Seafarers International Research Centre

Changes in seafarers' health 2011-2016: A summary report

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A summary report

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Introduction

This report sets out to provide a brief overview of the results of a questionnaire administered in both 2011 and 2016 relating to seafarers' health and medication.

Method

The questionnaire was administered to active seafarers visiting welfare centres (from their ships). The questionnaire was distributed and collected by port chaplains and by researchers in the UK, Philippines, and China.

In 2011, 1026 completed questionnaires were collected and in 2016 we expanded the sample size to 1513.

In this report the analysis focuses on the significant differences[1] identified between the findings for 2011 and 2016 and we also report on areas of consistency where findings relate to important behaviours and health issues.

The sample for phase one (2011) and phase two (2016) is remarkably consistent in terms of age profile, department (deck/engine/galley) and marital status. The mean age was 33.87 in 2011 and 33.78 in 2016.

However in other respects the sample displays some differences. There were slightly more females included in the 2011 results (2.1 % of the total sample) than in the 2016 results (1.1% of the sample). The nationality profile is markedly different in relation to the two samples with significantly more Filipinos, fewer Eastern Europeans and fewer 'others' included in phase 2 (2016) than in phase one. The job profile also differs but less significantly than nationality. In 2016, we included slightly more ratings in the sample (54% as opposed to 50% in 2011). There were very similar numbers of junior officers in both samples but fewer senior officers in phase two than in phase one (16% phase two

[1] Significance is assessed in two ways. Firstly we only report differences if they are statistically significant at the 95% level. Statistical significance indicates the level of confidence that we can have that the results are not spurious. However statistical significance is inadequate when evaluating the results of data collected using a non-random sample. We have therefore added the measure of 'effect size' which in studies of interventions provides an indication of how big the effect of an intervention is (the range is from no effect, minor effect, medium effect and high effect). For effect size we used Cramer's V on chi squared results with effect size reported in brackets as 'effect size' followed by the numeric value derived from Cramer's V. Where we occasionally used other tests these are reported in brackets with clarificatory text. Where we use Cramer's V, the interpretation of the result depends on the degrees of freedom (reported in brackets as d.f. 1,2,3,4, or 5) associated with the test. Appendix 1 shows the interpretation which should be applied to each level. Where we use Cohen's D, the scores applying to the levels which indicate strong, medium and minor effect are different with 0.2 indicative of minor effect , 0.5 of medium importance and 0.8 indicates a very strong difference in the two sets of results.

and 22% phase one). There were no significant differences between the samples in relation to the departments where seafarers worked, with just over half working in the deck department, and just over a third working in the engine department. The remainder worked in the galley. We did not find significant differences in the length of time during which seafarers in the two samples had worked, however we did find significant differences in the types of ship which they worked on. In 2016, significantly fewer seafarers in the sample were working on tankers and significantly more were working on car carriers than in the 2011 sample. Finally there was a significant difference identified in the numbers of crewmembers that seafarers worked alongside. To our slight surprise the average crew size was bigger in our 2016 sample (22.91) than in the earlier sample (20.85). Please see Appendix 2 for full details of the sample.

Findings

Sleep quality at sea

As an essential element of good mental and physical health, and an issue for concern at sea, we concentrated a number of questions on seafarers' accounts of the rest and sleep they experienced at sea. The results showed a very consistent pattern, with seafarers in 2016 reporting: more difficulty falling asleep (p=0.000, effect size 0.11, d.f.=3) and staying asleep (p=0.000, effect size 0.09, d.f.=3) and an increased tendency to wake up during sleep hours (p=0.000, effect size 0.17, d.f.=3); increased difficulty getting up at the appropriate time (p=0.000, effect size 0.13, d.f.=3); increased restless/disturbed sleep (p=0.000, effect size 0.09, d.f.=3); an increased tendency to wake up disorientated or confused (p=0.034, effect size 0 .06, d.f.=3); and an increased perception of inadequate sleep (p=0.008, effect size 0.07, d.f.=3) (see Appendix 3 for detailed figures). When these results are aggregated to create a 'fatigue score' we find that the mean score for 2016 is significantly greater than for 2011 (3.74 in 2016 and 3.08 in 2011) (independent t-test showed a strongly significant difference [p=0.000] with Cohen's D showing an effect size of [0.26]). The scores indicate that the experience of 'severe' fatigue has increased from 24% of the sample in 2011 to 36% in 2016.

