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Research Manuscript

Health, self-care and the offshore workforce -opportunities for behaviour change interventions: an epidemiological survey

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Abstract

Introduction: The high risk nature of offshore work and inherent occupational hazards necessitate that offshore workers engage in behaviours which promote health and wellbeing. The survey aimed to assess offshore workers' health, self-care, quality of life and mental wellbeing, and to identify associated areas requiring behaviour change.

Methods: Offshore workers attending a course, at a training facility in Scotland, were invited to complete a questionnaire comprising 11 validated measures of health, self-care, quality of life and mental wellbeing.

Results: 352 offshore workers responded (completion rate 45.4%). Almost three quarters were identified as overweight/obese (n = 236, 74.4%). Median scores for SF-8 quality of life (physical = 56.1, *IQR* = 4.8; mental = 54.7, *IQR* = 8.1) and Warwick-Edinburgh Mental Wellbeing scales were positive (52.0, *IQR* = 9.0). The largest proportion of participants' scores across alcohol use (n = 187, 53.4%) and sleep quality (n = 229, 67.0%) domains were categorized as negative. The median number of self-care domains for which offshore workers scored negatively was 3 (*IQR* = 2.0).

Conclusions: There are key areas relating to the health, quality of life, mental wellbeing and self-care of the offshore workforce that warrant addressing.

Key words: remote environments: offshore workers: self-care: health: mental wellbeing: occupational health: health promotion

Introduction

Preventive healthcare is a key component of a sustainable model of healthcare[1,2]. Preventive components of healthcare directives aid in reducing the incidence of chronic health conditions amongst populations[3,4]. Self-care refers to engagement with behaviours which promote health and wellness[5], and may be a critical factor in preventing the onset of chronic disease[6]. Evidence suggests that engagement with self-care may increase an individual's ability to preserve and manage their health[5,6]. It is anticipated that increasing engagement will also lead to improvements in individual's quality of life and wellbeing[7].

Promotion of self-care is a key global public health priority, and there is a recognized need to promote engagement within remote communities who are geographically isolated[8]. For example, the findings of a systematic review by Brundisini et al, on access to healthcare in remotely located communities, highlight that geographical location and widespread scarcities of health services may impede on accessibility[9]. Thereby, it is imperative that remote inhabitants are self-reliant and are active participants in the management of chronic health conditions[8,9].

The offshore workforce is a pertinent example of a population who live in a remote and hostile environment[10]. In the UK Continental Shelf (UKCS), around 64,000 individuals are employed offshore, of which around 29,000 spend over 100 nights per year in an offshore location[10]. The nature of shift work offshore, in conjunction with the hazards often inherent in offshore environments, may have a significant adverse impact on offshore workers' health and wellbeing[11]. It has been suggested that poor health within the workforce may increase absences from work and, also, increase the risk of medical evacuations (medevacs)[12]. Accordingly, promoting health and wellbeing within the workforce may be a key factor in mitigating early exit from the workforce due to health reasons and also in enhancing financial benefit[13].

It is often assumed that, since the offshore workforce are medically screened, personnel experience optimal health[14]. However, a recent narrative review on offshore workers' health and wellbeing identified concerns over a number of domains. The findings of that review emphasized a number of limitations particularly in relation to the current evidence-base being outdated and restricted in the coverage of key health domains[15].

Consequently, there is a unique opportunity to develop an up-to-date, comprehensive assessment of health, quality of life and mental wellbeing in the offshore workforce. Further, due to the increasing focus on preventive healthcare, particularly in remote communities, an exploration of self-care within the offshore workforce is warranted. This paper describes the outcome of an epidemiological survey the aim of which was to: (i) assess offshore workers' health, self-care, quality of life and mental wellbeing status, and (ii) identify associated areas requiring behaviour change.

