibration; radiation
- ergonomical heavy lifting, standing or sitting for long periods
- They can also affect the woman, the child and the pregnancy,

female reproductive system

- germ cells from birth, more susceptible to some toxic
- complex hormonal equilibrium, which can be easily disrupted by external agents with possible damage to the woman herself and to the offspring
- foetus is usually more vulnerable to environmental and occupational agents which can penetrate through the placental barrier

The range of short- and long-term adverse effects on reproductive function.



reproductive problems

- Menstrual cycle effects
- Infertility and subfertility
- Miscarriage and stillbirths
- Birth defects
- Low birth weight and premature birth
- Early menopause
- menarche
- Developmental disorders
- Childhood cancer

reproductive toxicants

- known
- ionizing radiation
- mercury
- lead
- polychlorinated biphenyls (PCBs)
- Ethylene glycol ethers (2EE) (2ME)

- suggested effects
- anesthetic gases
- biologics and antineoplastic drugs(HCW)
- Pesticides
- plasticizers ,phthalates , bisphenol-A
- Sterilant disinfectant ethylen oxide formaldehyde
- Shift work
- Physical exersion

Menstrual Cycle Effects

High levels of physical or emotional stress or exposure to chemicals such as carbon disulfide may disrupt the balance between the brain, pituitary, and ovaries.

This disruption can result in an imbalance of estrogen and progesterone, and lead to changes in menstrual cycle length and regularity and ovulation.

sex hormones have effects throughout a womans body, severe or long-lasting hormone imbalances may affect a womans overall health.

Infertility and Subfertility

- +*Ionizing radiation, radium
- Chromium compounds
- Anaesthetic gas
- Cadmium
- Mercury vapour (metallic)
- Chlorinated hydrocarbons
- Halogenated hydrocarbons
- Polychlorinated
- p,p-DDE (a DDT metabolite)
- Pesticides
- Noise

Miscarriage

pregnancy loss before 24 weeks

+* Organic solvents- Ionizing radiation- Infections

+ Building painters- Dry cleaning- Electronics industry- Hospital workers(radiology technicians, operating room- nurses)- Laboratory work- Pharmaceutical industry- Plast industry workers - Textile industry- Anaesthetic gases- Pesticides-Antineoplastic agents- Disinfectants- Inorganic lead- Microwaves- agriculture and horticulture, nursing food and beverage servers- noise- Physical exertion

Early menopause.

- Oocyte destruction by chemicals such as polyaromatic hydrocarbons (PAHs)

Preterm- LBW

- Preterm birth is the most important single determinant of adverse infant outcome in terms of both survival and quality of life.
- LBW is a cause of infant morbidity and mortality, as well as predicting adverse outcomes in later life (eg poorer growth and development, neurological and cognitive deficit, high blood pressure, noninsulindependent diabetes, coronary heart disease, stroke and obstructive lung disease)

Certain mutagenic chemicals

organic solvents, ethylene oxide, and metals (eg, arsenic and nickel)

Teratogens/ Birth defect/ Congenital malformation

Teratogen : any agent that causes a structural abnormality following fetal exposure.

- A birth defect is a physical abnormality present at birth, though it may not be detected until later.

greatest susceptibility to teratogenic agents occurs during the embryonic period.

- less than 1 per cent of birth defects are thought to be attributable to man-made chemicals.

teratogens/ Birth defect/ Congenital malformation

- antineoplastic drugs
- diethylstilbestrol (DES)
- lead
- Ionizing radiation
- Mental strain *+ hunter
- Infections *+

Developmental exposures

- prenatally and at birth: spontaneous abortion, stillbirth, LBW , IUGR, infant mortality, and malformation

- childhood: asthma, cancer, neurological and behavioural effects

- puberty: alterations in normal development and impaired reproductive capacity

- adults: cancer, heart disease, and degenerative neurological and behavioural disorders.

Childhood/ Developmental

- Lead: neurobehavioral problems , learning, memory, learning.
- Mercury: well known developmental neurotoxicant
- Organic solvens: lower score on language and gramotore skills, behavioral problems, deficit in color vision
- Environmental Expo PCBs: reduce verbal abilities, processing speed, visual recognition memory

Childhood- Erarly puberty

- Endocrine disrupting chemicals, puberty alter .
- Lead, TCDD delay puberty in girls and boys
- DDT, PCB, , PBB, PBDE, Bisphenol A, early puberty girls

- Erarly puberty reduces adult height, younger age at menarche increases the risk of breast cancer.

Childhood cancer

Potentially, carcinogens could cross the placenta and exert an effect at any stage of development.

