

Managing food on shift work

An exploration of the eating patterns, related lifestyle behaviours and experiences of shift workers on the island of Ireland

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Foreword

Shift workers make up a significant group, estimated at 15 per cent of the workforce in the Republic of Ireland (ROI) [1] and Northern Ireland (NI). This work pattern is necessary for some service industries and professions. It has been suggested that shift work has a negative impact on health, increasing the risk of chronic disease (long-term or incurable illness). Much of this is potentially linked to disruption of the normal circadian rhythm (“body clock”). However, it is also important to consider the reported lifestyle factors related to shift work on the island of Ireland today.

safefood commissioned a study to investigate the eating patterns and related lifestyle behaviours, experiences and workplace environments of shift workers on the island of Ireland. The study was carried out with the aim of developing recommendations that would facilitate **safefood** and others to promote healthy eating behaviours and communicate relevant health messages to this population group.

¹ Office for National Statistics (2015) People aged over 16 in employment who do shift work, by region of the UK in the three months ending June 2014 from Labour Force Survey. Accessed at <http://www.ons.gov.uk/ons/about-ons/business-transparency/freedom-of-information/what-can-i-request/published-ad-hoc-data/labour/march-2015/people-aged-over-16-in-employment-who-do-shift-work.xls>

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1 Introduction

An estimated 15 per cent of the workforce in Republic of Ireland [1] and Northern Ireland' is employed in shift work. Shift work entails working hours outside the standard working week, and may involve evening, weekend and rotating shift patterns.

It is well known that lifestyle behaviours such as diet, physical activity, alcohol consumption and smoking are associated with increased risk of chronic non-communicable (non-infectious) disease [2]. Due to the disruptive nature of shift work and subsequent erratic routine, lifestyle behaviours may be negatively influenced by shift work [3], which may account for a potentially increased health risk.

Little is known about the lifestyle behaviours and experiences of shift workers on the island of Ireland. There are no published data on the barriers or facilitators to improving lifestyle behaviours in this group.

2 Aims and objectives

This research set out to establish the dietary and related lifestyle behaviours of shift workers from the three largest employment sectors that require shift work on the island of Ireland. These are 1) accommodation and food services, 2) health and social care, and 3) manufacturing [4, 5]. The specific objectives were to

- Examine the eating habits of shift workers and assess the impact of shift work and different shift work patterns on diet and related lifestyle behaviours
- Explore the physical activity patterns of shift workers and determine whether shift work affects participation in physical activity
- Investigate the barriers and facilitators to healthy eating and physical activity within the shift work environment, specifically the availability of workplace facilities
- Develop recommendations to empower shift workers to lead healthier lifestyles, and to effectively target communication strategies for this population group.

3 Methodology

The study objectives were addressed in three phases:

- Literature review, which informed the study protocols (a particular set of rules or method) for the subsequent tasks
- Qualitative study (observations and insights drawn, for example, from focus group discussions)
- Quantitative study (measurable data, such as that recorded in a survey or questionnaire).

Literature review

A narrative review (a critical analysis of published research intended to get an overview of current knowledge) was conducted to summarise the effects of shift work on workers' lifestyle and health risk, and to address the barriers to and opportunities for shift workers to lead a healthier lifestyle [3]. An extensive search for relevant peer-reviewed scientific articles and reports was conducted using targeted internet searches of, for example, *Medline* and *Web of Knowledge* databases. Key words searches were conducted using the terms "shiftwork" or "shift work". Articles were considered if they were available in full text in English and contained research that had been conducted among human subjects.

Qualitative Study

Focus groups (n=15) were undertaken to gain insight into the barriers and facilitators to healthy eating and associated lifestyle behaviours among shift workers (n=109). Shift workers from the three largest shift work categories on the island of Ireland – the accommodation and food services sector, the health and social care sector and the manufacturing sector – participated. The discussion guide for the focus groups was informed by the literature review findings, and was piloted among a group of health and social care workers (n=6). An inductive thematic analysis procedure (a way of identifying and recording patterns), as outlined by Braun and Clarke [6], was applied to the data.