We asked the seafarers who did not get enough sleep why this was. The percentage who suggested it was due to working hours increased in 2016 to 32% (up from 28% in 2011) (p=0.027, effect size 0.04, d.f.=1). We also found an increase in the numbers of seafarers who suggested that lack of sleep was caused by motion (p=0.003, effect size 0.06, d.f. =1). In 2011 18% of seafarers suggested that their lack of sleep was a consequence of ship motion and in 2016 the percentage increased to 23%. The remaining factors were stable when we compared the two samples with no further differences

of statistical significance. When the factors which we considered were grouped into 'work' (hours, patterns, port duties), 'environment' (motion, noise, light, temperature) and 'anxiety' (general, work-related, homesickness and 'other') we found that the mean scores had significantly increased for work (independent t-test showed a significant difference [p=0.050] but Cohen's D showed an effect size of [0.08]), and environment (independent t-test showed a significant difference [p=0.014] but Cohen's D showed an effect size of [0.10]) related to sleep deprivation, but that there was no statistically significant difference which related to sleep disruption due to anxiety (independent t-test showed no significant difference [p=0.565] and Cohen's D showed an effect size of [0.02]) (see Appendix 4 for further details).

Quality of life on board

In phases one and two, the questionnaires included questions about cabin occupancy and daylight screening from cabins (both of which may be important to sleep). In 2016 we also included more questions about the quality of life on board in relation to the degree of social isolation or sociability experienced by seafarers. These questions were included because social activities can impact on mental and physical health.

In 2016 we found that significantly fewer seafarers shared a cabin than in 2011 (p=0.001, effect size 0.07, d.f.=1). Six percent shared a cabin in 2016 as opposed to 10% in 2011 which in general should be expected to contribute to better sleep quality (all other things being equal). Less positively we found that seafarers who completed questionnaires in 2016 were less likely to be able to screen out daylight from their cabins than those who completed questionnaires in 2011 (p=0.000 effect size 0.08, d.f.=1). Eighty-seven percent were able to screen out daylight in 2011 and only 81% were able to do so in 2016. This is likely to detract from sleep quality.

In terms of rest hours, seafarers who completed questionnaires in 2016 were asked about what they generally did in their non-work hours. The majority (42%) stated that they went to their cabins to rest. Many suggested that they went to their cabin to watch TV (21%) and only just over one in ten seafarers (13%) said that they went to their cabins to use the internet. Nine percent of seafarers listened to music alone in their cabin and very few indicated that they spent their free time engaged in communal activities such as watching TV/DVD together (5%), chatting with colleagues (3%), singing with others (2%) group sports (2%), using gym with others (1%), using ship's internet room (0.5%).

Seafarers' health-related behaviours: alcohol, smoking and diet

In 2016 seafarers reported less alcohol consumption on board than in 2011. In 2016, 80% stated that they drank alcohol on board **less** than once a week compared with 75% in 2011 (p=0.002, effect size 0.06, d.f. =1). This pattern was repeated when it came to leave time with fewer seafarers in 2016 reporting drinking more than twice a week during vacations - 25% in 2011 and 14% in 2016 (p=0.000, effect size 0.15, d.f.=5). Quantities consumed whilst in port were also reported by seafarers in 2016 to be significantly less than reported by seafarers in 2011 - a mean weekly consumption of 1.79 units in 2011 and 1.23 units in 2016 (independent t-test showed a significant difference [p=0.000] and Cohen's D showed an effect size of [0.20]).

In relation to smoking habits we found a similar pattern of reduced consumption. In 2011 35% of seafarers said that they smoked cigarettes while in 2016 this proportion had dropped to 31% (p=0.038 effect size 0.04, d.f.=1). Amongst those who smoked there had been a reduction in the numbers of cigarettes smoked - a mean of 11.5593 cigarettes per week were smoked per day in 2011 and this fell to a mean of 9.8908 per day in 2016 (independent t-test showed a significant difference [p=0.016] and Cohen's D showed an effect size of 0.18) .