Ionizing ++

EMF +/+ laudo

Building painters- Childhood leukaemia

Pharmaceutical industry

Organic solvents

Cancer/adult

- Increased mortality from lung cancer and bronchiectasis in young adults after exposure to arsenic in utero and in early childhood

Lead

- known to cross the placenta and have adverse effects on the foetus, including miscarriage, neural tube defects, and low birth weight.
- Regulations,restrictions on ‘women of reproductive capacity’, e.g. in they have action’ (25 µg/dL) or ‘suspension’ from work (30 µg/dL).
- pregnancy is declared, woman should be removed from any work where exposure to lead is ‘liable to be significant’

Chemical hazards

specific reproductive concern

- R60 and R62 (fertility);
- R61 and R63 (development);
- R64 (may cause harm to breast-fed babies)
- general carcinogenic hazard: R40, R45, R49, R68

Noise, heat

impacts that harm mother's health can indirectly have detrimental effects on fetus.

Shift work/ irregular hours

- moderately increased spontaneous abortions, preterm births, IUGR, decreased fecundability or longer time to pregnancy.

- Night-shift work increases the risk of cancer at several sites among men and increases the risk for breast cancer among women.
  - shift work increases women's risk of cardiovascular events more than it does for men

IARC carcinogenicity of shift work that involves night work*, but overall shift work that involves circadian disruption is probably carcinogenic to humans (Group 2A).*

- *night shift work may increase risk of breast cancer*

Non-ionizing radiation

Electromagnetic radiation at lower, non-ionizing frequencies has been less vigorously studied but

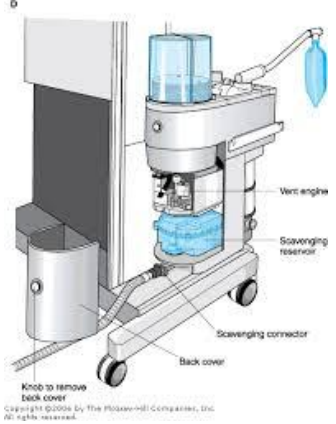
there is no current evidence of any significant reproductive hazard and there are no gender-specific occupational limits.

Computer/display screen equipment

evidence suggested that exposure to contemporary VDT was suspected to have only a slight association with a slight increase in the risk of miscarriage (10–20 %).

It was unclear whether this was attributable to electromagneticradiation or to other work-related conditions such as ergonomic factors, work stress, and long working hours

Anaesthetic gases



- Miscarriage
- NIOSH recommended exposure limits for Common anaesthetic agents (e.g. halothane, isoflurane, nitrous oxide)
- Nitrous oxide : spontaneous abortion, low birth weight ; in environments less well ventilated , e.g. delivery rooms, accident & emergency, and dental surgeries.
- in paediatric anaesthesia the anaesthetist may be less well protected: more gaseous induction is used, higher
- Ventilation, scavenging, and/or air monitoring should be considered where exposure may be prolonged.

Hospital staff

Potential reproductive hazards

X-rays, strong magnetic fields

antineoplastic drugs, anaesthetic gases,

disinfectants, infections

Councelling and comments

Mixing and intravenous administration of antineoplastic drugs should be avoided.

Open or semiclosed inhalation anaesthesia and work in insufficently ventilated

post-operative care units must be avoided

Carbon monoxide

- CO binds strongly with haemoglobin and acts as a chemical asphyxiant.
- CO crosses the placenta and acute exposure can cause foetal death or malformations.
- In acute exposure, foetal outcome is related to both maternal carboxyhaemoglobin level and maternal toxicity.
- Dichloromethane, a solvent used for paint removal, is readily absorbed through the skin and lungs

Cytotoxic drugs

- workplace exposure is not safe inpregnancy.
- The exposure can occur in manufacture, reconstitute, administer cytotoxic drugs to patients and subsequently handle their body fluids

Organic solvents

- perchloroethylene, methylene chloride,
- toluene, xylene, and glycol ethers and fluoride compounds
- semiconductor industry, laboratories, electronics, cleaning work
- higher risk SAB Suggestive study

potential association between solvent use and fetal growth or preterm delivery

Laboratory technicians

Potential reproductive hazards

Organic solvents, metals, pigments,

pesticides, acrylamide, ionizing *a*-

β-emitters and many others

Councelling and comments

Exposures are complex and highly varaible depending on type of laboratory. A specific evaluation of each uniqe job task is warranted. If open handling of laboratory chemicals can be avoided and extraction, mixing and pipetting take place in ventilated hoods and closed benches conditions may be safe for pregnant women. Risk for spillage and unintended peak

exposure should be considered

Biological hazards

- many infections cross the placenta ,fetus
- chickenpox and malaria, CMV, Toxo, Rubella, HIV,HBV
- significant contact for rubella and parvovirus B19 (‘slapped cheek disease’) as ‘15 minutes in the same room or face to face contact
- Vaccine >3 m- before pregnancy for varicella , rubella
- VZIG prophylaxis for susceptible workers
- morbilli