Methods

Design

An electronic cross-sectional, epidemiological survey was used to determine the health status, quality of life and mental wellbeing, and self-care status of offshore workers. A pilot study (n = 9), was initially conducted to assess the feasibility of the proposed recruitment strategy. Power size calculations were performed for a one way fixed effects, omnibus ANOVA, using a medium effect size (0.25), α (alpha) = .05 and power = 0.95. The results obtained from using G Power V software suggested a sample size of approximately n = 324.

Questionnaire development

In an effort to ensure face and content validity, eight experts in health services research, offshore health and self-care were invited to participate in an expert panel review of the questionnaire. The final version of the survey contained a number of validated tools (outlined in Supplement 1) in order to support the assessment, which pertained to either evaluating health status or self-care. Due to the absence of a universal measure of self-care, the seven pillar self-care framework, developed by Webber, Guo and Mann[6], in combination with extant literature on health in offshore workers provided the basis for the development of a measure tailored to reflect particular features of this specific population.

Health status

Self-reported data on participants' height and weight were collected and permitted calculation of BMI. Participants were asked if they: had been diagnosed with a long term health condition;

took medication for a long term health condition, and how many medications they took for a long term health condition. Participants were also asked questions relating to: work absences and medevacs.

Quality of life and mental wellbeing

Two validated measures were used to determine the health status of the population. The measures assessed participants' quality of life (SF-8) in terms of their physical (PCS) and mental functioning (MCS)[16] and mental wellbeing (Warwick Edinburgh Mental Wellbeing Scale (WEMWBS))[20]. The rationale for their inclusion was informed by the extant literature[18-20] on offshore health which has emphasized their respective importance. The measures and scoring procedures are outlined in Supplement 1.

Self-care domains

Seven validated behavioural measures were used to assess offshore workers' engagement in self-care (Supplement 1). Measures of self-care were selected in accordance with the offshore health literature and Weber, Guo and Mann's seven pillar framework, which proposes the following as key domains: health literacy; self-awareness of physical and mental condition; physical activity; healthy eating; risk avoidance or mitigation; good hygiene; rational and responsible use of products, services, diagnostics and medicines[6)]

The following aspects of self-care were evaluated: alcohol use (Fast Alcohol Screening Test (FAST))[21]; drug use (Single Question Drug Use Screening Test (SQDUST))[22]; sleep quality (Pittsburgh Insomnia Rating Scale-2 (PIRS-2))[23]; fruit and vegetable consumption (food frequency questionnaire (FFQ) element of the 5-a-day community evaluation tool)[24]; mindfulness (Mindful Attention Awareness Scale (MAAS)[25]; physical activity (International Physical Activity Questionnaire (IPAQ))[26], and smoking (Global Adult Tobacco Survey (GATS))[27].

Participant recruitment

Offshore workers attending the Further Offshore Emergency Training (FOET) course (n = 776) at an operational training facility in Aberdeen, Scotland, were recruited on a daily basis by the

researcher, over a period of 16 weeks (October 2014 to March 2015). The FOET operated daily from Monday to Friday with a maximum number of 16 attendees. It is a one day refresher course, which requires successful completion every four years to enable offshore workers to maintain their certification to work offshore in the UKCS. Only those with prior experience of working in an offshore environment, and who were employed in a position which required overnight stays in an offshore environment, were recruited.

Data collection

Delegates attending the FOET were informed by the trainer that the researcher would be providing a brief of a survey. The researcher presented orally details of the survey in accordance with a standardized script to ensure consistency. Interested delegates were asked to complete a paper contact form with details of their name and email address. Email invitations, including a link to the online questionnaire, were sent out within a 24 hour period. Recipients were asked to complete the questionnaire by the deadline date set for two weeks from the point of contact. All participants were provided with the opportunity to complete the form anonymously to minimize non-response bias[28]. Each respondent was sent two reminder emails at fortnightly intervals. Participants were provided with the opportunity to be entered into a prize draw for a £50 retail voucher.