Quantitative Study

A telephone survey of 1,300 shift workers was carried out by the market research company Millward Brown Ulster. The development of the quantitative survey was informed by the knowledge and insight gained from the literature review and the results of the qualitative study. Its development was derived from collaboration between the research teams at Dublin Institute of Technology and Ulster University, and Milward Brown Ulster. The survey investigated the work patterns, eating behaviours, specific lifestyle behaviours and workplace environments of shift worker participants. It was administered across a demographically and geographically representative sample, with a proportionate split between the Republic of Ireland (ROI) (n=850) and Northern Ireland (NI) (n=450).

4 Results

Findings from the literature review

This section provides an overview of the findings of the review of published literature [3].

Not all studies of shift workers demonstrate negative health outcomes related to shift work. However, the literature review found that shift workers appear to be at increased mental and physical health risk, particularly with regard to non-communicable diseases. These include cancer and cardiovascular disease (such as narrowing of the blood vessels, potentially leading to heart attack or stroke), and also metabolic disorders (disruption to the process of converting food to energy), gastrointestinal and sleep disorders.

Shift work can result in low-quality diet and irregular eating. Other adverse health behaviours are also reported, particularly increased smoking and poor sleep patterns. These altered lifestyle habits, in conjunction with disruption to circadian rhythms, can create an unfavourable “metabolic phenotype” – a set of observable metabolic traits – that facilitates the development and progression of chronic disease patterns.

The findings of the literature review also make clear that the actual health effects of shift work are difficult to quantify. This is due predominantly to a number of study design issues. These include varying definitions of shift work and inadequate control for confounding factors such as the low income of some shift workers.

This review highlights the unique nutritional issues faced by shift workers including erratic meal patterns, increased consumption of energy later in the day and increased snacking, with multiple snacks being consumed during the night shift in place of a full meal. It also details the obstacles to leading a healthier lifestyle while working shifts. The most commonly cited perceived barriers across studies are a lack of breaks, shift patterns, poor food selection, inadequate canteen opening times, lack of time and tiredness due to long working hours.

In relation to opportunities to promote health and reduce health risk among shift workers, the literature review finds that workplace initiatives and careful management of shift work by employers can help minimise the adverse effects of shift work on health and promote workers' wellbeing. Studies of workplace interventions generally report short-term modest reduction in weight as a result

of such interventions. It is noted, however, that systematic reviews of such studies identify a lack of data on long-term health and economic outcomes and the want of high-quality research in this area.

Findings from the qualitative and quantitative surveys

Effect of shift work on dietary behaviours

Participants reported that shift work resulted in workers' routines being frequently disrupted, with erratic and irregular eating patterns ensuing. Skipping meals was common, and more likely for those who did not get adequate sleep, with increased snacking as a compensatory measure. In addition, respondents reported that a lack of time, poor availability of healthy food and tiredness can all lead to a reliance on processed or convenience foods, resulting in poor diet quality.

Healthy eating guidelines were not met by the majority of shift workers: 40 per cent consume five portions of fruit and vegetables per day, 9.5 per cent consume three portions of milk, cheese or yogurt per day and only 40% reported consuming wholegrains daily. However, this dietary pattern is no less favourable than the general adult population, as in ROI only 26% of adults consume five portions of fruit and vegetables daily.

Effect of shift work on lifestyle behaviours

Less than half (44%) of shift workers reported meeting the recommended levels of physical activity per week, citing lack of time and energy as creating difficulty with engaging in physical activity.

High rates of smoking were noted in the shift-work population (30%), which compares unfavourably to the general population rates in ROI (19.5%) [7] and NI (22%) [8].

The perceived effects of shift work on alcohol consumption were mixed, with both increased and decreased consumption being reported as a consequence of shift work. Of those who drink alcohol (80%), one quarter (24%) reported "high-risk" drinking i.e. exceeded the recommended maximum intake of alcohol per week for men and women.