Dental assistants

Potential reproductive hazards

Nitrous oxide, x-rays, creosol, chlorphenol, methacrylates. There are no data to indicate that mercury vapour from amalgam is teratogenic at exposure levels seen in dental clinics

Councelling and comments

Unless local exhaust and room ventilation is keeping nitrous

oxide concentrations in ambient air at levels far below threshold limit values, pregnant women should be replaced

Electronics and semiconductor industry

Potential reproductive hazards

Inorganic lead in solder tin, glycol ethers in

adhesives

Councelling and comments

If local exhaust ventilation is adequate, soldering seldom

causes measurable increase in blood lead. Skin absorption

and inhalation of glycol ethers must be effectively ruled out

Greenhouse workers

Potential reproductive hazards

Fungicides, insecticides, growth retardants

Councelling and comments

Pregnant women should not apply pesticides because of potential risk of high exposure and failure of protective equipment. Pesticide-treated cultures should not be handled until residue on leaves have disappeared (appropriate reentry time). Use of gloves important to avoid skin absorption

Hair dressers

Potential reproductive hazards

Dyes (includng toluene- and phenylenediamines), sprays, shampoos, permanent-wave solutions and perfumes

Councelling and comments

Use of gloves to avoid direct contact with dyes and local exhaust ventilation to clear room air for contaminants from sprays and permanent wave solutions are most often sufficient to ensure safe working conditions for pregnant women

Screen printing

Potential reproductive hazards

Highly volatile organic solvents

Councelling and comments

In manual or semi-automatic screen printing, it is difficult to obtain sufficiently low exposure levels and replacement of pregnant women is advisable

Reinforced plastics laminating

Potential reproductive hazards

Styrene,

methylene chloride

Councelling and comments

Manual laminating is related to high exposures and use of airstream helmets and other protective outfit is necessary

Pregnant women should be replaced

Plastic extruders

Potential reproductive hazards

Complex mixtures of organic compounds in

low concentrations in ambient air

Councelling and comments

Irritation of mucus membranes is an indication of possible risk.

Adequate control of process temperature important to avoid high exposure

Painters in construction work

Potential reproductive hazards

Organic solvents in paints, varnishes, fillers

and adhesives

Councelling and comments

Use water-based rather than solvent-based products. Take care not to use water-based paints with low content of white spirit that may evaporate differentially and cause rather high exposure levels in ambient air. Work from ladder or scaffolds should be avoided in late pregnancy. If appropriate action is taken pregnant painters can most often continue work during pregnancy

Physical exertion

- Heavy lifting, prolonged standing, or repetitive stooping and bending, prolonged standing

most consistent adverse effect:

preterm delivery and possibly low birth weight and SAB, with less consistent results seen for fecundability and menstrual disorders.

NOISE

The fetal ear is sensitive to noise-induced damage from the 20th week of gestation. Uterus and fetal fluids attenuate the sound level, but less so at low frequencies where resonance phenomena may even reinforce the sound pressure.

Noise

- Pregnant women should avoid very high exposure levels above 110 dB over eight hours and low frequency noise should be avoided at even lower exposure levels.
- Noise associated with miscarriage, preterm birth and growth retardation which has been attributed to high circulating cortisol levels related to continuous activation of the hypothalamic–pituitary–adrenal (HPA) axis.

Menstrual cycle

Menstrual disorders

Troublesome symptoms: heavy bleeding, pain, and mood changes. A few days each month of absence and/or reduced performance can easily cause a considerable impact on work.

Average women 10% decrease in endurance and work capacity during

menstural period

Menorrhagia/ heavy menstrual bleeding

- common problem
- menstrual loss of greater> 80 mL of blood or bleeding sufficient to interfere with emotional, social, and material quality of life.
- Diagnosis relies on excluding common/
- transvaginal ultrasound and outpatient hysteroscopy

Dysmenorrhoea

- Dysmenorrhoea can be associated with menorrhagia, fibroids, or endometriosis, which may require treatment of the underlying cause.
- Pain management includes simple analgesia and NSAIDS

Polycystic ovary syndrome

- 2– 26 %
- PCOS predisposes to diabetes, sleep apnoea, depression, endometrial thickening, and, in some phenotypes, cardiovascular disease. Presenting symptoms can include central obesity , acne, excess facial hair, and menstrual dysfunction.
- The mainstay of treatment is control of carbohydrate metabolism (commonly metformin or Inofolic® (400 mcg folic acid + 4 g of myo- inositol)) and menstrual regularization.