Data analysis

The epidemiological data were analysed using the IBM Statistical Analysis Software Package – SPSS Statistics version[18] (http://www-03.ibm.com/software/products/en/spss-statistics). Descriptive statistics were used to report demographics, employment, health status, quality of life and mental wellbeing, and self-care. Means and standard deviations were used where distributions were normal, and medians and interquartile ranges, when the distribution was skewed. Mann Whitney U tests were used to determine associations between quality of life and mental wellbeing variables and self-care domains. P values ≤ 0.05 were considered statistically significant.

Ethics approval

Ethical approval was granted by the University School Research Ethics Committee. The training site granted approval to access FOET delegates.

Results

Demographics

Of the 776 delegates who attended the FOET course, 657 provided contact details (84.7% response rate), of whom 352 completed the questionnaire (45.4% completion rate). Participants Participantswere aged 22-64 years (*Mean* = 42.9, SD. 10.1), and most were male (n = 335, 96.3%) and either married or in a civil partnership (n = 258, 74.1%).

Health status

Participants' BMI values (n = 317) ranged from 17.7 to 40.6, with a median value of 27.5 (*IQR* = 4.9). Almost three-quarters of participants were classified as either 'overweight' (n = 162, 51.1%) or 'obese' (n = 74, 23.3%). One respondent was 'underweight' (n = 1, 0.3%), and the remainder, within a healthy weight range (n = 80, 25.2%). Fifty-two (14.8%) participants (n = 352) reported that they had been diagnosed with a long term health condition. Of the 50 participants who disclosed having at least one long term condition, 80% (n = 40) reported taking medication for their illness(s).participants. The number of medicines taken for each long term health condition ranged from 0 to 5. participants

Quality of life and mental wellbeing

Median scores for the SF-8 quality of life measure were 56.1 (*IQR* = 4.9) for the PCS (n = 338) and 54. 7 (*IQR* = 8.1) for the MCS (n = 342). Both scores exceeded the norm-based score of 50.0 advocated by the SF-8 developers and were representative of greater physical and mental quality of life. Participants' mental wellbeing scores (n = 326), as determined by the WEMWBS, ranged from 19.0 to 70.0 (out of a possible 14.0 to 70.0) with a median value of 52.0 *(IQR* = 9.0).

Self-care domains

As outlined in Table I, FAST scores (n = 350) indicated that over 50% (n = 187, 53.4%) of participants were deemed to be at risk of 'harmful/hazardous' alcohol use (score ≥3). SQDUST scores (n = 345) demonstrated that the majority of the sample did not report using recreational drugs over the last 12 months (n = 327, 94.8%). PIRS-2 scores (n = 342) suggested that most participants (n = 229, 67.0%) suffered poor sleep quality (score ≥2).

The results from the FFQ (n = 348) showed that the majority of participants adhered to 5-a-day fruit and vegetable guidelines (n =191, 54.9%). MAAS scores (n =317) ranged from 1.7 to 6 (possible range 1.0 to 6.0), with a median value of 4.5 (*IQR* = 1.10). Of the 352 participants who completed the IPAQ, around two thirds (n = 249, 70.7%) achieved the 150-minutes/75-minutes of moderate/vigorous activity guidelines. The median value was 56.00 (*IQR* = 9.00). The findings from the GATS (n = 352) suggested that the majority were non-smokers (n = 195, 55.4%).

Exploring self-care

Participants' individual scores across each self-care domain were categorized as either 'positive' or 'negative' (Supplement 2 describes the parameters used to categorize domains). Positive self-care domains were identified for the majority in respect of: fruit and vegetable intake (n=191, 54.9%); drug use (n = 327, 94.8%); physical activity (n = 249, 70.7%); smoking (n = 282, 80.1%), and mindfulness (n = 160, 50.5%). Conversely, the largest proportion of participants for whom negative self-care domains were identified pertained to alcohol use (n=187, 53.4%) and sleep quality (n = 229, 67.0%) (Table II). The median number of self-care domains which offshore workers (n = 275) scored negatively across was 3 (*IQR* = 2.0).