Perhaps the most surprising change reported by seafarers in our 2016 sample related to diet. In 2016 more respondents reported that they were vegetarian than in 2011 (16% reported that they were vegetarian in 2016 compared with 11% in 2011) (p=0.004 effect size 0.07, d.f. =2).[2] Vegetarian diets are generally considered to be healthier than non-vegetarian diets (Sabaté, 2003; Leitzmann, 2005; Key, *et al.*, 1999).

Generally speaking there were some improved dietary habits reported by seafarers but also some changes in behaviour that are regarded by experts as less healthy (Deshmukh-Taskar, *et al*., 2012; Smith, *et al.*, 2010; Huang, *et al.*, 2010). Seafarers reported eating more vegetables at sea and to a lesser degree at home in 2016 when compared with 2011 (p=0.001, effect size 0.09, d.f. =4 and p=0.002, effect size 0.09, d.f. =4 respectively). Vegetable consumption is widely acknowledged by dieticians to be beneficial to human health. Equally a reduction in the consumption of fried food is widely regarded as carrying beneficial health consequences (Djousse, *et al.*, 2015; Cahill, *et al.*, 2014; Qi, *et al.*, 2014). In terms of fried food, seafarers in 2016 reported lower rates of consumption at sea than had seafarers in 2011 - 66% reported eating fried food most days, or every day, in 2011 but only 60% did so in 2016 (p=0.010, effect size 0.08, d.f.=4). Leave consumption of fried food showed a

[2] We have been unable to account for this in terms of the different nationality composition of the sample which would incline us to expect a decline in vegetarianism and not an increase.

bigger decline with only 13% of seafarers in 2016 reporting eating fried food every day compared with 20% of seafarers in 2011[3] (p=0.000, effect size 0.12, d.f.=4). However less healthily, whilst at sea, respondents who were inclined to sometimes skip breakfast reported missing breakfast more frequently than respondents in 2011 (p=0.001, effect size 0.09, d.f. =4) although the numbers who ate breakfast every single day remained relatively stable.

Seafarers' Health

Seafarers in 2011 reported their general health to be better overall than seafarers in 2016. In 2011, 36% of seafarers reported their health to be 'very good' as opposed to 30% in 2016 (p=0.003, effect size 0.08, d.f. =4). This pattern was also reflected in the small (but not significant) increase that was reported in the mean numbers of days indicated as time 'off sick' - 2.20 in 12 months in 2011 and 2.81 days in 2016 (independent t-test did not show a significant difference [p=0.470] and Cohen's D showed no effect [0.04]). More significantly seafarers in 2016 reported spending more of their leave time visiting doctors than in 2011 - 13% reported visiting a doctor 'quite often' and 9% reported visiting a doctor 'very often' in 2016 as opposed to 6% and 4% respectively in 2011 (p=0.000, effect size 0.16, d.f.=3).

In relation to both physical and mental health seafarers can be expected to demonstrate a strong healthy worker effect whereby unhealthy workers are screened out at pre-employment medical examinations leaving mainly healthy workers on board ships. This implies that it is more relevant to compare morbidity from year to year amongst seafarers than it is to make comparisons with land-based workers.

Using the data collected in 2011 and 2016 we are able to consider the results from questions incorporated in our questionnaire from the validated 'General Health Questionnaire'. An analysis of the responses to these questions allows us to examine validated health scores for seafarers. In relation to scores which indicate the presence/absence of psychiatric health disorders we observed a deterioration in seafarers' mental health between 2011 and 2016. In 2011 scaled responses indicate the presence of a 'psychiatric disorder' in 28% of respondents while in 2016 this had risen substantially to 37% (p=0.000, effect size 0.09, d.f. =1). Although this figures still compares favourably with **some** studies of comparable workers in land-based studies (Smith *et al*., 2004) it

[3] The daily consumption of fried food was much higher on board than whilst on leave in both 2011 and 2016 (25% of respondents reported eating fried food on board every day in 2011 and 22% reported doing so in 2016).

compares rather unfavourably with most studies of the general population[4] (see e.g. Doherty *et al.,* 2009) and the increase over time is a particular cause for concern (see Appendix 5). It is important to stress that these questions do not pick up long-term psychiatric problems but are designed to screen for recent onset deteriorations in mental health.