The negative effect of shift work on sleep was evident, with two thirds (66%) not getting the recommended seven to nine hours sleep per 24 hours. Insufficient sleep (that is, less than seven hours) was associated with negative dietary and lifestyle behaviours. Compared to those shift workers surveyed who achieved adequate sleep, those with insufficient sleep were more likely to skip meals on working days and skipped meals on days off significantly more frequently. Those with insufficient sleep were also significantly less likely to consume the recommended five portions of fruit and vegetables per day and significantly less likely to consume the recommended three portions of dairy

foods (milk/cheese/yoghurt) per day. Those with insufficient sleep were also significantly more likely to report that shift work increases their alcohol intake.

Identification of the influences on dietary and lifestyle behaviours among shift workers

A range of factors that may influence the dietary and lifestyle behaviours of shift workers were identified from the qualitative survey (Figure 1):

- Gender. Gender played a part, with males reporting poorer dietary behaviours than females and more likely to report being overweight. Males also reported poorer sleep patterns. Females were more likely to report “high-risk” drinking.
- Age. Younger shift workers reported poorer dietary behaviours and had higher rates of alcohol consumption and smoking than older workers. Lower physical activity and poorer sleep patterns were reported by older shift workers.
- Socioeconomic status. Lower socioeconomic groups reported poorer dietary behaviours and higher rates of smoking compared with more affluent groups.

Differences were observed in the degree to which individuals or workers in specific employment sectors were influenced by intrinsic or extrinsic factors. (Intrinsic factors are internal or personal factors, for example, a person’s motivation to change or their resilience. Extrinsic factors are external and impersonal, for example, work schedules or the presence of a vending machine.)

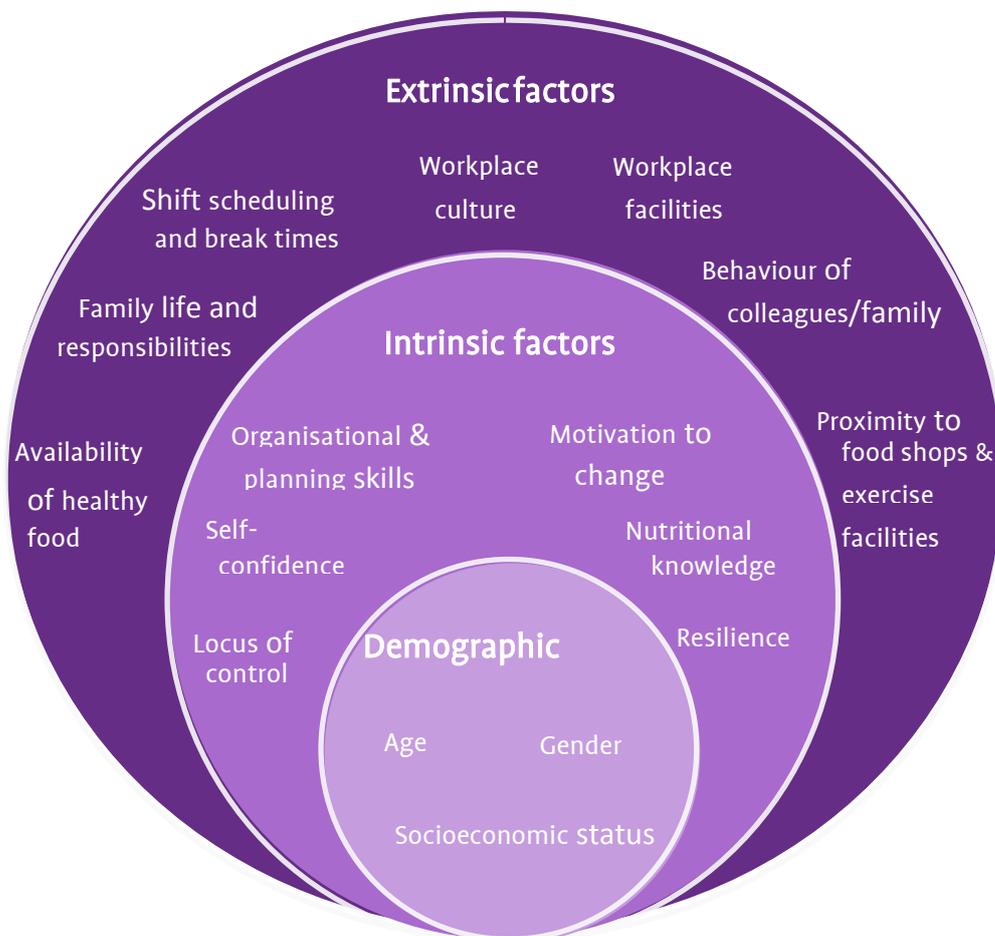
- The primary difference was observed between structured and unstructured workplace environments, particularly in relation to break times and working hours.
- Erratic and unreliable break times and issues with finishing on time at the end of a shift were common features of the health and social care and accommodation and food sectors, where the workload and service demand is often unpredictable.
- The health and social care sector appeared from the qualitative data to have the worst workplace environment, with very poor access to facilities for buying, storing or preparing food, and poor availability of healthy dining options. Despite this, the quantitative data showed that the health and social care workers tended towards healthier patterns of food consumption. They also had the lowest rates of smoking. It is possible that this relates to the higher educational attainment among workers in this sector compared with other sectors, or a bias towards an interest in health and nutrition.
- The manufacturing sector benefitted from better-structured patterns of work and break times, usually with a more clearly defined workload. In addition, they were the sector

