



Offshore sickbay consultations in relation to age, job factors, and self-reported health

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The work reported here had two main aims. First, the frequency and nature of offshore sickbay consultations in relation to personal and job-related factors (including age, job type, job level and shift work) was examined in data relating to 1944 sickbay consultations. Second, the correspondence between health information derived from self-report survey data and that recorded in sickbay consultation records was analysed in data from 342 individuals.

Four diagnostic categories were derived from the sickbay records: musculo-skeletal, gastric, respiratory, and skin/wound. Respiratory and musculo-skeletal disorders were the most frequently recorded (28.5% and 23.0% of the total respectively). Illness accounted for 78.0% of consultations, accidents for 15.3%, and 'other' reasons for 6.7%. Job type was strongly predictive. Construction personnel had high consultation rates for accidents; maintenance personnel were most likely to seek consultation for illness. Gastric problems were particularly associated with production jobs, and musculo-skeletal problems with administrative jobs.

Examination of self-reported health data in relation to consultation records showed a significant correlation between total consultations and total health scores, but the correspondence within specific diagnostic categories was not strong. For musculo-skeletal problems, however, the correlation between number of consultations and self-report scores was highly significant.

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SUMMARY

The main aim of the work reported here was to examine the frequency and nature of offshore sickbay consultations in relation to personal and job-related factors, including age, job type, job level and shift work. In this analysis, the unit of analysis was the sickbay consultation (n=1944). A further aim was to examine the correspondence between information about health problems derived from self-report survey data (collected in 1995-6) and that provided by sickbay consultation records for those years. In this case, the unit of analysis was the individual offshore worker (n=342).

Four main diagnostic categories were derived from the sickbay records: musculo-skeletal, gastric, respiratory, and skin/wound. A further category, 'other' was used for all diagnoses that did not fall within one of these four main categories. Overall, respiratory and musculo-skeletal disorders were the most frequently recorded of the four specific diagnoses, accounting for 28.5% and 23.0% of the total respectively. Illness accounted for 78.0% of the total consultations, accidents for 15.3%, and 'other' reasons for 6.7%. The pattern of diagnostic categories varied significantly across these three reasons for consultation.

Particular age groups, job types, job levels and shiftwork patterns were associated with disproportionately high consultation rates relative to their proportions in the sample. These factors were also related to significantly different frequencies of consultation for accidents as compared with illness, and with different diagnoses.

Job type was one of the most strongly predictive factors. Construction personnel had particularly high consultation rates for accidents, while maintenance personnel were the most likely to seek consultation for illness. Personnel in different job types also differed significantly in diagnosis. Gastric problems were disproportionately likely among production personnel, while musculo-skeletal problems were particularly associated with administrative jobs. Shift work was also relevant. Day/night shift workers were more likely to attend the sickbay than day workers; they were also more likely to experience gastric problems.

Examination of self-reported health data in relation to consultation records showed a significant correlation between total consultations and total health scores, but the correspondence within specific diagnostic categories was not very strong. Musculo-skeletal problems were one exception; for this type of disorder, the correlation between mean number of consultations and mean health scores was highly significant. However, musculo-skeletal consultations were also positively associated with symptoms of psychological distress as reported in the survey data.

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1. INTRODUCTION

A number of publications concerned with the mental and physical health of personnel employed on North Sea oil and gas installations, and the health risks to which they exposed, have appeared over the past decade (e.g. Gann, Corpe, & Wilson, 1990; Gardner, 2003; Lauridsen *et al.*, 1991; Horsley & McKenzie, 1997; Iversen, 1991; Parkes, 1992, 1993; Parkes, Clark, & Payne-Cook, 1997). The empirical data reported are largely based on self-reported health information.

In addition, two earlier studies, based on analyses of sickbay consultations and medical evacuation records, provide more objective data on medical diagnoses among offshore personnel. The Statfjord study (Hellesoy, 1985) reports reasons for sickbay visits among Norwegian offshore personnel. Of the total sickbay visits, 47% were due to somatic complaints, while accidents and injuries were responsible for 16%, and personal and work-related concerns for 15%. Drilling and catering personnel were more likely than other occupational groups to contact the sickbay as a result of accidents or injuries rather than illness.

Overall, musculoskeletal disorders were the most frequent diagnosis, accounting for 25% of the total number of sickbay consultations, followed by infection (18%), alimentary illness (10%) and respiratory disease (7%). Rather different results were reported by Anderson and Cox (1987) who found that 40% of sickbay consultations were medical cases, 10 - 15% were for eye problems, 10% were due to skin problems, with 5 - 10% for medical trauma, 5 - 10% for musculoskeletal problems and 1 - 15% for ear, nose and throat problems.

Other information about medical problems among offshore personnel comes from a study by Norman, Ballantine, Brebner, Brown, Gauld and Mawdsley *et al.* (1988). These authors investigated the causes of medical evacuation of offshore personnel due to illness and injury; the most frequent type of illness resulting in evacuation from the installation was 'disorders of the digestive system' (including dental problems), which accounted for 30% of the total. Musculo-skeletal and respiratory problems respectively accounted for 20% and 15%. Evacuations as a result of injuries were largely due to fractures, strains and sprains, jointly making up 43% of the total.

Norman *et al.* also observed a change in the relative proportions of illness and injury evacuations over an eight-year period; they found that the percentage of illnesses increased while the percentage of injuries decreased. A similar pattern was reported by Horsley (1997); in his analysis, illness accounted for 47% of the total evacuations in 1987-88, as compared with 64% for 1991-92 evacuations. This trend can most probably be attributed jointly to improved safety regimes on offshore installations, and to the increasing age of the offshore personnel.

These studies of objective medical outcomes provide a general profile of the types of health problems commonly experienced on offshore installations, but little or no attempt is made to identify the occupational and personal factors underlying the statistics reported. While some analyses of offshore accidents and injuries have sought to examine the role of individual and job-related factors, such as shift patterns, job level, occupational group, and individual differences in age and job tenure (e.g. McNabb, Ratard, Horan, & Farley, 1994), these variables have rarely been examined in relation to the frequency and nature of sickbay visits.

The present study sought to address these issues by linking formal records of sickbay consultations with self-report survey data from the same personnel to examine the

frequency of sickbay visits and the categories of diagnoses recorded in relation to personal and occupational characteristics of the employees concerned. More generally, the present study sought to contribute to research into factors affecting the nature and frequency of occupational health consultations, a topic that has not been widely studied in the past; indeed, Hulshof, Verbeek, van Dijk, van der Weide, & Braam (1999) noted that the number of empirical studies in this area were ‘remarkably limited’.

1.1 Aims of the study

There were two main aims of the data analyses reported here.

- First, the study sought to link the diagnoses recorded in sickbay ‘*medical encounter*’ reports to individual and job-related information. The aim of this analysis was to identify particular patterns of diagnoses associated with factors such as age group, job type, and shift pattern. In this study, the unit of analysis was the *sickbay consultation*. The data related to a total of 1944 consultations made between August 1993 and July 1998; these data included 873 consultations made by 342 individuals during the years 1995-96 which coincided with the survey data collection.
- The relationship between health problems identified by offshore personnel in the survey carried out 1995-96, and the distribution of diagnoses arising from the sickbay consultations made by these personnel (n=342) during the two-year period concerned. In this study, the unit of analysis was the *individual worker*.