The questions relating to seafarers' own perceptions of their health indicated that notwithstanding the improvements that were observed in relation to diet, smoking, and alcohol consumption, seafarers in 2016 did not feel they were as healthy as respondents in 2011. In 2016 more seafarers felt that they seemed to get ill more often than 'most people' than in 2011, with only 32% of seafarers denying this in 2016 compared with 47% in 2011 (p=0.000, effect size 0.17, d.f.=4). Similarly more seafarers in 2011 felt they were as healthy 'as anybody I know' (39%) than felt this in 2016 (just 30%) (p=0.000, effect size 0.10, d.f.=4).

In relation to specific health problems we found limited evidence of change in the 2011 and 2016 seafarer samples. However where significant differences were reported they generally indicated a reduction in the health issue concerned. Thus although seafarers reported feeling less healthy, in general, fewer seafarers on board reported having been diagnosed with a specific medical problem. This is likely to reflect more stringent pre-employment medical examinations and checks within the industry. There was little significant change reported in the use of prescription medication on board with a reduction of prescribed painkillers - 13% of seafarers reported taking these in the past year whilst at sea in 2011, and 10% reported taking prescribed painkillers in the previous 12 months in 2016 (p=0.020, effect size 0.05, d.f.=1). The use of self-prescribed medications at sea was also reported less often by seafarers in 2016 than in 2011 - the mean self-medication score fell from 1.0741 in 2011 to 0.7911 in 2016 (independent t-test showed a significant difference [p=0.000] with Cohen's D showing a small/medium effect [0.28]). This pattern was repeated a little less strongly in relation to their use whilst seafarers were on leave (independent t-test showed a significant difference [p=0.000] with Cohen's D showing a small effect [0.23]).

[4] NB general population studies include women who typically display higher levels of 'caseness' than men making these findings of even greater significance.

Conclusion

The findings from our studies of seafarers' self-reported health and health-related practices indicates that in some respects there have been improvements in behaviours and in practices over the five years that have elapsed between 2011 and 2016. Seafarers smoke and drink less and seem to follow healthier eating practices with increased consumption of vegetables and decreased consumption of fried food both at sea and at home (NB regrettably the consumption of fried food at sea is far higher than consumption at home). Seafarers also report fewer conditions that have been diagnosed by doctors and seem to suffer from fewer specific self-diagnosed problems. This is presumably one reason why seafarers' use of both prescribed painkillers and self-prescribed medications appears to have fallen.

By contrast there are somewhat contradictory findings in relation to fatigue, mental health and perceptions of health amongst seafarers. Sleep quality has reduced in the period 2011-2016 and this appears to be primarily related to work factors and environmental factors rather than to seafarers' reported levels of anxiety. An interesting related finding that companies could readily address is the increase in the proportion of respondents in 2016 who reported being unable to screen natural daylight out of their cabin. Fatigue scores for seafarers have risen over this period and this is a matter of some concern for both the long-term health of the seafarer population and for operational safety. Similarly we have seen a deterioration in some aspects of seafarers' mental health. Scores relating to questions drawn from the validated 'General Health Questionnaire' suggest that there has been an increase in psychiatric disorders amongst serving seafarers. This might explain, in part, why more seafarers in 2016 (than 2011) felt that their health was less robust than that enjoyed by other people around them.

Recommendations

1) Ship operators ensure that effective means of screening out daylight are provided in all seafarer cabins.

2) Ship operators encourage further provision of tasty and satisfying alternatives to fried food on board.

3) Ship operators ensure that vegetarian meal options are made available to seafarers on board.

4) Ship operators encourage seafarers to eat breakfast by providing access to breakfast cereals and similar food 'out of hours'.

5) Ship operators minimise seafarer exposure to environmental factors which disturb sleep (e.g. poor weather) even when this requires that they prioritise crew welfare over commercial concerns.

6) Ship operators place sufficient numbers of seafarers on board in order to produce a reduction in the work-related factors which are resulting in seafarers' fatigue (e.g. working hours).