most likely to have workplace facilities available. The manufacturing sector was most likely to have experience of workplace health initiatives, along with some groups in the accommodation and food services sector.

- Vending machines were reported to have the largest impact on workers' diets compared with other facilities in the workplace. This was a negative impact associated with higher consumption of soft drinks and high sugar/high fat foods.

Differences were also observed in how individuals coped with the demands of shift work. This may be due in part to various personal or intrinsic factors which may affect an individual's ability to manage their diet and lifestyle appropriately, which is closely related to locus of control. Locus of control refers to the extent to which individuals believe they can control events affecting them. Discussions of reasons for food choice showed that an element of personal choice is at play, and that shift work may sometimes be used as an excuse for less healthy dietary choices. Many discussed how it was "*easy to blame shift work*" and thus often used shift work to justify unhealthy behaviours.

Figure 1: Range of factors that may influence the behaviours of shift workers



Barriers to healthier living for shift workers

A number of barriers to healthier living were identified by shift workers both at individual and workplace levels (Table 1).

Table 1: Barriers to healthier living for shift workers at individual and workplace levels

Level	Barrier
Individual (employee)	<ul style="list-style-type: none"> Motivation to change Organisational skills Planning and time management Nutritional knowledge External locus of control
Workplace (employer)	<ul style="list-style-type: none"> Limited workplace facilities Lack of healthy dining options Erratic routine Lack of structured breaks and finishing times Occupational stress Workplace culture

Facilitators to healthier living for shift workers

Factors enabling healthier living were identified by shift workers both at individual and workplace levels (Table 2). Many opportunities for promoting health in the workplace were identified.

Table 2: Facilitators to healthier living for shift workers at individual and workplace levels

Level	Facilitator
Individual (employee)	<ul style="list-style-type: none"> Nutrition and lifestyle advice specific to shift work Advice on time management Ideas for meal planning
Workplace (employer)	<ul style="list-style-type: none"> Improved workplace facilities Healthier menu options Improved shift structure Workplace health initiatives

Differences in experiences and behaviours by employment sector

Differences were evident between the three employment sectors investigated (Figure 2). The primary difference was observed between structured and unstructured employment. The health and social care and accommodation and food services groups were more likely to report a lack of breaks, and unclear finishing times, with poor structure to work organisation. For many in the manufacturing sector, experiences in the workplace environment were better. This indicates that the shared workplace environment exerts a strong influence on health behaviours and that sector-specific interventions may be required.