Further details of the data sets and the analyses are given in the method sections.

2. MEDICAL ENCOUNTER REPORT ANALYSIS

2.1 METHOD

2.1.1 Database details

The archival data analysed in this study were the ‘medical encounter’ reports for male personnel employed on three separate offshore installations operated by a major oil company. These reports summarised all visits to the installation sickbay, detailing the date of consultation, reason for the visit, diagnosis, and nature of disposal. Data relating to consultations over a five-year period (1993-98) were available.

The sickbay data analysed related to personnel who took part in a survey carried out in 1995-96 (Parkes & Clark, 1997) and who made at least one sickbay visit during the period, August 1993 - July 1998, inclusive. The unit of analysis for this study was thus a *sickbay consultation* rather than an individual worker. A total of 1944 consultations were made by 310 personnel between August 1993 and July 1998 inclusive. In addition, the records for a further 39 personnel indicated that they had made no consultations during these years, while no information was available for the remaining 28 personnel in the original survey sample (n=377).

The participants in the survey work during 1995-96 were not all employed on the installation in the years prior to, or after, those dates; thus the sample of 2003

consultations represented varying numbers of personnel in different years. For analyses that depended on knowing the ‘base rates’, i.e. the numbers of survey participants employed on the installation at the time, a sub-sample of 900 consultations made in the years 1995-96 was used.

For each recorded consultation, the age, job type, job level, and shift pattern of the patient requesting the consultation were recorded in the database. Most of those whose data were included in this study sought more than a single consultation during the five-year period examined; in these cases, the relevant personal data were duplicated in adjacent lines of the database. This arrangement of the data set allowed relationships between diagnosis type and various attributes of the personnel concerned to be examined.

2.1.2 Recoding of diagnostic categories

The original Medical Encounter Reports included a three-digit code for each consultation. This code represented a specific diagnosis, e.g. AAH represented ‘Vomiting’. On the original reports, the codes were grouped into 15 broad diagnostic groups, shown below together with the percentage of diagnoses in each category.

A	Alimentary/Digestive System	[6.0%]
C	Cardiovascular System	[1.1%]
D	Dental	[4.8%]
E	Ear/Otological	[4.5%]
G	Genito-Urinary System/Reproductive Organs	[1.5%]
H	Hormonal/Endocrine/Nutritional/Metabolic	[0.5%]
I	Infections/Infestations/Notifiable	[0.8%]
M	Musculoskeletal	[23.3%]
N	Nervous System	[0.6%]
O	Ophthalmic	[5.6%]
P	Psychological/Mental Disorders	[0.9%]
R	Respiratory System	[28.2%]
S	Skin/Dermatological	[15.0%]
X	(Exempt Accident Code)	[0.1%]
Z	Miscellaneous, including GP Prescribed Medications	[3.9%]

For the purposes of the present analyses, the data were recoded so that all categories except A, M, R and S were subsumed under a new category, Z. The final categories were thus:

A	Alimentary/Digestive (designated <i>gastric</i> in this report)
M	Musculoskeletal
R	Respiratory
S	Skin/Dermatological (designated <i>skin/wound</i> in this report)
Z	Other

As compared with the original 15 diagnostic categories, the smaller number obtained by recoding ensured that individual cell readings were sufficiently large to meet the requirements of the statistical tests to be employed. In spite of the inclusion of dermatological conditions in Category S, the majority of consultations in this category were diagnosed as Lacerations / Contusions / Wounds, and this category is therefore designated ‘Skin/wound’ in the present report. Examples of diagnoses included in each of the final categories are shown in Table 2.1.

Table 2.1
Coding of sickbay diagnoses for analysis purposes

Code	Category	Examples
A	<i>Gastric</i> [Alimentary / Digestive]	Dyspepsia / heartburn/indigestion; diarrhoea; constipation
M	<i>Musculoskeletal</i>	Backache / back pain; knee disorder; any fracture of bones
R	<i>Respiratory</i>	Common cold; sinusitis; tonsillitis; influenza group of symptoms
S	<i>Skin/wound</i> [Skin / Dermatological]	Lacerations/Contusions/Wound; Burns; Abscesses; Boils; Impetigo; Eczema
Z	<i>Other</i>	Dental; ear; ophthalmic; headache; mental disorders; cardiovascular; nervous system

2.2 RESULTS: DESCRIPTIVE DATA

2.2.1 Overall distribution of consultations across diagnoses

Figure 2.2.1 shows the distribution of consultations for each type of diagnosis, expressed as percentages of the total of 1944 consultations. Among the four specific diagnostic categories, the most frequent were for *Respiratory* (28.4%) and *Musculoskeletal* problems (23.0%), while the *Other* category accounted for 27.8% of the total.

2.2.2 Reason for consultation

Reasons for consultation were categorised as accident, illness, or ‘other’ (e.g. routine health surveillance). Illness accounted for the great majority of consultations (78.0% of the total), while accidents accounted for only 15.3% and the ‘other’ category for 6.7%. Diagnoses differed significantly across accident, illness, and ‘other’ reasons for consultation ($\chi^2 = 452.6$, $df=8$, $p<.001$); gastric and respiratory consultations were almost entirely associated with illness, while approximately one in three of the musculo-skeletal and skin/wound consultations resulted from accidents (see Figure 2.2.2).

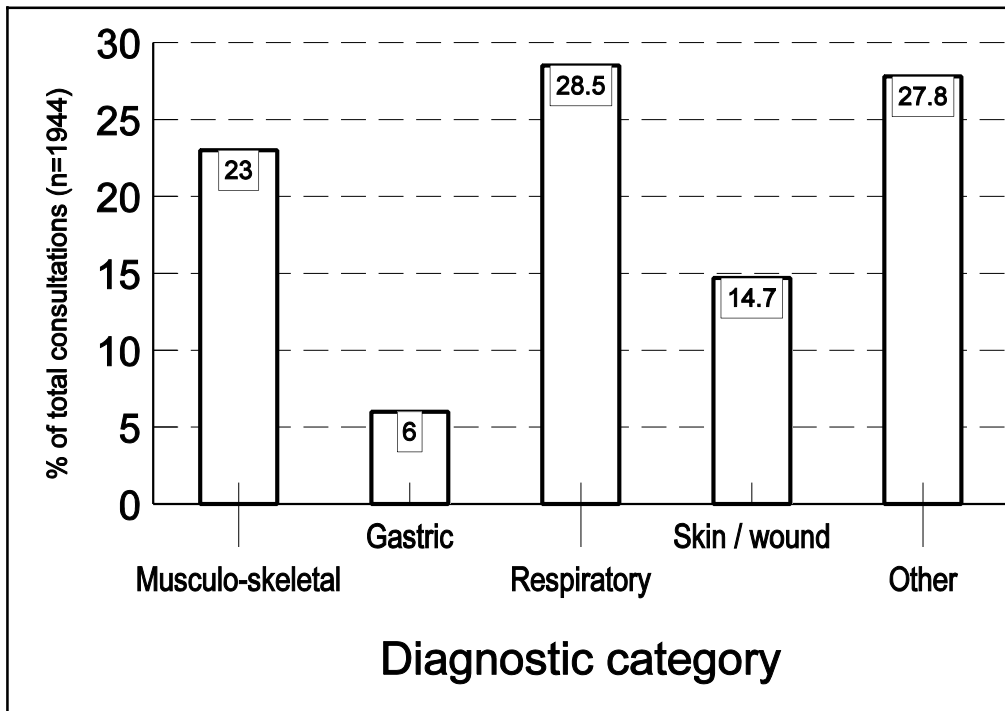


Figure 2.2.1
Distribution of diagnostic categories (N=1944 consultations)