Self-care domains associated with quality of life (PCS and MCS) and mental wellbeing (WEMWBS)

A number of significant associations were observed between self-care domains and quality of life, and mental wellbeing (Table III).

Those classified as having 'positive' scores in respect of mindfulness (U = 4558.00, p = <.001), physical activity (U = 9265.50, p = .05) and sleep quality (U = 6768.00, p = <.001) experienced more positive mental wellbeing (WEMWBS) than those who scored negatively across these domains. Similarly, hazardous alcohol users reported poorer mental wellbeing (WEMWBS) than non-hazardous users (U = 11391.00, p = .04).

In addition, those categorized with positive mindfulness (U = 9870.50, p = .02) and sleep quality (U = 10270.00, p = .05) scores experienced greater physical quality of life (PCS) than those scoring negatively.

Moreover, participants who were classified as having positive scores across mindfulness (U = 7515.50, p = <.001), sleep quality (U = 8272.00, p = <.001) and drug use (U = 1747.00, p = .03) domains experienced greater mental quality of life (MCS) than those who scored negatively. Hazardous alcohol users reported poorer mental quality of life (MCS) than non-hazardous users (U = 11026.00, p = <.001).

Discussion

Main findings of the survey

This cross-sectional, epidemiological survey has furthered understanding of the health, self-care, quality of life, and mental wellbeing status of offshore workers by identifying key areas pertaining to health and self-care status that may benefit from behaviour change.

These key areas included: overweight/obesity; hazardous/harmful alcohol use, and poor sleep quality. Furthermore, most offshore workers' scored negatively across multiple self-care domains. However, as demonstrated by the distribution of scores, participants were also identified as having positive health across a number of domains including: quality of life; mental wellbeing; adherence to 5-a-day fruit and vegetable guidelines; physical activity; smoking; drug use, and mindfulness.

A number of significant associations between self-care variables and quality of life and mental wellbeing were observed. For example, poorer mental wellbeing was associated with hazardous alcohol use, poorer sleep quality, decreased physical activity and decreased mindfulness. Similarly, decreased mindfulness and poorer sleep quality were associated with poorer physical quality of life. Moreover, decreased mental quality of life was associated with hazardous alcohol use, drug use, poorer sleep quality and decreased mindfulness.

Key concerns pertaining to offshore workers' health status were identified, in particular overweight/obesity. The proportion of offshore workers with a BMI in the 'overweight' or 'obese' categories was similar to those reported in a recent publication[29], but higher than historical estimates[14,30]. This may suggest an increasing prevalence of obesity within the workforce.

Moreover, a number of self-care domains indicated cause for concern within the sample of offshore workers including the hazardous or harmful use of alcohol and poor quality of sleep. Heavy alcohol consumption has previously been reported within the offshore workforce[14,31]. Relatedly, shift work disorder, characterized by sleep disturbance, has been reported previously in offshore workers and has been associated with subjective health complaints, pseudo-neurological issues and gastric problems[32]. For many offshore workers,

shift work, involving both day and night shift, is a requisite of employment[33], which may pose a challenge in addressing poor sleep quality within the workforce.

The domains identified as positive are perhaps unsurprising due to the nature of offshore work. For example, it may be anticipated that since offshore workers are fitness-screened that they would exhibit high levels of psychological and physical wellness. Similarly, the low prevalence of drug use may be expected due to the random drug testing that offshore workers are subjected to.

The results pertaining to physical activity, 5-a-day fruit and vegetable consumption, and smoking domains should be interpreted with caution. For example, the findings suggested a comparatively higher level of physical activity than that which has been previously estimated in the offshore workforce[30]. However, there were still a large percentage of participants who were not achieving MVPA guidelines. Hence, increasing engagement in physical activity may still be a key issue within this remote population. Similarly, the prevalence of smoking was decidedly lower than historical estimates[30] and more recent ones[29]. Whilst smoking was regarded as a positive aspect of self-care in this survey, since the majority were categorized as 'ex/non-smokers', any prevalence should be regarded as a risk. Thus, it would be remiss to exclude it is a behaviour that did not warrant attention.