7) Ship operators pay more attention to the protection of seafarers' mental health. In addition to taking steps to reduce fatigue, operators are encouraged to find ways of providing better access to those facilities and amenities on board which serve to allow seafarers to relax and to achieve a degree of mental restoration. These are likely to include: games; sports facilities provided in properly designed, designated, spaces; spacious, comfortable, communal areas where collective entertainment for the whole crew can be enjoyed; Wi-Fi access in cabins, views of the natural environment from cabins; access to regular shore-leave; clean and well-maintained living spaces; flexible lighting; heating/air conditioning that can be regulated within cabins (see Ellis and Sampson 2012).

Bibliography

Cahill, L.E., Pan, A., Chiuve, S.E., Sun, Q, Willett, W.C., Hu, F.B., Rimm, E.B. (2014) Fried-food consumption and risk of type 2 diabetes and coronary artery disease: a prospective study in 2 cohorts of US women and men. *American Journal of Clinical Nutrition*, 1-9.

Deshmukh-Taskar, P., Nicklas, T.A., Radcliffe, J.D., O'Neil, C.E., Liu, Y. (2012) The relationship of breakfast skipping and type of breakfast consumed with overweight/obesity, abdominal obesity, other cardiometabolic risk factors and the metabolic syndrome in young adults. The National Health and Nutrition Examination Survey (NHANES): 1999–2006. *Public Health Nutrition*: 16(11), 2073–208.

Djousse, L., Petrone, A.B., Gaziano, M. (2015) Consumption of Fried Foods and Risk of Heart Failure in the Physicians' Health Study. *Journal of the American Heart Association*, 1-7.

Doherty D.T., Moran, R, Kartalova-O'Doherty, Y. (2009) Psychological distress, mental health problems and use of health services in Ireland. Health Research Board: Dublin.

Ellis, N., Sampson, H., Acejo, I., Tang, L., Turgo, N., Zhao, Z. (2012) Seafarer Accommodation on Contemporary Cargo Ships, Cardiff, December, ISBN 1-900174-43-X, online at www.sirc.cf.ac.uk.

Huang, C.J., Hu, H.T., Fan, Y.C., Liao, Y.M., Tsai, PS. (2010) Associations of breakfast skipping with obesity and health-related quality of life: evidence from a national survey in Taiwan. *International Journal of Obesity,* 34, 720–725.

Key, T.J., Davey, G.K., Appleby P.N. (1999) Health benefits of a vegetarian diet. *Proceedings of the Nutrition Society*, 58, 271–275.

Leitzmann C. (2005) Vegetarian Diets: What Are the Advantages? *Diet Diversification and Health Promotion*, 57, 147-156.

Qi, Q., Chu, A.Y., , Kang, J.H., Huang, J., Rose, L.M., Jensen, M.K., Liang, L., Curhan, G.C., Pasquale, L.R., Wiggs, J.L., De Vivo, I., Chan A.T., Choi H.K., Tamimi, R.M., Ridker, P.M., Hunter, D.J., Willett W.C., Rimm, E.B., Chasman, D.I., Hu, F.B., , Qi, L. (2014) Fried food consumption, genetic risk, and body mass index: gene-diet interaction analysis in three US cohort studies. *British Medical Journal*, 1-12.

Sabaté J. (2003) The contribution of vegetarian diets to health and disease: a paradigm shift? American Journal of Clinical Nutrition, 78(suppl), 502–507.

Smith, K.J., Gall, S.L., McNaughton, S.A., Blizzard, L., Dwyer, T., Venn, A.J. (2010) Skipping breakfast: longitudinal associations with cardiometabolic risk factors in the Childhood Determinants of Adult Health Study. *American Journal of Clinical Nutrition*, 92, 1316–25.

Smith, A., Wadsworth, E., Moss, S., and Simpson, S. (2004). The scale and impact of psychotropic medication use by workers. Project Report. [Online]. Norwich: HSE Books. Available at: http://www.hse.gov.uk/research/rrpdf/rr282.pdf.