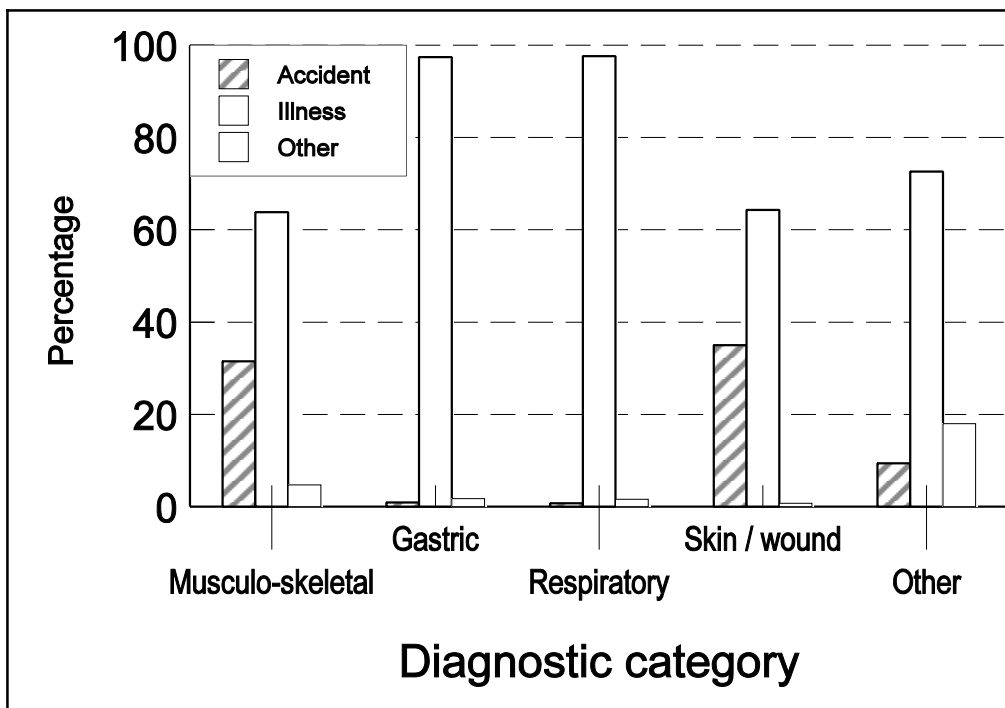
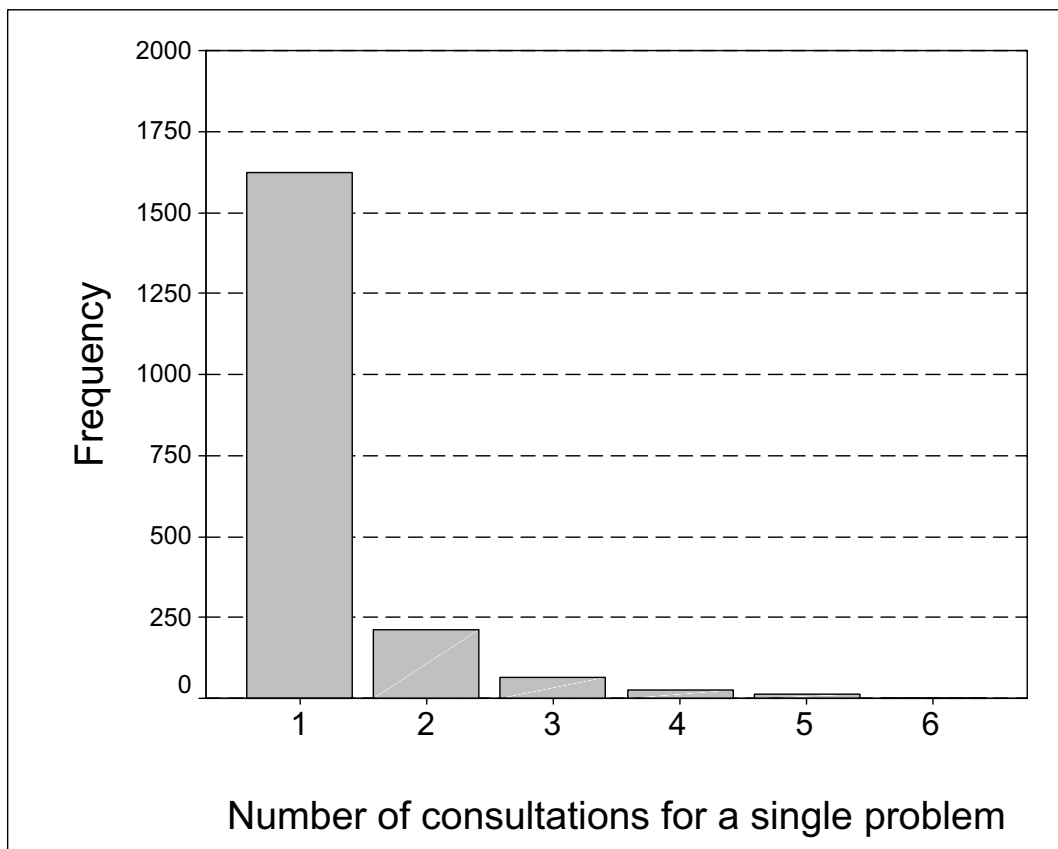


Figure 2.2.2
Percentage of consultations for accident, illness, or 'other' problem in relation to diagnostic category

2.2.3 New contact vs. repeat consultations

The overall distribution of ‘new contact’ consultations as compared with repeat consultations for the same problem (defined as consultations occurring within 3 days of the initial consultation) is shown in Figure 2.2.3. Of the total consultations, 83.6% were initial contacts; consultations in excess of three for the same problem accounted for only 1.3% of the total. There was no significant difference between diagnoses in the distributions of repeat consultations.



2.2.4 Disposal

The outcome of each consultation was recorded. The great majority of cases (89.2%) resulted in a ‘return to work’ decision, while 8.6% were classified as ‘send home / medivac / fatality’, and 2.1% were referred to their general practitioner. The disposal decision differed significantly across the three ‘reasons for consultation’ ($\chi^2 = 20.8$, $df = 4$, $p < .001$); in particular, only 82.2% of accident consultations resulted in a ‘return to work’ decision, as compared with 90.4% of illness consultations, and 92.4% of ‘other’ consultations.

2.3 SICKBAY CONSULTATIONS IN RELATION TO AGE AND JOB FACTORS

To examine whether factors such as age, job type, job level, and shiftwork were related to the number of consultations made, the reason for consultation (illness vs. accident) or to the diagnosis assigned (gastric, musculo-skeletal, respiratory, or skin/wound), further analyses were carried out.

First, the frequencies of consultations in each group were compared with the numbers of personnel in the corresponding group obtained from the survey database. As noted in Section 2.2.1, only consultations occurring during the years 1995-96 were included in these analyses; the numbers of personnel in each group in the relevant years were obtained from the survey data.