Further, whilst adherence to 5-a-day fruit and vegetable guidelines was regarded as positive within the population, a large proportion of offshore workers did not achieve consumption targets. This reflects findings from the extant literature highlighting the pervasiveness of unhealthy eating habits amongst offshore workers[14,30].

Since the majority of participants scored negatively across a number of self-care domains, this finding suggests that individuals have multiple aspects which may require behaviour change. It has been acknowledged that engagement in multiple unhealthy behaviours increases the incidence of chronic health conditions and likelihood of premature mortality[34]. Furthermore, the likelihood of chronic conditions increases in accordance with age and as evidenced by the findings of this study and the extant literature. Given the age range of offshore workers, there are a number of personnel who may be at increased risk of developing long term health issues[10]. The management of chronic conditions within the offshore workforce represents a significant global endeavour for both remote healthcare practitioners and offshore workers[35].

Hence, reducing engagement across multiple domains may be of paramount importance in this remote population.

Strengths and limitations of the survey

This research has addressed the paucity of literature around aspects of health, self-care, quality of life and mental wellbeing amongst the offshore workforce. The recruitment procedures adopted were a key strength of the survey: the researcher was granted access to a training facility which had a large daily foot fall of offshore workers who represented a broad demography in terms of age and occupational status. Whilst there may have been a bias in response between those who participated and those who did not, due to the nature of approved recruitment procedures it was not possible to obtain data on the latter. However, the demographic profile of participants was relatively similar to those published in a recent workforce report in terms of age (40.8 years) and gender (3.6% female)[10]. Further, the power of the analysis was enhanced by the size of the sample which aligned to previously published literature on health in offshore workers [29]. Moreover, the sample size (n = 352) exceeded the sample size results obtained from G Power V software (n = 324) and hence, would be considered appropriate in terms of the data analysis conducted. The oversampling was conducted in an effort to overcome non-participation associated with completion of online surveys. For example, meta-analyses of response rates to online surveys estimate a rate of between 34% and 39.6% [36,37]. Self-report data collected in this survey may have been vulnerable to recall, reporting and response style bias [28]. In an effort to minimise potential for such bias, the survey utilized a range of standardized measures previously demonstrated to have validity and reliability in evaluating the key concepts.

Implications for remote health

Despite investment in health promotion and surveillance in the oil and gas industry[14], the key findings from the survey highlight the predominantly poor health status of those working in remote offshore locations across multiple domains. Although, specific causal mechanisms cannot be determined by virtue of the cross-sectional design of this epidemiological survey, these key findings would intuitively suggest that improvement may be attained by the implementation of a self-care intervention. In particular, one which encompasses multiple behaviours, has a strong theoretical underpinning[38], and utilizes a range of techniques known

to facilitate behaviour change[39]. Encouraging offshore workers to take ownership of their own health may have a positive impact on their overall health status and reduce the likelihood of medevacs. Whilst the findings of this study are specific to the offshore workforce, they highlight the importance of promoting self-care in other remote and rural occupational populations whose access to healthcare is also limited.

Conclusion(s)

Maintaining and improving the health of employees working in offshore environments may be a crucial component in maximizing economic opportunity, ensuring the longevity of the workforce and reducing the occurrence of critical medical incidents. The findings from this research demonstrate that the offshore workforce may benefit from implementation of a self-care intervention which targets multiple behaviours. It is advised that intervention development is underpinned by behaviour change theory to ensure effectiveness.