Appendix 1 – Interpretation of Cramer's V

Effect sizes for Cramer's V

df*	small	medium	large
1	.10	.30	.50
2	.07	.21	.35
3	.06	.17	.29
4	.05	.15	.25
5	.04	.13	.22

*df = degrees of freedom

Appendix 2 – Sample details

Age

Year		N	Minimum	Maximum	Mean	Std. Deviation
2011	How old are you?	1026	16	72	33.87	10.359
	Valid N (listwise)	1026				
2016	How old are you?	1476	18	64	33.78	10.011
	Valid N (listwise)	1476				

Gender

Year			Frequency	Percent	Valid Percent	Cumulative Percent
2011	Valid	Male	1004	97.9	97.9	97.9
		Female	22	2.1	2.1	100.0
		Total	1026	100.0	100.0	
2016	Valid	Male	1493	98.7	98.9	98.9
		Female	16	1.1	1.1	100.0
		Total	1509	99.7	100.0	
	Missing	System	4	.3		
	Total		1513	100.0		

Current Status

Year			Frequency	Percent	Valid Percent	Cumulative Percent
2011	Valid	Single	403	39.3	39.3	39.3
		Living with a partner	50	4.9	4.9	44.2
		Married	553	53.9	53.9	98.1
		Separated	10	1.0	1.0	99.0
		Divorced	8	.8	.8	99.8
		Widowed	2	.2	.2	100.0
		Total	1026	100.0	100.0	
2016	Valid	Single	574	37.9	38.1	38.1
		Living with a partner	68	4.5	4.5	42.7
		Married	827	54.7	55.0	97.6
		Separated	23	1.5	1.5	99.1
		Divorced	9	.6	.6	99.7
		Widowed	4	.3	.3	100.0
		Total	1505	99.5	100.0	
	Missing	System	8	.5		
	Total		1513	100.0		

Nationality

Year			Frequency	Percent	Valid Percent	Cumulative Percent
2011	Valid	Filipinos	182	17.7	17.7	17.7
		Indians	162	15.8	15.8	33.5
		Other Asians	181	17.6	17.6	51.2
		Northern, Western and Southern Europeans	127	12.4	12.4	63.5
		Eastern Europeans, Baltic and Russians	253	24.7	24.7	88.2
		Others (including Middle Eastern, Africans and Small Islanders)	121	11.8	11.8	100.0
		Total	1026	100.0	100.0	
2016	Valid	Filipinos	807	53.3	60.5	60.5
		Indians	161	10.6	12.1	72.6
		Other Asians	134	8.9	10.0	82.6
		Northern, Western and Southern Europeans	76	5.0	5.7	88.3
		Eastern Europeans, Baltic and Russians	110	7.3	8.2	96.6
		Others (including Middle Eastern, Africans and Small Islanders)	46	3.0	3.4	100.0
		Total	1334	88.2	100.0	
	Missing	System	179	11.8		
	Total		1513	100.0		

Number of crew on present/ recent ship

Year		N	Minimum	Maximum	Mean	Std. Deviation
2011	Number of crew on present/ recent ship	1012	4	44	20.85	5.702
	Valid N (listwise)	1012				
2016	Number of crew on present/ recent ship	1486	5	550	22.91	22.856
	Valid N (listwise)	1486				

DWT of present/ recent vessel

Year		N	Minimum	Maximum	Mean	Std. Deviation
2011	DWT of present/ recent vessel	900	1000	408215	46775.37	40756.779
	Valid N (listwise)	900				
2016	DWT of present/ recent vessel	1173	1	3299000	50854.33	140188.426
	Valid N (listwise)	1173				

Job Title

Year			Frequency	Percent	Valid Percent	Cumulative Percent
2011	Valid	Ratings	517	50.4	50.4	50.4
		Petty officers	27	2.6	2.6	53.0
		Junior officers	261	25.4	25.4	78.5
		Senior officers	221	21.5	21.5	100.0
		Total	1026	100.0	100.0	
2016	Valid	Ratings	649	42.9	53.7	53.7
		Petty officers	51	3.4	4.2	57.9
		Junior officers	312	20.6	25.8	83.7
		Senior officers	197	13.0	16.3	100.0
		Total	1209	79.9	100.0	
	Missing	System	304	20.1		
	Total		1513	100.0		