Premenstrual syndrome (PMS)

- distressing physical, behavioural and psychological symptoms, in the absence of organic or underlying psychiatric disease, which regularly recurs during the luteal phase of each menstrual (ovarian) cycle and disappears or significantly regresses by the end of menstruation.

Endometriosis

benign but complex 10% of women

Characterized by the presence of hormonally reactive endometrial tissue around ovaries, pelvis, bladder, and bowel, endometriosis

- dysmenorrhoea, menorrhagia, general pelvic pain, dyspareunia, and discomfort when going to the toilet.

losses in productivity- need for prompt referral

fibroids

- Menstrual problems can affect young females in time of university / employment.
- impact work or study include persistent pain, especially during menstrual periods, irregularities of menstruation
- often exacerbated by the psychological impact of hormonalmonthly changes.
- This can produce an effect on work attendance and productivity. Short- term adjustments to work patterns may be helpful
- anaemia and associated fatigue

gender identity issues- LGBTQ

- 10% of people identify as lesbian, gay, bisexual, transgender, or questioning
- Health and well- being issues relating to these groups are numerous and poorly understood by health professionals.
- Depression and suicide
- Substance misuse
- Cervical cancer
- Breast and endometrial cancer

LGBTQ- workplace

They need reassurance and support in the workplace as much as other employees, and

training of employers and colleagues will help reduce stigma

pregnancy

Working women have better pegnancy outcomes than unemployed women, especialiy in developed countries*;*

Healthier behaviors by higher social class, such as avoidance of smoking, alcohol during pregnancy,economic benefits; better nutrition and improved access to health care services.

Pregnant worker

First trimester

↑Total body volume → ↑HR
↓total RBC→anemia, ↓Hb
↑vulnerable to CO
↑Ventilation rate 7L/M→10L
↑absorption any toxic in air
↑ GFR 50% → ↑urination
↑Metabolic rate→ ↑sensitve hot, humid
Vomiting, fatigue→ ↓work capacity

Second trimester

feel better
Weight gain 7kg
Tilt body forward
Lower spine curves inward
↑Pelvic joint mobile , Agg LBP
Change gravity ↓balance
↑blood to pool legs, dizziness, faint prlong standing, hot work
↑ Varicose vein

Third trimister

Weight gain 11kg
Peipheral edema
↑ fatigue, insomnia,
, shortness breath
Incontinencel frequency
prolong standing, balance, endurance, exertion, hot difficult

Pregnancy changes that affect fitness FW

- Need to urinate more frequently/urgently.
- Nausea and need for frequent meals/increased fluid intake.
- Intolerance of strong odours.
- Liability to faint.
- Tiredness.
- Poor tolerance of shift work.
- Susceptibility to occupational stressors.
- Reduced ability to run: heavily pregnant abdomen, joint laxity, ankle oedema
- gravity changes, affecting risk of falls, work at heights.
- Heat intolerance.
- Fit and efficacy of protective clothing and equipment.
- Work in confined spaces, access via emergency exits.

- However, employers have a responsibility
- to carry out a risk assessment.

Factors to consider in a pregnancy risk assessment

- Physically demanding work.
- Prolonged standing.
- Long hours, shift work, or night work.
- Hazards: radiation exposure, chemicals/ anaesthetic gases

PHYSICAL WORKLOAD

healthy and fit wome are able to comply with physical work demands throughout pregnancy without posing a risk to the fetus.

PHYSICAL WORKLOAD

- moderate or light exertion levels should be safe throughout pregnancy
- Heavy lifting, prolonged standing, or repetitive stooping and bending are recommended to be discontinued early during the second trimester