Thus, the analyses described below were based on a maximum sub-sample of 873 consultations made by the group of 342 individuals for whom consultation data (including zero consultations) were available. For clarity, consultations assigned to the 'other' categories in the 'reason for consultation' and 'diagnosis' analyses were excluded thus reducing the size of the consultation sample in some analyses.

2.3.1 Age groups

Overall consultation rates. The percentages of consultations in each age group are shown graphically in Figure 2.3.1, together with the corresponding percentages of the age groups among the 342 individuals concerned. In general, the agreement between the two distributions is quite close, indicating that there was no marked difference between age groups in the likelihood of consultation; statistically, the difference in the distributions was marginally significant ($\chi^2 = 12.9$, $df=7$, $p < .10$).

The most obvious discrepancy was in the 45 - 49.9 years age group, which accounted for 22.3% of consultations but only 18.1% of the sample. Conversely, in each of the two highest age groups (50-54.9 years, and 55-59.9 years), the actual consultation rates were lower than the expected values. A likely explanation of this finding is that personnel with impaired health choose to leave offshore work before they reach the age of 50 years, leaving a particularly healthy sub-group continuing to work offshore beyond that age.

Age group in relation to reason for consultation. Further analyses showed that the age groups differed significantly in the relative proportions of accident and illness consultations ($\chi^2 = 27.1$, $df=7$, $p < .001$). In general, as shown in Figure 2.3.2, younger age groups had disproportionately more accident consultations, while older age groups were relatively more likely to consult for illness reasons. However, this general pattern (which is consistent with general findings for accident rates among younger age groups) did not apply in age groups above 50 years.

Age group in relation to diagnostic category. There was no significant relationship between age group and the four diagnostic categories examined.

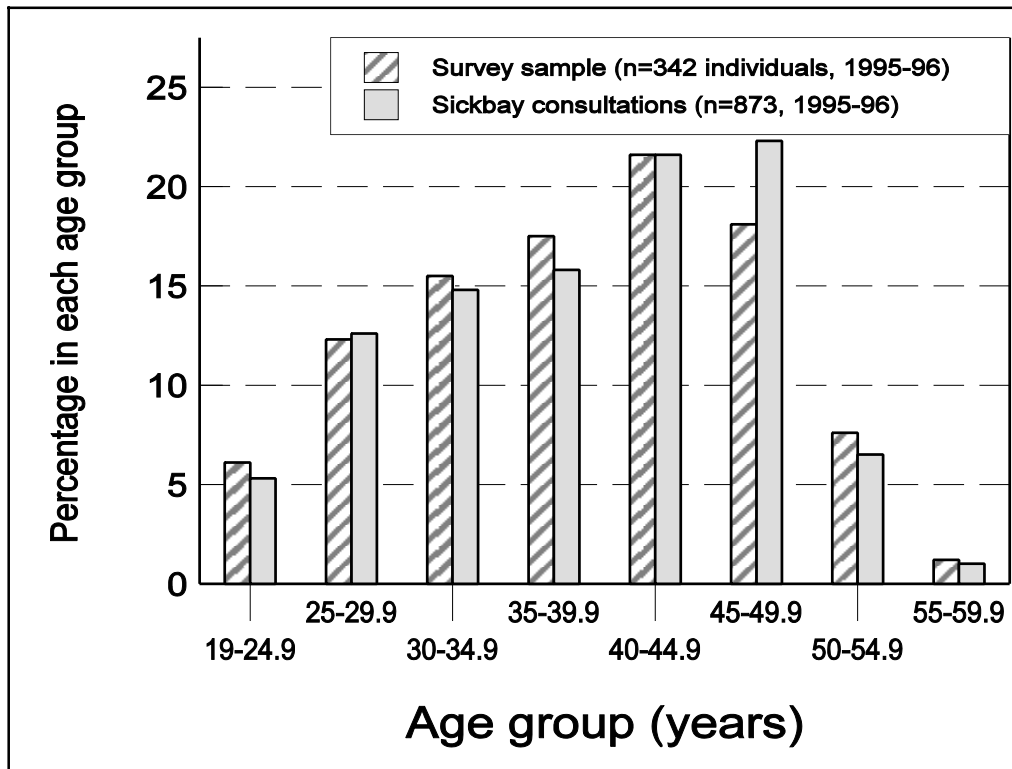


Figure 2.3.1
Percent of consultations in each age group relative to survey sample

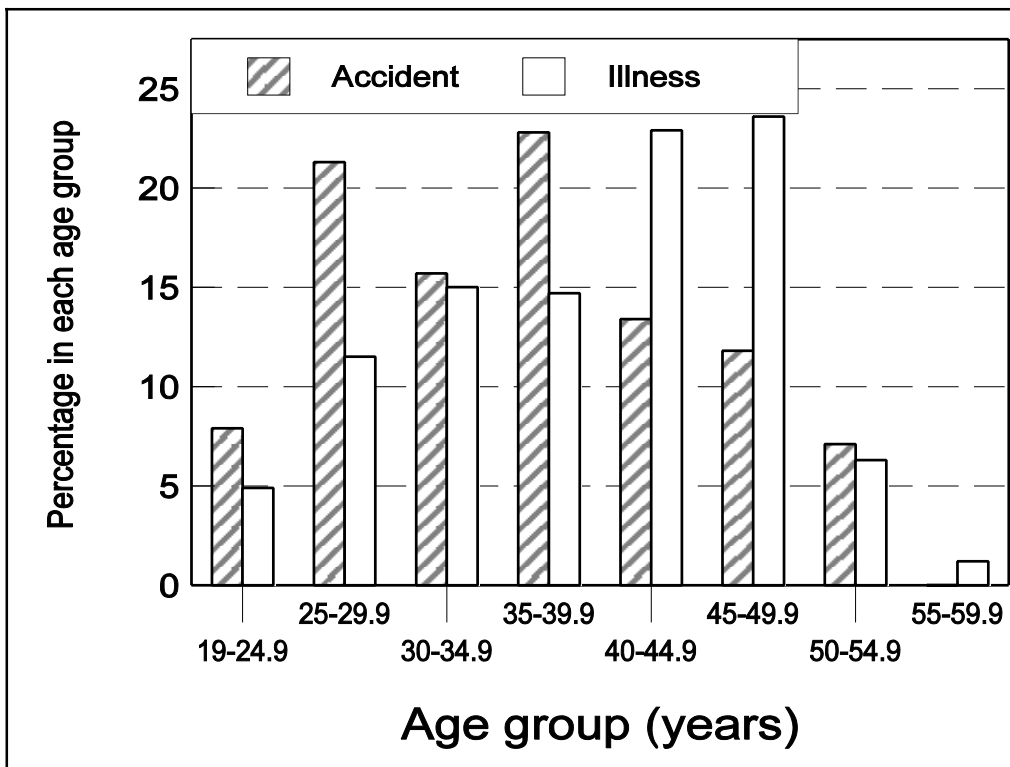


Figure 2.3.2
Percentages of accident and illness consultations in each age group

2.3.2 Job types

Overall consultation rates. An overall comparison of percentages of consultations in relation to percentages of the survey sample was also carried out for the job type categories. The pattern of observed frequencies of consultation differed significantly from the expected rates based on the relative proportions of each job type in the survey sample ($\chi^2 = 28.7$, $df=7$, $p<.001$). Taking all reasons for consultation together, maintenance personnel showed disproportionately high consultation rates while those working in the production and drilling areas showed lower-than-expected rates.

