

Fatigue in British fishermen

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ABSTRACT

A survey was conducted to establish the extent of fatigue in British fishermen. Problems accessing the target population limited the sample to 81 people, highlighting the difficulty of conducting research in this area. Whilst the results cannot be considered representative of the British fishing population, the fact that 60% ($n = 48$) believed their personal safety had been at risk because of fatigue at work, 16% ($n = 13$) had been involved in a fatigue related accident, and 44% ($n = 36$) said they had worked to the point of exhaustion or collapse suggests a problem that requires further investigation.

INTRODUCTION

It is commonly known that fishing is a dangerous occupation. Indeed, it is consistently found to be one of the most dangerous jobs in Britain [1, 2] and in many other countries [3-6]. Accounting for the high mortality rate, working conditions are cited as a primary cause, with workers exposed to extreme and unpredictable weather conditions, ship movement, and potentially dangerous equipment [7]. These pressures can be further compounded by fishing quotas and a limit on how many days can be spent at sea [8]. Little is known, however, about which human factors are most important in terms determining a fishermen's likelihood of being involved in an accident. One such human factor is fatigue.

Outside of the domain of commercial fishing a separate literature exists linking fatigue and occupational accidents. Results from the Maastricht Cohort study show that fatigue is an independent risk factor for being involved in an occupational accident across industries [9]. In terms of road transport, specifically, it has been estimated that around 16% of accidents may be the result of sleep or sleepiness [10], although exact figures cannot be calculated due the way in which accident data are compiled. Indeed, this can be considered indicative of the way in which fatigue as an issue has been regarded. The

reporting of fatigue or fatigue-related variables is often inadequate, especially in the maritime domain [11], leading to a corresponding lack of information on the extent of the problem.

A more fundamental problem relates to 'how' fatigue is recorded. If fatigue could be measured in the aftermath of an accident in the same way as blood alcohol, for example, then perhaps a more detailed picture would be available. Fatigue, however, is a complex construct which defies any standardised form of measurement. In terms of a broader conceptualisation, a relevant definition comes from the International Maritime Organization's (IMO) guidelines on fatigue [12], as follows: "A reduction in physical and/or mental capability as the result of physical, mental, or emotional exertion which may impair nearly all physical abilities including: strength; speed; reaction time; coordination; decision making; or balance."

One of the few reviews of fatigue in the fishing industry comes from a conference paper presented at the 2nd International Fishing Industry Safety and Health (IFISH) conference [13]. The authors highlight the importance of considering human factors such as stress and fatigue when trying to account for the high fatality rate in fishermen and cite a report indicating that fishermen routinely work 24 to 96 hours or more with little or no sleep [14].

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Matheson et al. [15, 16] conducted a study into the health of fishermen in the Scottish sector. Whilst the aim of the study was primarily to assess health and health-related behaviours, fatigue was also investigated. The survey results showed that fishermen believed fatigue was a key factor in terms of both their safety and health whilst at sea, with split/broken sleep periods highlighted as a contributory cause (see also [17]). Gander et al. similarly concentrated on sleep patterns when studying New Zealand fishermen during the demanding hoki season, using a mixture of subjective and objective measures [18, 19]. In terms of showing conclusive evidence of fatigue through disrupted sleep patterns, however, Gander et al. were unable to detect disruption on a level that might account for the excessively high mortality rate.

In contrast to the few studies that exist on the topic, the present study did not primarily focus on sleep as a means of establishing the prevalence of fatigue. Analogous to the case of port turnarounds with mini-bulkers [20], it is probable that fatigue in fishermen is only a significant problem at certain times, when key factors come together to create a dangerous situation (see the combined effects model [21]). Using scenario-style questions, the present study, therefore, aimed to tap into these high-risk occurrences and gain an insight into the extent of the problem of fatigue in the British fishing industry at a global level. In a sample that is extremely difficult to access, a sub-aim of the study was to learn more about the process of surveying fishermen in order to aid more detailed epidemiological work in the future.

METHODS

A questionnaire survey was conducted in order to establish the extent of the problem of fatigue in the UK fishing industry.