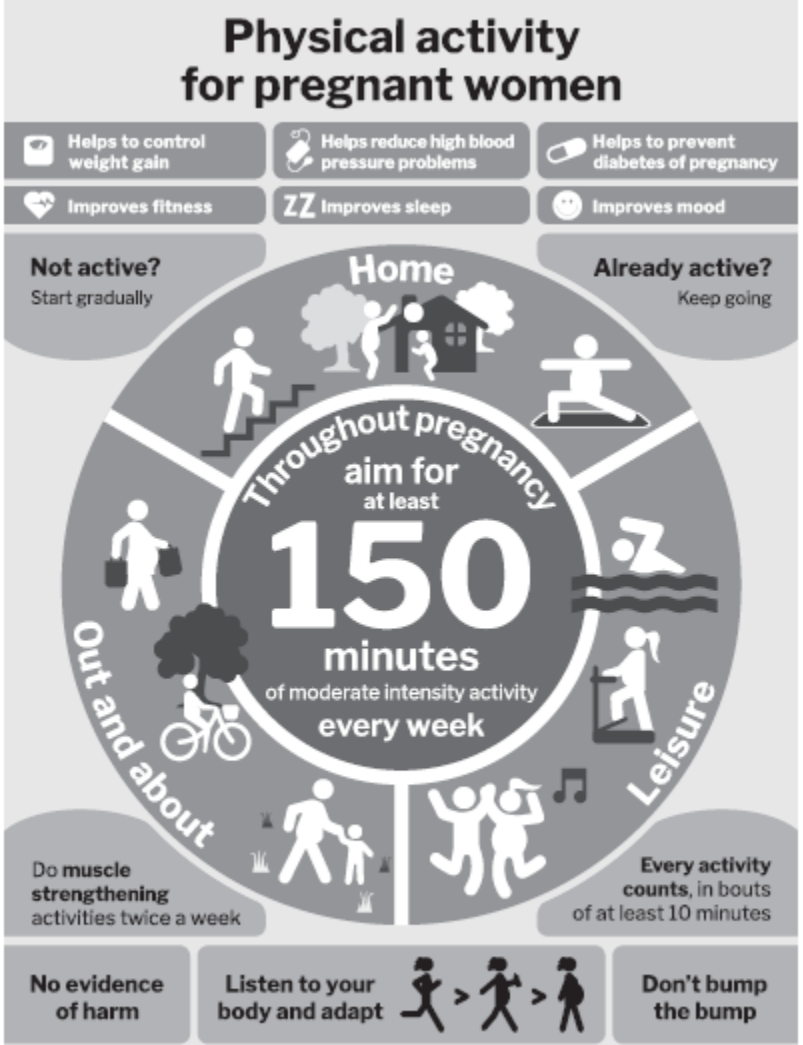
PHYSICAL WORKLOAD

Duties of a pregnant woman, especially one with a high risk pregnancy can be individually assessed, and adjusted

PHYSICAL WORKLOAD

Prolonged strenuous physical exertions, awkward postures and prolonged standing should be avoided and sufficient rest periods for the pregnant woman is warranted – in particular in the third trimester and in the presence of earlier pregnancy failures or if pregnancy complications develop

Physical activity for pregnant women



UK Chief Medical Officers Recommendations 2017: Physical Activity in Pregnancy.

Exercise pregnancy

all women should be encouraged to participate in aerobic and strength-conditioning exercise as part of a healthy lifestyle during their pregnancy' and that 'reasonable goals' of aerobic conditioning should be maintained;

Exercise pregnancy

these appear to confer physical and psychological benefits:

reduced fatigue, varicosities, swelling of extremities, insomnia, stress, anxiety and depression, perhaps even length of labour and delivery complications

Stress and pregnancy

- Becoming and being pregnant is a significant life event
- A psychological stressor
- uncertainty, fear, loss of control, physical discomfort, and disturbed sleep
- outcomes : hypertension, preterm delivery and LBW
- stressful events, if sufficiently severe, may cause congenital malformations- hunter

Air travel in pregnancy

- no evidence of ↑the risk of complications in pregnancy such as preterm labour, rupture of membranes, or abruption.
- The radiation dose to the fetus from flying is not significant unless frequent long- haul air travel occurs in pregnancy.
- Body scanners that utilize ionizing radiation for security checks do not pose a risk to
- mother or fetus.
- DVT risk small ↑ Flights lasting more than 4 h

DVT risk/Air travel in pregnancy

- A specific venous thromboembolic risk assessment should be made in pregnant women who are travelling by air.
- Graduated elastic compression stockings are recommended for women flying medium- to long-haul flights and
- low- molecular- weight heparin for those with significant risk factors such as previous thrombosis or morbid obesity.
- Low- dose aspirin provides insufficient.

Air travel in pregnancy

Some airlines request a ‘fit to fly letter’ after 26 weeks of gestation.

‘Twin pregnancies’ are advised not to fly after 32 weeks and women with singletons are advised not to fly after 36 weeks of gestation

Driving

- common-sense approach for the management of most pregnancy symptoms, e.g. tiredness, feeling faint, backache, and limited space behind the steering wheel in the third trimester
- Seatbelt wearing is still compulsory

- eclamptic fits (considered a ‘provoked seizure’)
- gestational diabetes

Extreme heat

Pregnant women are normally advised to avoid saunas and prolonged hot baths as a core temperature of over 38.9°C presents a theoretical teratogenic risk.