Job type in relation to reason for consultation. Further analyses showed that the distribution of consultations across job types was significantly different for illness and accidents ($\chi^2 = 71.16$, $df=7$, $p<.001$). As shown in Figure 2.3.3, for illness consultations, maintenance personnel had relatively high rates and drillers relatively low rates. In contrast, the pattern of accident consultations demonstrated disproportionately high rates among construction personnel and, to a lesser extent, among technical and drilling personnel, while management and production personnel showed low rates relative to the survey base values. The observed and expected frequencies were significantly different across job groups for both illness ($\chi^2 = 23.9$, $df=7$, $p<.001$) and accident ($\chi^2 = 37.7$, $df=7$, $p<.001$) consultations.

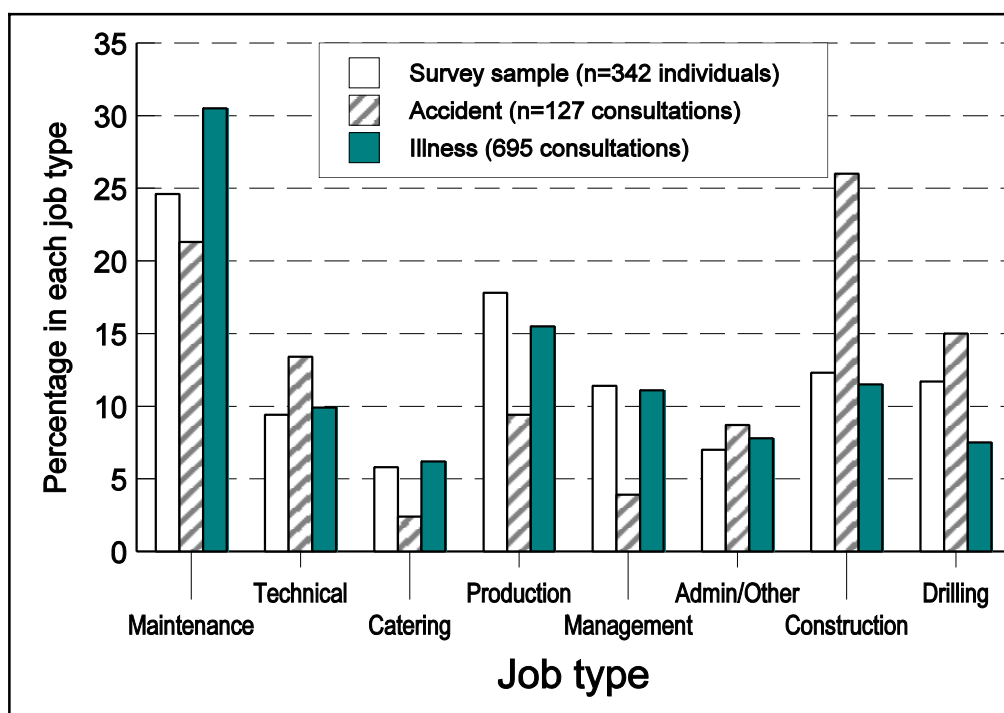


Figure 2.3.3
Percent of consultations for accidents and illness in each job type relative to percent in survey sample

Job type in relation to diagnostic category. Personnel in different job types differed significantly in the relative frequencies with which the four main diagnoses were assigned as a result of the consultation ($\chi^2 = 69.86$, $df=21$, $p=.001$). As shown in Figure 2.3.4, the most marked features of the results were the relatively high rates of certain kinds of

diagnoses in particular job types. Thus, gastric problems among production workers, gastric and skin/wound problems in the technical group, and musculo-skeletal problems among those in administrative jobs, are all conspicuously high relative to other diagnoses and relative to the proportions of the relevant group in the survey sample (see Figure 2.3.3).

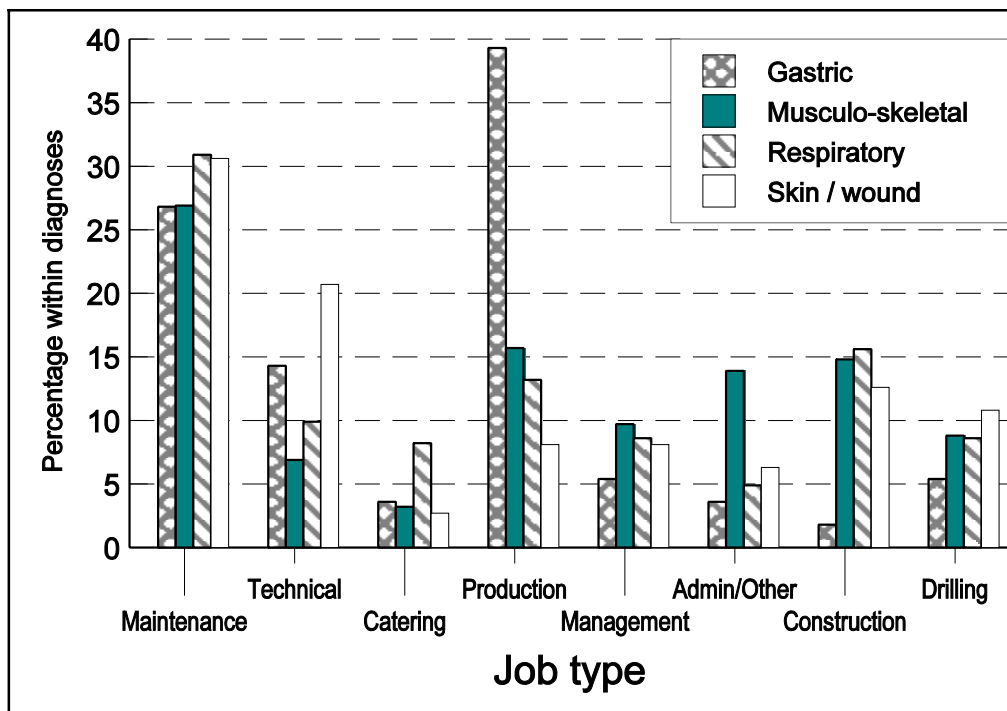


Figure 2.3.4
Percent of consultations in each diagnostic category in relation to job type

2.3.3 Job level

Overall consultation rates. A comparison of consultation rates in the five job level categories relative to the proportions of each job level group in the survey sample was also carried out. Although the difference between the two distributions fell short of the .05 level of significance ($\chi^2 = 7.77$, $df=4$, $p=.10$), the data suggested that personnel in the lowest job grade tended to account for more consultations (68.5%) than would have been expected from their percentage of the total sample (64.6%).

Reason for consultation. When illness and accident consultations were examined separately, the distributions were found to be significantly different across job level groups ($\chi^2 = 10.30$, $df=4$, $p<.05$). Relative to the total consultations for each job level, the proportion of illness consultations increased with increasing seniority while there was a corresponding decrease in accident consultations. There was no evidence that illness consultations were disproportionately high for any job level group relative to their numbers in the survey sample; however, technicians were found to have higher than expected consultation rates for accidents ($\chi^2 = 12.81$, $df=4$, $p < .02$).