Figure 2: Overview of reported health behaviours, workplace experiences and main issues for shift workers by employment sector

Overview of reported health behaviours	Workplace experiences	Main issues
Accommodation and food services sector		
67% skip meals on work days	58% agree they get adequate breaks	Long hours Lack of breaks
35% are smokers	58% are happy with healthy options	Erratic routine
28% are high-risk drinkers	41% agree their workplace environment facilitates a healthy lifestyle	Access to alcohol in workplace environment
51% get inadequate physical activity	62% have access to a canteen	Access to unhealthy foods leads to constant grazing
60% get insufficient sleep		
40% are overweight		
Health and social care sector		
64% skip meals on work days	52% agree they get adequate breaks	Long hours Lack of breaks
26% are smokers	43% are happy with healthy options	Occupational stress Heavy workload
24% are high-risk drinkers	37% agree their workplace environment facilitates a healthy lifestyle	Lack of time and energy
60% get inadequate physical activity	61% have access to a canteen	Poor access to out-of-hours food facilities
67% get insufficient sleep		Erratic routine
51% are overweight		
Manufacturing sector		
54% skip meals on work days	71% agree they get adequate breaks	Lack of time
30% are smokers	46% are happy with healthy options	Erratic routine
15% are high-risk drinkers	49% agree their workplace environment facilitates a healthy lifestyle	Lack of motivation
62% get inadequate physical activity	69% have access to a canteen	Access to unhealthy foods
78% get insufficient sleep		
64% are overweight		

5 Conclusions and recommendations

Shift work has a far-reaching effect on the lives of workers. This research has identified a range of issues reported by shift workers at both an individual and a workplace level that can be addressed through the recommendations given here.

There is some evidence from other studies that shift work has a negative impact on health, particularly in relation to chronic diseases such as hypertension (abnormally high blood pressure), obesity and diabetes. However, the research to date is somewhat inconclusive and conflicting in its findings.

This present study indicates that the groups of shift workers who participated have much in common with the general adult population. They cite lack of time and motivation for healthy eating and adequate physical activity. Their dietary habits and indicators of healthy eating, such as fruit and vegetable consumption, are no worse than the general population. In addition, there are reported age, gender and social class differences in health behaviours and these are mirrored in the general adult population with young people, males and those with lower incomes faring less well.

The differences between the occupational sectors studied is of particular note. Those in manufacturing report achieving more routine meals and less hazardous alcohol intake but are more overweight and sleep-deprived. These findings confirm the need for a tailored approach for each sector to promote health.

It is envisaged that these recommendations could alleviate some of the potential health issues associated with shift work, with resulting positive effects on workers' physical and psychological wellbeing and on their work-life balance. This research provides evidence for the need to address factors in the workplace environment in collaboration with the key stakeholders. Both employees and employers have a vested interest in the health of workers.

Target younger and new shift workers

Younger shift workers and those new to shift work should be prioritised for support to enable them to transition from the structured routine associated with full-time education to the irregular routine experienced with shift work. This would help to prevent the development of the less favourable lifestyle (eating, sleeping, physical activity and smoking) behaviours that can be associated with shift work.

Target employers to influence the workplace environment

Employers should be encouraged to provide reasonable time for eating and rehydrating during each shift and access to facilities for safely storing and preparing meals and snacks. In addition, the provision of facilities for purchasing healthy foods within the workplace, either in a canteen setting or healthy vending machine options, is required.

Promote healthy sleep

Awareness and guidance on healthy sleep patterns should be provided to shift workers, giving advice on sleep hygiene and adjusting sleep patterns to different shift patterns.

Tailor dietary guidance

Dietary guidance for shift workers should be tailored to the individual work circumstances to encourage regular meal patterns. This is particularly the case for those in the healthcare and accommodation and food service sectors. Specific information is needed on meal planning and time management. Suitable meal and snack ideas are needed for when time is limited for food shopping and meal preparation.

Promote physical activity

The benefits of physical activity should be promoted, highlighting practical options for those on irregular and night shifts. Older shift workers and those working longer shifts need particular encouragement.

Support smoking cessation

Targeted smoking-cessation help, potentially as part of workplace wellbeing health initiatives, should be aimed at shift workers.

Use social media or online applications

Social media or online applications should be used to communicate with shift workers, where possible as part of workplace information technology or human resource systems. This means of communication may be particularly useful in targeting younger age groups.

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