Few jobs pose a risk of hyperthermia, but

environments hot enough to cause fainting need consideration

Road traffic collisions

Deceleration during a road traffic accident can cause foetal death even in the absence of major abdominal injury

Surgery - pregnancy

- Amniocentesis miscarriage rate of less than 1 per cent RTW the next day
- C-section, as lifting and driving may be a problem RTW Some women 3–4 weeks most women 6–8 weeks

minor disorders of pregnancy

- Musculoskeletal problems
- Backache- up 75% - 30% severe
- restriction of activity is more useful than the progressive strengthening programmes
- Symphysis pubis dysfunction
- to 6 months- 85 % recur in a subsequent pregnancy
- Tiredness and emotional lability may be significant in the first trimester

Physical- Radiation

- The available evidence suggests that exposure of female health care personnel, prior to conception,within the prescribed safe limits, does not constitute a risk factor for reproductive health.
- Since the year 2000, the European Union (EU) directive prescribes that pregnant workers should be protected from doses .1 mSv during the entire period of gestation

Postnatal depression

- During the first 6 months after delivery, the prevalence of major depression is 12–13 %. Postnatal depression is thought to be generally underdiagnosed and most
- antidepressants can be used safely by nursing mothers of healthy full-term infants.
- Cognitive-behaviour therapy
- demonstrated to be comparably effective

Pregnancy- related time off

Pregnant employees have four key rights:

- Paid time off for antenatal care (which includes antenatal classes if recommended by a healthcare professional).
- Maternity leave.
- Maternity pay.
- Protection against unfair treatment, discrimination, or dismissal as a consequence of being pregnant, or on maternity leave.

- 52 weeks of maternity leave

ILO Convention on maternity protection- June 2000

the ILO formally adopted Maternity Protection Convention (No. 183) and it's accompanying Recommendation (No.191)

aspecific risk assessment and management of the following risks concerning pregnant women:

(a) arduous work involving the manual lifting, carrying, pushing or pulling of loads;

(b) work involving exposure to biological, chemical or physical agents which represent a reproductive health hazard;

(c) work requiring special equilibrium;

(d) work involving physical strain due to prolonged periods of sitting or standing, to extreme temperatures, or to vibration.

(e) night work if a medical certificate declares such work to be incompatible with her pregnancy or nursing.

Developmental & environmental origins of adult disease

HOW TO REDUCE EXPOSURE?
Examples of advice for patients

- Don't smoke! Nor stay near smokers
- No alcohol during pregnancy
- No use of drugs
- Consult your doctor before taking medications
- Eat food without additives
  …organic (without pesticides and preservatives)
  if not possible, wash your fruits and vegetables
- Avoid fish rich in persistent organic pollutants and mercury (bigger fish)
- Observe fish advisories on mercury
- Don't use solvents – avoid paints
- Reduce the number of chemical cleaners at home
- Avoid heating plastic food containers

WHO

Breastfeeding

Breastfeeding

- High blood flow to milk formation ratio 400-1 even low level in the blood
- Exposure level- no harm organic chemicals below TLV but no for certain metals or metal oxides.
- High fat solubility → ↑absorb OW octanol- water
- Low Molecular weight → easy passe lipid membrane
- Long serum half- life → accumulate
- Nonpolar substances
- How quickly the substance is metabolized or excreted by mother

Breastfeeding- metabolism

- halogenated hydrocarbons stored in body fat.

but

- Solvents rapidly excreted and rapidly decreases after removal exposure

Breastfeeding

- Lead, mercury, cadmium, arsenic
- Organic solvents and volatile organic chemicals (such as dioxane, perchloroethylene, and bromochloroethane)
- Organocholorine insecticide, fungicides, chlordane. Dieldrine, aldrin,DDT,heptacholor,…
- Chemicals from smoke, fires, or tobacco
- Some radioactive chemicals used in hospitals for radiation therapy (such as Iodine-131)

Breastfeeding- FFW

breastfeeding is not compatible with certain ‘front-line jobs’, e.g. armed forces, fire, and police services.

-potential for uncontrolled workplace exposures;

perceived reduced physical fitness; the

impact of serious injury on the dependent baby; unpredictable working hours incompatible with

feeding or expressing demands.

Older women

Older women

Positive paid work for older women:

access to an independent source of income

engagement in social support networks opportunities for satisfaction, enhanced self-esteem ,the contribution employment can make to positive mental health

employment helps to keep their *mind and body active* and generates a feeling of contributing something of value to society

Older women

- women are more vulnerable than men to biological difference:
- arthritis and osteoporosis
- autoimmune diseases
- Musculo-skeletal disorders- work related

repetitive movement; manufacturing , assembly work

- shift work increases women's risk of **cardiovascular events** more than it does for men

the risk of injury in the workplace

- increases with age women, those aged 45–54 y

have the greatest risk of being injured at work

Risks of accidental injury due to falling, tripping or slipping at work also increase with age for women

- Many of the problems women in the workplace relate to poor ergonomic design

where workstations, work cycles and equipment are designed for male employees

Older women worker in health and social care

- a particular set of risks including physical injuries from lifting people, needle injuries and toxic chemicals,
- *older nurses* are at greater risk of asthma

Stress- old women

- Older women experience other forms of workplace stress.
- gender and age discrimination
- in occupations where appearance is seen a significant part of employment discrimination
- This negativity towards older women

leads to pressure to maintain youthful appearance

- unpaid work impact on both physical and mental well being.
- >55y 18h/weeks versus 5h male

Menopause

Menopause

changes in lipids and bone loss begin to occur, both of which have implications for long- term health.