Job level in relation to diagnostic category. There was a significant relationship between job level and diagnostic category ($\chi^2 = 25.15$, $df = 12$, $p < .02$). As shown in Figure 2.3.5, technicians (the lowest job level) showed relatively high rates of consultations in all diagnostic categories but particularly for skin/wound problems (consistent with the higher rates of accident consultations in this group). In contrast, supervisors showed relatively high rates of gastric problems.

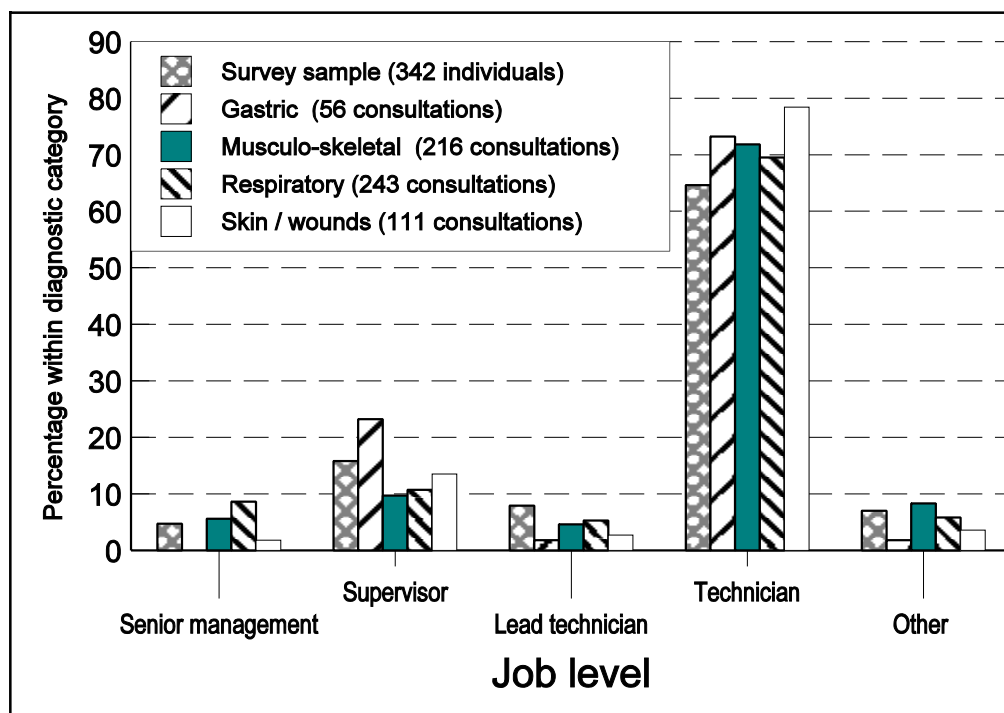


Figure 2.3.5
Percent of consultations in each diagnostic category for each job level in relation to survey sample size

2.3.4 Shift work

Overall consultation rates. Personnel working day/night rotating shifts were compared with those working only days in terms of consultation rates. The two groups differed significantly in consultation rates ($\chi^2 = 6.58$, $df=1$, $p = .01$); day/night shift workers showed relatively high rates, while day workers showed relatively low rates of total consultations.

Reason for consultation. Further analyses showed that among day/night shiftworkers a higher proportion of consultations was attributable to accidents (19.6%), as compared with illness, than for day workers (11.5%). This difference was significant ($\chi^2 = 10.18$, $df=1$, $p<.001$). Accident consultations, but not those for illness, showed disproportionately high rates among day/night shiftworkers relative to their numbers in the sample ($\chi^2 = 15.36$, $df=1$, $p <.001$).

Shift work in relation to diagnostic category. Day-workers and day/night shift-workers differed significantly in the diagnosis resulting from their consultations ($\chi^2 = 12.96$,

df=3, p<.005). As shown in Figure 2.3.6, shift-workers were diagnosed as having gastric problems more than twice as often as day-workers; conversely, day-workers were more likely to experience respiratory problems. However, the remaining two diagnoses, musculo-skeletal and skin/wound diagnoses, were approximately equally distributed between the two groups, consistent with the relative proportions of day-workers and shift-workers in the survey sample.

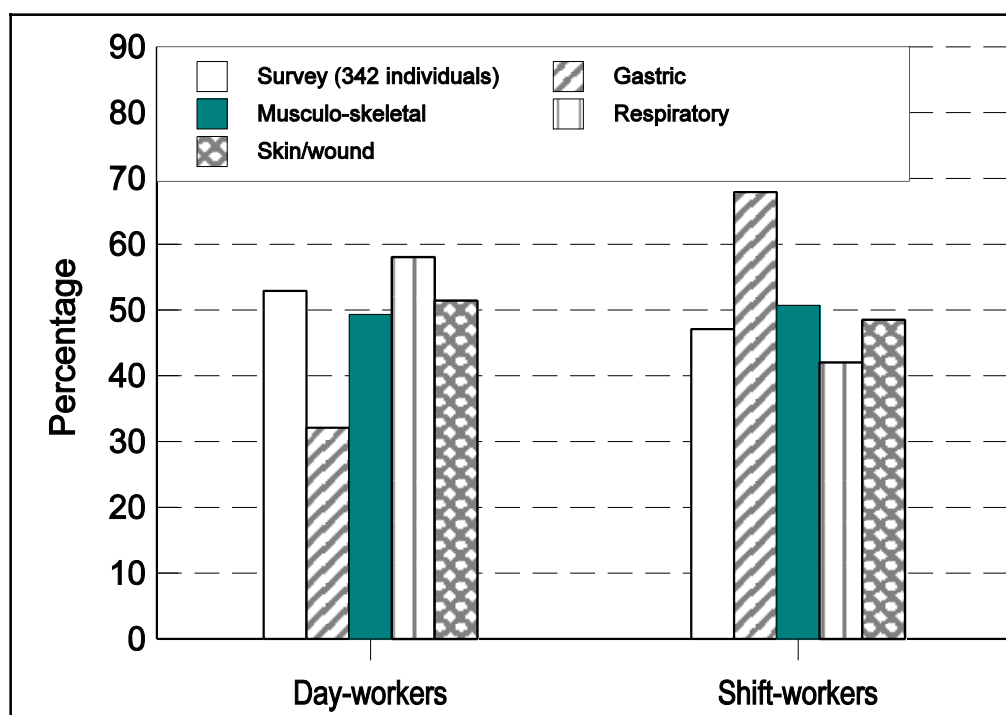


Figure 2.3.6
Percentage of consultations by day-workers and day/night shift-workers
in each diagnostic category

2.4 SICKBAY CONSULTATIONS IN RELATION TO SELF-REPORTED HEALTH PROBLEMS

The unit of analysis in the findings reported above was the *sickbay consultation*; in contrast, in the work reported in this section, the unit of analysis is the *individual worker*. Thus, in order to evaluate the extent to which self-reported health problems corresponded to the diagnoses made as a result of sickbay consultations, the health problems identified by offshore personnel in the self-report survey carried out in 1995-96, were examined in relation to the sickbay diagnoses for these personnel (n=342) during the two-year period concerned.