Department

Year			Frequency	Percent	Valid Percent	Cumulative Percent
2011	Valid	Deck department	522	50.9	51.5	51.5
		Engine department	374	36.5	36.9	88.4
		Catering and hospitality department	118	11.5	11.6	100.0
		Total	1014	98.8	100.0	
	Missing	System	12	1.2		
	Total		1026	100.0		
2016	Valid	Deck department	788	52.1	53.5	53.5
		Engine department	510	33.7	34.6	88.2
		Catering and hospitality department	174	11.5	11.8	100.0
		Total	1472	97.3	100.0	
	Missing	System	41	2.7		
	Total		1513	100.0		

Years at Sea

Year		N	Minimum	Maximum	Mean	Std. Deviation
2011	Years a sea	1026	1	46	9.65	8.784
	Valid N (listwise)	1026				
2016	Years a sea	1447	0	48	9.12	8.804
	Valid N (listwise)	1447				

Most recent Ship Types Worked On

Year			Frequency	Percent	Valid Percent	Cumulative Percent
2011	Valid	Tankers	121	11.8	11.8	11.8
		Container ships	605	59.0	59.0	70.8
		Bulkers	125	12.2	12.2	82.9
		General cargoes	74	7.2	7.2	90.2
		Car carriers	36	3.5	3.5	93.7
		Others	65	6.3	6.3	100.0
		Total	1026	100.0	100.0	
2016	Valid	Tankers	63	4.2	4.2	4.2
		Container ships	924	61.1	62.1	66.4
		Bulkers	152	10.0	10.2	76.6
		General cargoes	98	6.5	6.6	83.2
		Car carriers	128	8.5	8.6	91.8
		Others	122	8.1	8.2	100.0
		Total	1487	98.3	100.0	
	Missing	System	26	1.7		
	Total		1513	100.0		

Appendix 3

For all tables in Appendix 3 there were statistically significant difference between responses in 2011 and 2016.

Have difficulty falling asleep

Year			Frequency	Percent	Valid Percent	Cumulative Percent
2011	Valid	Not at all	402	39.2	39.7	39.7
		A little	457	44.5	45.1	84.8
		Quite a bit	125	12.2	12.3	97.1
		Almost always	29	2.8	2.9	100.0
		Total	1013	98.7	100.0	
	Missing	System	13	1.3		
	Total		1026	100.0		
2016	Valid	Not at all	478	31.6	32.8	32.8
		A little	631	41.7	43.3	76.1
		Quite a bit	293	19.4	20.1	96.2
		Almost always	56	3.7	3.8	100.0
		Total	1458	96.4	100.0	
	Missing	System	55	3.6		
	Total		1513	100.0		

Have difficulty staying asleep

Year			Frequency	Percent	Valid Percent	Cumulative Percent
2011	Valid	Not at all	421	41.0	41.8	41.8
		A little	440	42.9	43.7	85.5
		Quite a bit	126	12.3	12.5	98.0
		Almost always	20	1.9	2.0	100.0
		Total	1007	98.1	100.0	
	Missing	System	19	1.9		
	Total		1026	100.0		
2016	Valid	Not at all	508	33.6	35.6	35.6
		A little	630	41.6	44.2	79.8
		Quite a bit	261	17.3	18.3	98.1
		Almost always	27	1.8	1.9	100.0
		Total	1426	94.2	100.0	
	Missing	System	87	5.8		
	Total		1513	100.0		

Wake up during sleep

Year			Frequency	Percent	Valid Percent	Cumulative Percent
2011	Valid	Not at all	406	39.6	40.4	40.4
		A little	412	40.2	41.0	81.3
		Quite a bit	145	14.1	14.4	95.7
		Almost always	43	4.2	4.3	100.0
		Total	1006	98.1	100.0	
	Missing	System	20	1.9		
	Total		1026	100.0		
2016	Valid	Not at all	359	23.7	25.1	25.1
		A little	687	45.4	48.1	73.2
		Quite a bit	314	20.8	22.0	95.2
		Almost always	68	4.5	4.8	100.0
		Total	1428	94.4	100.0	
	Missing	System	85	5.6		
	Total		1513	100.0		