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455 **Tables**

456 Table I. Health status and self-care of offshore workers

457

Domain (n)	Category	n (%)
BMI (310)	Underweight	1 (0.3)
	Normal	80 (25.8)
	Overweight	160 (51.6)
	Obese	69 (22.3)
Chronic health condition (352)	Yes	52 (14.8)
	No	300 (85.2)
Unable to travel to work (348)	Yes	70 (20.1)
	No	278 (79.9)
Required medevac (347)	Yes	42 (12.1)
	No	305 (87.9)
Required emergency medevac (41)*	Yes	14 (34.1)
	No	27 (65.9)
Hazardous alcohol use (350)	Non-hazardous	163 (46.6)
	Hazardous	187 (53.4)
Drug use (345)	Used recreational drugs in last 12 months	18 (5.2)
	Not used recreational drugs in last 12 months	327 (94.8)
Sleep quality (342)	Greater sleep quality	113 (33.0)
	Poorer sleep quality	229 (67.0)
Fruit and vegetable intake (348)	Adherent to guidelines	191 (54.9)
	Non-adherent to guidelines	157 (45.1)
Physical activity (352)	Adherent to guidelines	249 (70.7)
	Non-adherent to guidelines	103 (29.3)
Smoking (352)	Non-smoker	189 (54.6)
	Ex-smoker	87 (25.1)
	Smoker	70 (20.2)

458 **One respondent did not supply information on emergency medevac.*

459

460 Table II. Positive and negative scoring

Domain (n)	Category	n (%)
Hazardous alcohol use (350)	Positive	163 (46.6)
	Negative	187 (53.4)
Drug use (345)	Positive	327 (94.8)
	Negative	18 (5.2)
Sleep quality (342)	Positive	113 (33.0)
	Negative	229 (67.0)
Fruit and vegetable intake (348)	Positive	191 (54.9)
	Negative	157 (45.1)
Physical activity (352)	Positive	249 (70.7)
	Negative	103 (29.3)
Smoking (352)	Positive	282 (80.1)
	Negative	70 (19.9)
Mindfulness (342)	Positive	160 (50.5)
	Negative	157 (49.5)

461

462 Table III. Mann-Whitney analyses between self-care domains and age, quality of life, and
463 mental wellbeing
464

Domain	Self-care Score Category	Median WEMWBS (IQR)	WEMWBS p value	Median SF-8 PCS (IQR)	SF-8 PCS p value	Median SF-8 MCS (IQR)	SF-8 MCS p value
Alcohol use	Positive	53.00 (9.00)	.04*	56.62 (4.41)	.48	57.25 (5.70)	<.001*
	Negative	51.50 (9.00)		55.95 (5.12)		52.71 (9.19)	
Physical activity	Positive	53.00 (9.00)	.05*	56.12 (4.97)	.87	55.34 (7.98)	.11
	Negative	50.00 (8.75)		56.00 (4.82)		53.90 (8.78)	
5-a-day guidelines	Positive	53.00 (9.00)	.12	55.99 (5.15)	.81	54.67 (7.84)	.41
	Negative	51.00 (8.00)		56.12 (4.45)		54.75 (8.76)	
Smoking	Positive	52.00 (9.00)	.24	56.12 (4.76)	.76	54.78 (7.98)	.10
	Negative	51.50 (10.75)		56.26 (5.87)		52.74 (8.97)	
Mindfulness	Positive	55.00 (6.00)	<.001*	56.60 (3.84)	.02*	57.32 (5.23)	<.001*
	Negative	48.00 (10.75)		55.25 (5.87)		52.31 (11.11)	
Sleep quality	Positive	55.00 (8.50)	<.001*	56.64 (3.73)	.05*	57.43 (5.26)	<.001*
	Negative	50.00 (9.00)		55.40 (5.59)		52.69 (9.15)	
Drug use	Positive	52.00 (9.00)	.09	55.95 (4.99)	.42	54.77 (8.08)	.03*
	Negative	48.50 (14.75)		56.68 (3.93)		49.98 (15.66)	

465 *$p \leq .05$*
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467 Supplement 1. Questionnaire content