For most women, the menopause causes no significant problems, but some women,

perhaps 20– 25%, report considerable difficulties in both their personal and working lives.23 During their menopausal transition, some women report that fatigue and difficultieswith memory and concentration affect work.

Menopause

- ↑FSH - In UK, 70 % women between 45-59Y are employed beyond the menopause
- 1/3 of workers felt embarrassment or difficulties in menopause with their employers hot flushes, headaches, tiredness, and lack of energy most likely to be perceived to be made worse by work.
- Work may be affected by sleep deprivation, hot flushes, mood alteration, memory, or concentration difficulties

Workplace recommendations for the menopause

- Employers should have more knowledge and awareness about th menopause.
- managers should be better able to talk about the menopause.
- Specific needs during the menopause should be assessed with agreement of appropriat work adjustments.
- Working conditions should be assessed to consider the specific needs of menopausal women and ensure that the working environment will not make their symptoms worse

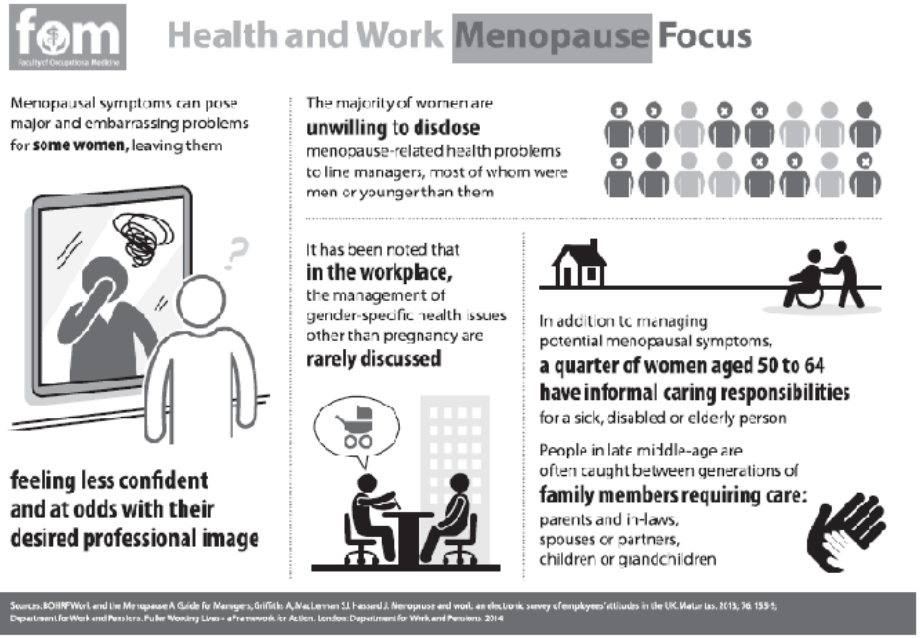


Figure 8.6 'Health and Work: Menopause Focus' infographic from the Faculty of Occupational Medicine.

Return to work

rtw

Understanding the work–life balance is particularly important in planning a successful return to work after major illness. Domestic responsibilities rarely reduce on return to work and a phased start

can be highly successful, e.g. working mornings only at first and increasing back to full duties within 4–6 weeks. This allows for increased rest and pacing of work while rehabilitation continues, physically and/or psychologically.

Miscarriage and work

- Prolonged standing standing for greater than 3, 5, or 6 hours/day moderately increased risk

Long working hours (>40 hours per week), heavy physical work, manual handling, and lifting had a *small* increased risk for miscarriage.

- Recurrent miscarriage:

50– 75%unex plained

history of recurrent miscarriage whose work is physically demanding and/or requires long periods of standing could benefit from a short-term change in her duties

Miscarriage- RTW

Miscarriage is known to have significant psychological sequelae, and timing of return to work is based more on emotional than physical recovery.

1 week (Note: emotional recovery may take longer)

gynaecological procedures

Emphasis was therefore placed on the value of

early activity, particularly walking. Walking immediately after these procedures will not be harmful

and it should be encouraged

wound healing

- delayed by infection, ischaemia, malignancy,
- poor nutrition, haematoma.
- Intercurrent illnesses and treatments

diabetes mellitus, jaundice, uraemia, use of irradiation and treatment with oral steroids, immunosuppressive drugs ,chemotherapeutic agents.