SAMPLE

Fishermen in the UK rarely work for large companies and have low union representation, which makes the task of surveying difficult. Therefore, new techniques of data collection had to be found. In light of the study by Matheson et al. in Scotland [16], it was decided that as far as possible the geographical focus of the research would be upon other parts of the UK to avoid Scottish fishermen being over-surveyed.

SAMPLE METHOD 1 – SEAFISH

The Sea Fish Industry Authority (SEAFISH) is a non-governmental public body tasked with support-

ing the UK seafood industry, which provides training through industry-led Group Training Associations (GTAs). Through GTA contacts, survey questionnaires were distributed amongst fishermen attending safety courses in England and Wales. In the first round of data collection an incentive was provided by means of a £2 donation to the RNLI (Royal National Lifeboat Institution); this increased to £4 in the second round with an option to donate the money to the RNMDSF (Royal National Mission to Deep Sea Fishermen). Approximately half of the returned surveys came back as a result of the GTA sampling approach.

SAMPLE METHOD 2 – FISHING NEWS

Fishing News is a weekly industry newspaper. In the edition dated 29th April 2005 an advertisement was placed on the front cover asking fishermen to take part in the study either by requesting a questionnaire or by completing the survey online (at www.fishingfatigue.com). An editorial piece written by one of the research team was also included to encourage interest. An incentive was provided by means of a £5 donation to the RNMDSF for each completed questionnaire. Approximately half of the returned surveys came back as a result of the newspaper advertisement, with over half of these respondents completing the survey online.

THE QUESTIONNAIRE

A key priority was to keep the questionnaire short, after discussion with industry representatives. The questionnaire was a shortened version of the Cardiff seafarers' fatigue project [21] questionnaire, previously used to survey merchant seafarers. The survey included five sections, as follows:

Section 1: About your job and the vessel you work on

This section included a large number of items designed specifically for the fishing sample. Participants were asked about number of crew, whether they slept onboard, type of vessel, role onboard, maritime qualifications, experience at sea, and other paid employment outside fishing. These questions were refined through a pilot survey with GTA attendees.

Section 2: The hours that you work and rest

This section included items addressing typical daily working hours, days spent at sea, opportunities to gain rest, and travel to/from the vessel.

Section 3: Fatigue at sea

This section contained a mixture of fatigue items from the main Cardiff seafarers' fatigue project questionnaire, and items designed specifically for the fishermen sample. The fishermen-specific items were scenario based in order to help ground the concept of fatigue. Examples of such items included: "Have you ever worked to the point of exhaustion or collapse?" "Have you ever 'nodded-off' at the wheel?" and "Have you ever been so tired that you slept on the deck or in the gangway?"

Section 4: General health and well-being

This section contained standardised health and well-being scales used in the main Cardiff seafarers' fatigue project questionnaire.

Section 5: Some questions about yourself

In this section participants were asked standard demographic questions (age, sex, education, and nationality).

RESULTS

DEMOGRAPHICS

In total 81 fishermen completed the fishing fatigue questionnaire. Almost all were male (1 was female, and 2 did not respond). The mean age of the sample was 44.0 years old (SD = 12.65, range 17–71) with the majority either married or living with a partner (81.1%, $n = 64$). In terms of nationality, 64.5% ($n = 49$) described themselves as British, 22.4% ($n = 17$) described themselves as Welsh, and the remainder described themselves as Scottish, English, Northern Irish, or other (13.1%, $n = 10$). Most worked on vessels with 2 ($n = 30$, 37%) or 3 ($n = 16$, 20%) crewmembers. The mean number of crew was 3.04 (SD = 1.74, range 1–11). Twenty-eight (35%) worked on shellfish fishing vessels, 17 (21%) on trawlers less than 24 m, and 10 (12%) on dual purpose vessels less than 24 m. A further 15 (19%) worked on other vessels including: a 17 ft Dory ($n = 3$), a potter, a crabber, a scallop dredger, and a sheltie (all $n = 1$ each). Thirty-five (43%) worked as skipper and a further 21 (26%) as "everything". Mean time on their current vessel was 6.69 years (SD = 6.26, range 0–25), and mean number of years at sea was 19.74 (SD = 11.71, range 1–49), while time working as a fisherman was 19.81 (SD = 11.98, range 0–49). Nine (11%) also had other jobs (a wide variety from farmer to lorry driver to nightclub doorman).