Have difficulty getting up

Year			Frequency	Percent	Valid Percent	Cumulative Percent
2011	Valid	Not at all	526	51.3	52.3	52.3
		A little	337	32.8	33.5	85.9
		Quite a bit	105	10.2	10.4	96.3
		Almost always	37	3.6	3.7	100.0
		Total	1005	98.0	100.0	
	Missing	System	21	2.0		
	Total		1026	100.0		
2016	Valid	Not at all	568	37.5	40.3	40.3
		A little	559	36.9	39.6	79.9
		Quite a bit	222	14.7	15.7	95.6
		Almost always	62	4.1	4.4	100.0
		Total	1411	93.3	100.0	
	Missing	System	102	6.7		
	Total		1513	100.0		

Have restless or disturbed sleep

Year			Frequency	Percent	Valid Percent	Cumulative Percent
2011	Valid	Not at all	430	41.9	42.8	42.8
		A little	426	41.5	42.4	85.2
		Quite a bit	126	12.3	12.5	97.7
		Almost always	23	2.2	2.3	100.0
		Total	1005	98.0	100.0	
	Missing	System	21	2.0		
	Total		1026	100.0		
2016	Valid	Not at all	529	35.0	37.0	37.0
		A little	597	39.5	41.7	78.7
		Quite a bit	257	17.0	18.0	96.6
		Almost always	48	3.2	3.4	100.0
		Total	1431	94.6	100.0	
	Missing	System	82	5.4		
	Total		1513	100.0		

Wake up confused, disorientated, irritable

Year			Frequency	Percent	Valid Percent	Cumulative Percent
2011	Valid	Not at all	585	57.0	58.2	58.2
		A little	351	34.2	34.9	93.1
		Quite a bit	63	6.1	6.3	99.4
		Almost always	6	.6	.6	100.0
		Total	1005	98.0	100.0	
	Missing	System	21	2.0		
	Total		1026	100.0		
2016	Valid	Not at all	824	54.5	57.6	57.6
		A little	463	30.6	32.4	90.0
		Quite a bit	124	8.2	8.7	98.7
		Almost always	19	1.3	1.3	100.0
		Total	1430	94.5	100.0	
	Missing	System	83	5.5		
	Total		1513	100.0		

Feel that you don't get enough sleep

Year			Frequency	Percent	Valid Percent	Cumulative Percent
2011	Valid	Not at all	316	30.8	31.3	31.3
		A little	465	45.3	46.1	77.4
		Quite a bit	181	17.6	17.9	95.3
		Almost always	47	4.6	4.7	100.0
		Total	1009	98.3	100.0	
	Missing	System	17	1.7		
	Total		1026	100.0		
2016	Valid	Not at all	424	28.0	29.3	29.3
		A little	607	40.1	42.0	71.3
		Quite a bit	319	21.1	22.1	93.4
		Almost always	95	6.3	6.6	100.0
		Total	1445	95.5	100.0	
	Missing	System	68	4.5		
	Total		1513	100.0		

Appendix 4

Reason for not enough sleep

Year		N	Minimum	Maximum	Mean	Std. Deviation
2011	Work	1026	.00	3.00	**.7719**	.88711
	Environment	1026	.00	4.00	**.4903**	.76535
	Anxiety	1026	.00	3.00	.3431	.59530
	Total	1026	.00	10.00	**1.6053**	1.43038
	Valid N (listwise)	1026				
2016	Work	1503	.00	3.00	**.8430**	.89864
	Environment	1505	.00	4.00	**.5728**	.87225
	Anxiety	1501	.00	4.00	.3584	.69722
	Total	1499	.00	11.00	**1.7712**	1.70652
	Valid N (listwise)	1499				

Where the means are significantly different between 2011 and 2016 they appear in bold.

Appendix 5

GHQ12 Score Clinical Levels

Year			Frequency	Percent	Valid Percent	Cumulative Percent
2011	Valid	No Psychiatric Disorder (0-11)	718	70.0	72.4	72.4
		Psychiatric Disorder (12-36)	274	26.7	27.6	100.0
		Total	992	96.7	100.0	
	Missing	System	34	3.3		
	Total		1026	100.0		
2016	Valid	No Psychiatric Disorder (0-11)	789	52.1	63.5	63.5
		Psychiatric Disorder (12-36)	454	30.0	36.5	100.0
		Total	1243	82.2	100.0	
	Missing	System	270	17.8		
	Total		1513	100.0		