Self-reported health problems: Survey data. The categories of health problems reported in the survey questionnaire were: headache, neck pain, shoulder pain, back pain, indigestion, heartburn, stomach upset and sleep problems (Parkes, 1995). Each problem was rated on a 0-3 scale, where 0 represented no problem, and positive scores represented degrees of severity of a problem that was experienced (1 = mild, 2 = moderate, 3 = severe). Ratings for neck pain, shoulder pain and back pain were combined to form a

‘musculoskeletal’ category. Indigestion, heartburn and stomach upset were combined into a ‘gastric’ category. The final self-report categories were thus: *Gastric*, *Musculoskeletal*, *Headache*, and *Sleep* problems. These scores were also combined to form a total score.

2.4.1 Total consultations in relation to total health problems score

The initial analyses examined the extent to which total health problems score (obtained by summing the incidence/severity scores for the eight health complaints assessed) for individuals in the survey sample were associated with the number of sickbay consultations made during the years concerned (1995-6). Overall, there was a highly significant association between the total health problems score and overall number of sickbay consultations ($p < .001$, Wilcoxon signed ranks test).

In a further analysis, health scores were grouped into four levels, and the mean total consultations summed across musculo-skeletal, gastric, and skin/wound problems (respiratory problems were omitted from this total as these problems were not assessed in the survey) were calculated for each of the four levels. One-way analysis of variance confirmed the significance of the relationship ($F = 6.32$, $df=3$, $p < .001$), which was positive and approximately linear.

The pattern of results is shown graphically in Figure 2.4.1. Thus, individuals with higher scores on the health problems measure in the survey questionnaire were more likely to consult the sickbay medic about health concerns falling within the major diagnostic categories examined in the present work. As compared with those who reported no health problems, those with scores of 6 or more on the health questionnaire had two-and-a-half times as many consultations over the two-year period assessed.

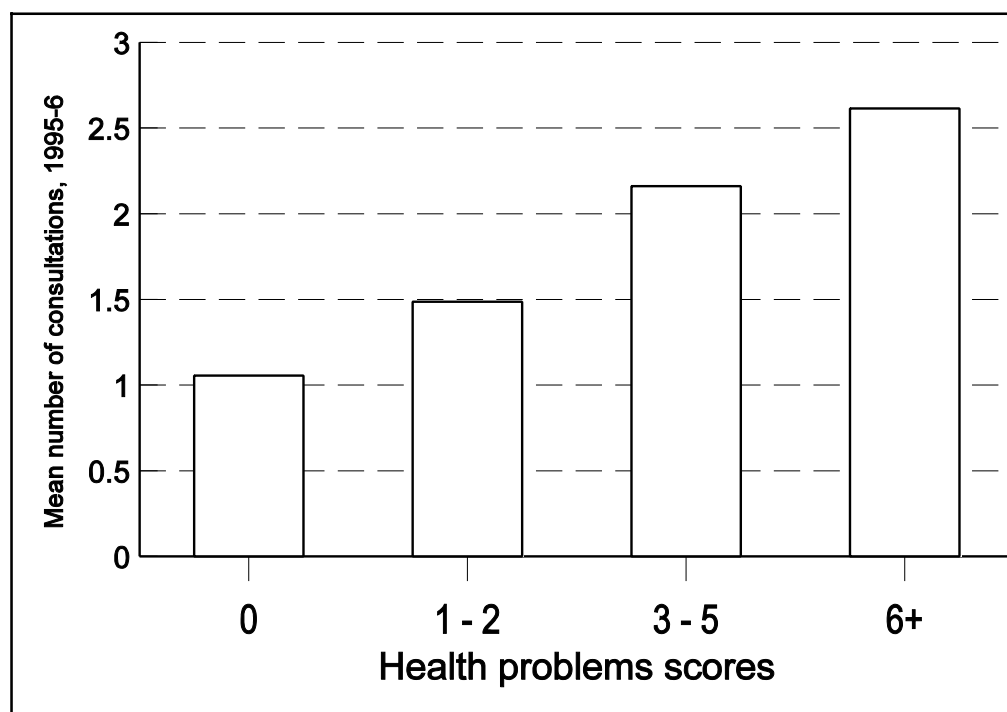


Figure 2.4.1
Mean number of sickbay consultations, 1995-6, in relation to self-reported health problems scores

2.4.2 Specific sickbay diagnoses in relation to health problem reports

The significant relationship between total consultations and health scores, noted above, does not indicate whether individuals who reported a specific health problem in the survey were also more likely to receive a similar diagnosis in the sickbay consultation records. This issue was examined by calculating tau (non-parametric) correlations between consultations for specific diagnoses and the corresponding self-reported health problems.

Musculo-skeletal problems. The total number of sickbay diagnoses in the musculo-skeletal category for each individual was found to correlate significantly with individual reports of musculo-skeletal problems in the survey questionnaire (tau = .164, $p < .001$). However, the frequency of this diagnosis also correlated significantly with mental health scores, poorer mental health being associated with greater number of musculo-skeletal consultations (tau = .096, $p < .05$).

Although the correlation between self-reported musculo-skeletal problems and sickbay diagnoses in the musculo-skeletal category was significant, the magnitude of the correlation was not large. The modest size of the association reflected the fact that for many of the individuals who reported musculo-skeletal problems in the survey there was no record of any sickbay consultation for such problems.

More specifically, among those with no consultations for musculo-skeletal problems, 130 individuals did not report such problems in the survey, while 98 individuals did have positive self-report scores in this category. Conversely, those with three or more recorded musculo-skeletal consultations were approximately equally divided between those who had, and those who had not, reported such problems in the survey. The relatively weak correspondence between consultation records and self-reports may in part be attributable to the different time periods involved in the two sets of data, but the role of mental health in musculo-skeletal disorders may also have played a part.

Other health problems. There was no significant relationship between self-reported gastric complaints and consultations for gastric problems. However, consultations for headaches were significantly associated with self-reports of headaches (tau = .166, $p < .001$). Neither of these categories of consultation diagnoses correlated with self-reported mental health scores. Skin/wound consultations had no direct equivalent in the self-report data, and no correlations were therefore examined..

Inter-correlations among diagnostic categories. Correlations among the separate diagnostic categories for sickbay consultations were generally significant, suggesting the presence of a general factor reflecting individual differences in frequency of sickbay attendance, irrespective of the particular health problems experienced. It would be expected that this tendency would correlate with more general individual differences in vulnerability, as assessed in the present study by the neuroticism measure. Consistent with this prediction, the correlation between total consultations and neuroticism scores was found to be significant (tau = .10, $p < .02$, $n=342$), although no more than modest in magnitude.

3. CONCLUSIONS

The results of the present study were consistent with previous work in illustrating the broad pattern of offshore health problems in general, and sickbay consultations in particular. Thus, in the present data, 15.3% of the consultations examined were accounted for by accidents as opposed to illness or routine health monitoring; the corresponding proportion of accidents found by Hellesoy (1986) was 16%.

Also in agreement with Hellesoy, drilling personnel were more likely than other occupational groups to attend the sickbay as a result of accident rather than illness. This finding is also consistent with other evidence demonstrating a relatively high incidence of accidents among drillers (e.g. McNabb et al. 1994; Parkes & Swash, 1999). In the present data, however, there was no evidence to suggest that catering personnel had relatively high rates of sickbay consultations for accidents relative to illness, as was reported by Hellesoy.