FATIGUE

The mean length of typical longest continuous duty for the sample was 14 hours (SD = 9.32, range 2–48). Nearly a third ($n = 25$, 31%) had considered their working hours a danger to their own health and safety, and a quarter ($n = 20$, 26%) had considered their working hours a danger to safe operations onboard ship. Most of the fishermen ($n = 61$, 81%) felt that the effects of fatigue increased the longer they were at sea, and 60% ($n = 48$) said their personal safety had been at risk because of fatigue at work. Thirteen (16%) had been involved in a fatigue related accident or incident, 36 (44%) said they had worked to the point of exhaustion or collapse, 33 (41%) had fallen asleep at the wheel, and 34 (43%) had been so tired they had slept on the deck or in the gangway. Most (49, 60%) felt that the seasons had a very important impact on the effort required to complete their normal duties.

DISCUSSION

In total, 81 British fishermen completed the survey, with evidence to suggest that fatigue may a problem in this population. Thirteen of the fishermen (16%) had been involved in a fatigue related accident or incident, 36 (44%) said they had worked to the point of exhaustion or collapse, 33 (41%) had fallen asleep at the wheel, and 34 (43%) had been so tired they had slept on the deck or in the gangway. These findings should, however, be viewed with caution due to a number of methodological limitations, as follows:

1. Due to challenges associated with accessing the population, the sample size was small ($n = 81$) and response rates could not be calculated. Most respondents were also working on smaller fishing vessels. The results should therefore not be considered representative of the approximately 12,500 fishermen in the UK fleet.
2. There was no direct control group in the study against which to compare the results.
3. The scenario-based fatigue questions used the phrasing 'Have you ever...' which gives no indication of frequency, or typical working state. The question of acceptability was also not addressed. Falling asleep at the wheel once over a forty-year career might be acceptable, whilst falling asleep every day would not be.
4. The fatigue results reported are not from validated scales. Sample-specific fatigue items were designed and used to increase the relevance and acceptability of the questionnaire; however, this

sacrificed the possibility of comparison with other working groups in the literature.

CONCLUSIONS

Despite the methodological challenges faced, two conclusions can be drawn from the study:

1. FATIGUE IN FISHERMEN REQUIRES FURTHER INVESTIGATION

The fact that 41% of the current sample reported having fallen asleep at the wheel supports the argument that fatigue should be considered a key health and safety risk factor for fishermen. If a fishing vessel is being navigated by a skipper who has fallen asleep then both that ship and other ships in the vicinity are at increased risk of collision.

2. MEASUREMENT OF FATIGUE – USE OF SCENARIO-BASED QUESTIONS

The current study employed scenario-based questions as the primary means of measuring fatigue. Rather than asking respondents for ‘ratings’ of tiredness, they were instead asked about specific ‘scenario’s that may or may not have occurred, for example: ‘Have you ever worked to the point of exhaustion or collapse?’ ‘Have you ever ‘nodded-off’ at the wheel?’ and ‘Have you ever slept on the deck or in the gangway?’ This was found to be a useful approach, although it is difficult to validate questions of this style across industries.

In addition to preventative strategies focusing on working patterns, opportunity for sleep, and job demands, a cultural change is needed in which fatigue is seen as a serious health and safety issue that requires management. Information on fatigue needs to be made available to fishermen, and fatigue awareness training delivered where appropriate so that fishermen know how to recognise fatigue and act accordingly when it occurs. The importance of mode of delivery should also not be underestimated as gaining access to the fishing population is likely to prove a significant challenge. Educational materials will therefore need to be designed in a way that is engaging for fishermen, potentially innovating beyond conventional poster and leaflet campaigns.

A survey was conducted to establish the extent of fatigue in British fishermen. Indications were found to suggest fatigue is a problem that requires further investigation; however, sample access remains a significant challenge when studying this industry.

ACKNOWLEDGEMENTS

The research described in this paper was supported by the Maritime and Coastguard Agency, the Health and Safety Executive, Nautilus UK, and the Seafarers’ International Research Centre, Cardiff. The views expressed in the paper are those of the authors and should not be taken to reflect the official position of the sponsors. Full details of the seafarers’ fatigue research programme can be found in the final report [21].

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