Malnutrition, deficiencies of protein, vitamins, and trace elements such as zinc and mnmanganese

- Age obesity smoking
- Psychology- Any surgical procedure is likely to be a significant event

Occupational health management of gynaecological operations

- medical conditions can delay recovery

and this must be considered when advising on fitness to work and adjustments.

- The type of work, especially heavy manual work, must also be taken into account. Evaluation of physical strain on a surgical scar must be considered in the assessment to minimize the risk of scar rupture and subsequent incisional herniation

RTW gynaecological procedures

	Some women	Most women
Endometrial ablation	-	2–5 days
Miscarriage D&C	1–2 days	1 week emotional>
Diagnostic laparoscopy	2 days	1 week
Laparoscopic procedure	1 week	**2-3 weeks**
Mid-urethral sling operation for stress urinary incontinence	3–4 days	3 weeks
Vaginal /Laparoscopic hysterectomy	2–4 weeks	**4-6 weeks**
Abdominal hysterectomy	2–4 weeks	**6-8 weeks**
Laparascopic ovarian cyst	1week	**2-3 weeks**

Breast surgery

brest	sedentary	Light manual	Heavy manual
Benign lumpectomy	1 week	2 weeks	
cosmetic	2 weeks	4 weeks	4-6 weeks
Breast cancer wide local excision and sentinel node biopsy	2 weeks	6 weeks	4– 6 weeks
Breast cancer wide local excision or mastectomy and axillary clearance	2– 3 weeks	6– 12 weeks	12 weeks+
Breast cancer with radiotherapy and endocrine therapy	2– 12 weeks	4– 12 weeks	12 weeks+
Breast cancer with chemotherapy, radiotherapy, endocrine therapy, Herceptin	2– 39 weeks	26– 39 weeks	26– 52 weeks

mastectomy

- Radiotherapy typically involves daily treatment over 3–6 weeks, Some women choose to continue working part time

  main side effect of fatigue 1-2 m
- Chemotherapy will depend on the staging may involve a course of six or eight cycles with 3 weeks between, or weekly infusions
- Many women will choose to work part time between cycles of treatment

Gynaecological cancers

- ovarian cancer and asbestos exposure
- In general, gynaecological cancers are not occupational in origin.
- RTW time off work is difficult to predict depends, on the staging of the disease.

Endometrial cancer

3% of female cancers, and is the fourth most common cancer diagnosed in women after *breast , lung , and cancer of the colon and rectum.*

- mainly in postmenopausal 40– 74y
- risk factors: nulliparity, obesity, diabetes and Lynch syndrome (aka hereditary nonpolyposis colorectal cancer).
- postmenopausal bleeding, intermenstrual bleeding, vaginal discharge, anaemia, or thrombocytosis.

Cervical cancer

- >20 y - the highest rates 30-34 y
- Early screening/ detection prevents 75% of cancers.
- cervical screening programme is available to women aged 25– 64 in England.
- every 3 years, 50– 64 y every 5 years.
- Human papillomavirus (HPV) causes 99.7%
- screening.

Cervical cancer- HPV

- transmitted through sexual contact and can be prevented by a two- dose vaccination (Gardasil®)
- In most cases, the immune system will clear HPV without the need for treatment but
- smokers are at higher risk. HPV has over 100 subtypes
- HPV- positive women should be referred for colposcopy. If high- risk HPV is not detected, women may return to routine screening.
- Biopsies, confirm the pre- invasive (non-

Urogynaecology

- stress incontinence and overactive bladder symptoms.
- assessment is not essential in the initial management.
- lifting, bending and even brisk walking may exacerbate stress incontinence symptoms but will not alter the course of the condition
- pelvic floor physiotherapy40% cure. drug duloxetine
- Open surgery ,colposuspension or sling 80–90 % cure a RTW 6–12 weeks.
- The tension-free vaginal tape (TVT™) is a popular minimal access operation with similar cure rate RTW 3–4 weeks

Gynaecological surgery and work -

- Early RTW is not usually associated with adverse wound outcomes and pain and tiredness are more limiting than wound integrity. Where a significant wound infection has involved dehiscence and/or cellulitis, RTW intervals may need to be extended

Major abdominal surgery

- transverse suprapubic incision; abdominal hysterectomy, myomectomy, salpingo-oopherectomy, and Burch colposuspension.
- Mid-line incisions; ovarian malignancy or better access is required such as removing a large fibroid.
- Patients with mid-line incisions take longer to recover and are more complications.

Hysteroscopic procedures

- Diagnostic hysteroscopy is now routinely done as an outpatient procedure. There is a risk of fainting from vagal stimulation that can last beyond the procedure, and
- most units do not advise driving immediately afterwards. Hysteroscopic surgery, e.g. resection of
- fibroids, usually requires a general anaesthetic and return to work after a few

Thanks!

Any questions?