It was clear from the present study, however, that consistent with the suggestion made by Horsley (1997), older personnel were significantly more likely to attend the sickbay as a result of illness as opposed to accident, in contrast to the higher proportion of accident consultations by younger personnel. A similar finding applied to shiftwork; day/night shift workers had relatively high consultation rates for accidents, as compared with day workers, whereas the opposite was true for illness consultations.

The frequencies with which different diagnoses were made as a result of sickbay consultation could also be examined in relation to data published in previous studies. Thus, in the present study, musculo-skeletal problems accounted for 23% of total sickbay consultations as compared with 25% in Hellesoy's data. However, these proportions are substantially different from the values reported by Anderson and Cox (1987) who estimated only 5-10% of sickbay consultations resulted in a musculo-skeletal diagnosis, as compared with the 40% designated 'medical cases'.

A further finding of the present study was that 28.4% of sickbay consultations were for respiratory disorders, a slightly higher proportions than the total for infections (18%) and respiratory disease (7%) in Hellesoy's data. Conversely, the present study found a lower proportion of gastric diagnoses (6.0%) than in Hellesoy's data (19%). Discrepancies such as these are most likely to be due to differences in the coding of diagnostic categories.

The nature of the data sets and the analyses used in the present study allowed not only comparison with existing data, but also provided new findings. In particular, for analyses of sickbay consultations made by personnel in the 1995-6 survey sample, it was possible to examine whether some particular sub-groups of individuals were disproportionately likely to attend the sickbay during the years concerned relative to their numbers on board. The results indicated that individuals in the 45.0 - 45.9 years age group; maintenance personnel (for illness) and construction personnel (for accident); personnel at the lowest job level; and shift workers all tended to show higher than expected consultation rates.

Although diagnostic category was not related to age, several job factors did show significant patterns in relation to diagnoses. In particular, production work was associated with significantly high rates of diagnoses within the gastric category; this finding was most likely due to the high proportion of day/night shift workers among production personnel. Consistent with this explanation, when shift work vs. day work was examined

in relation to diagnoses, shift work showed a strong association with gastric diagnoses. Parkes and Clark (1997) and Parkes (1999) reported similar findings from analysis of self-report data. Conversely, musculo-skeletal diagnoses tended to be more prevalent among administrative personnel.

The present study was unusual in that it was also possible to examine the extent to which self-report health data reflected the nature and frequency of sickbay visits. There was a highly significant correlation between overall self-reported health scores and number of sickbay consultations, although the magnitude of the correlation was not large. Thus, some personnel who reported health problems on the survey questionnaire did not consult the sickbay medic; conversely, among those with recorded sickbay consultations, not all reported relevant health problems in the self-report survey. It is of course possible that for longer-term problems personnel preferred to consult their own medical practitioner while on shore leave rather than the sickbay medic.

The most significant association between the self-report data and the sickbay consultation data was for the specific diagnosis of musculo-skeletal problems. However, a complication in the interpretation of this result was that musculo-skeletal diagnoses also correlated with poorer mental health. This finding reflects the uncertainty, widely acknowledged in the literature, in understanding the causes of musculo-skeletal complaints.

Thus, the relationship between impaired mental health and musculo-skeletal problems may be a direct causal one (in which case it may be unidirectional in either direction) or it may be reciprocal, each problem serving to influence the other. Alternatively, the relationship may be indirect, mental health impairment and musculo-skeletal problems both being associated with some third factor, such as a general tendency to complain.

Finally, it should be noted that the generally modest correlations between self-reported health information and sickbay consultation rates may be partially attributable to the methodology of the present study. Thus, for instance, the health data obtained in the survey were relatively limited and did not include all the major diagnostic categories used in the sickbay records; in particular, respiratory problems were among the most frequent diagnoses but were not included in the survey questionnaire. Furthermore, the survey data related to a more limited time period than the sickbay records.

Nonetheless, the findings derived from the present study serve not only to strengthen existing published results but also to provide additional information of relevance to offshore occupational health physicians and others concerned with the maintenance and promotion of health among offshore personnel.

4. REFERENCES

- ANDERSON, I. K. & COX, R.A.F. (1987). In: Cox RAF, ed. *Offshore medicine: Medical care of employees in the offshore oil industry*. 2nd Edition. London: Springer-Verlag, 1987. (pp. 61-88).
- GANN, M., CORPE, U., WILSON, I. (1990). The application of a short anxiety and depression questionnaire to oil industry staff. *Journal of the Society of Occupational Medicine*, **40**, 138-142.
- GARDNER, R. (2003). Overview and characteristics of some occupational exposures and health risks on offshore oil and gas installations. *Annals of Occupational Hygiene*, **47**, 201-210.
- HELLESØY, O. H. (Ed.). (1985). *Work environment: Statfjord Field*. Bergen, Oslo: Universitetsforlaget.
- HORSLEY, H. D. (1997). *Study of medical evacuations from offshore installations: Five year report, 1987-1992*. [Report No. OTH 94 461] London: Health and Safety Executive.
- HORSLEY, H. D. & MacKENZIE, I.G. (1997). *Lifestyle survey amongst North Sea oil workers*. Paper presented at HSE/UKOOA conference, 'Occupational Health Offshore', Aberdeen, March, 1996.
- HULSHOF, C.T., VERBEEK, J.H., van DIJK, F.J., van der WEIDE, W.E., BRAAM, I.T. (1999) Evaluation research in occupational health services: general principles and a systematic review of empirical studies. *Occupational and Environmental Medicine*, **56**, 361-377.
- IVERSEN, E. (1991). Health, sick leave, and work organization on a Norwegian oil field. In: Proceedings of the 4th Annual Conference of the European Health Psychology Society (Eds. M. Johnston, M. Herbert, & T. Marteau). Leicester: British Psychological Society.
- LAURIDSEN, O. *et al.* (1991). *Shift-work and health: Shift-work, sleeping difficulties, psychosocial work environment and psychosomatic complaints*. Norway: Rogaland Research / Phillips Petroleum Company.
- McNABB, S. J., RATARD, R.C., HORAN, J.M., & FARLEY, T.A. (1994). Injuries to international petroleum drilling workers, 1988-1990. *Journal of Occupational Medicine*, **36**, 627-630.

- NORMAN, J. N., BALLANTINE, B. N., BREBNER, J. A., BROWN, B., *et al.* (1988). Medical evacuations from offshore structures. *British Journal of Industrial Medicine*, **45**, 619-623.
- PARKES, K. R. (1992). Mental health in the oil industry: A comparative study of onshore and offshore employees. *Psychological Medicine*, **22**, 997-1009.
- PARKES, K. R. (1993). *Human factors, shift work, and alertness in the offshore oil industry*. Report OTH 92-389. London: HMSO.
- PARKES, K. R., & CLARK, M. J. (1997). Psychosocial aspects of work and health in the North Sea oil and gas industry. *Part IV. The offshore environment in the mid-1990's: A survey of psychosocial factors*. Report 96 530. Sudbury: HSE Books.
- PARKES, K. R., & SWASH, S. (1999). *Injuries on offshore oil and gas installations: An analysis of temporal and occupational factors*. Report prepared by University of Oxford under HSE-OSD Contract MaTSU/8843/3516.



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