Measure	Domain	Measurement and scoring	Interpretation of scores/categories
BMI	Healthy weight	BMI was calculated by dividing participants weight in kilograms by height in meters squared. Scores are assigned to categories.	Underweight: <18.5; normal: 18.5-24.9; overweight: 25-29.9; obese: >30.
SF-8	Physical and mental quality of life over the last 4 weeks	The SF-8 requires participants to answer eight questions, using a 5 or 6-point Likert scale, relating to either physical or mental quality of life, and produces two summative scores which pertain to each. Scores are generated by using the accompanying software.	The survey developers advocate using the norm-based cut-off value of 50.0 for each score rather than the possible range of scores. Scores greater than 50.0 are indicative of greater quality of life.
WEMWBS	Mental wellbeing over the last 2 weeks	The 14 item WEMWBS requires participants to provide answers on a 5-point Likert scale. Exemplar: "*I've been feeling optimistic about the* future". Total scores are generated by summing individual scores for each of the 15 items.	Scores range from 14-70. Higher scores represent greater mental wellbeing.
FAST	Hazardous alcohol use in the last year	The Fast Alcohol Screening Test (FAST) was used to identify hazardous alcohol users. The FAST contains four questions relating to alcohol use. Total scores are generated by summing the numerical values associated with responses.	Scores range from 0-16. Hazardous alcohol users: ≥3; non-hazardous: <3.
SQDUST	Recreational drug use in the last year	Participants were asked to indicate: "*How many times in the past year have you used an illegal drug or used a prescription medication for non-medical reasons?*" Drug use was grouped into categories.	Use of an illegal substance within the last 12 months; no use of illegal substances over the last 12 months
PIRS-2	Sleep quality over the last 7 days	Participants completed two questions using a 4-point Likert scale and total scores were generated by summing the responses. Scores were grouped into categories.	Scores range from 0-6. Lower risk insomnia: <2; higher risk insomnia: ≥2.
FFQ	Diet over the last 24 hours	Participants were required to indicate the number of portions of foods that they had consumed. The number of portions of fruit and vegetables was totaled to determine overall consumption. Scores were grouped into categories.	Not achieving five-a-day fruit and vegetable consumption guidelines: <5; achieving five-a-day fruit and vegetable consumption guidelines: ≥5.
MAAS	Mindfulness (attention	Statements in the 15-item MAAS were worded negatively and represented decreased mindfulness. Responses were measured using a 6-point Likert scale. Total scores were generated by summing the	Scores range from 1- 6. Higher scores represent greater engagement in mindfulness.

	and awareness)	responses, in accordance with a scoring protocol, and dividing by the total number of items.	
IPAQ	Physical activity	Participants were required to report the number of days, hour and minutes that they have exercised vigorously, moderately or walked for a period of ten minutes or more. Total scores are generated in accordance with a scoring protocol. Scores were categorized in accordance with moderate-vigorous physical activity guidelines.	Not achieving recommended level of physical activity: < 150/75 minutes moderate/vigorous physical activity; achieving recommended level of physical activity: ≥150/75 minutes moderate/vigorous physical activity.
GATS	Smoking	The Global Adult Tobacco Survey was used to evaluate smoking. Participants are required to complete an initial screening question and depending on the response, may be required to complete another thereafter. Screening question: "*Do you currently smoke tobacco on a daily basis, less than daily, or not at all?*". Participants are categorized, on the basis of their answers, as a smoker, non-smoker or ex-smoker	Smoker/ex-smoker/non-smoker

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Supplement 2. Parameters used to categorise self-care

Domain	**Positive self-care score**	**Negative self-care score**
Physical activity	Achieving MVPA guidelines	Not achieving MVPA guidelines
Diet	Achieving 5-a-day guidelines	Not achieving 5-a-day guidelines
Smoking	Not current smoker (ex and non)	Current smoker
Alcohol use	FAST non-hazardous	FAST hazardous/ harmful
Drug use	No use	Drug use
Mindfulness	> sample median (≥4.53)	< sample median (≤4.52)
Sleep quality	Greater sleep quality	Poorer sleep quality