

Development and validation of tools to screen occupational mental health and workplace factors influencing it: for the Indian workforce

Rakesh BALACHANDAR^{1*}, Asha KETHARAM¹ and Srikala BHARATH²

¹Division of Clinical Epidemiology, ICMR-National Institute of Occupational Health, India

²National Institute of Mental Health and Neurosciences, India

Received January 21, 2022 and accepted April 23, 2022

Published online in J-STAGE May 11, 2022

DOI <https://doi.org/10.2486/indhealth.2022-0019>

Abstract: An imbalance in the key organizational psychology constructs viz. “Workload”, “Reward”, “Community”, “Control”, “Values” and “Fairness” are potential factors leading to negative occupational mental health, i.e. burnout. Burnout, a psychological syndrome is the combination of emotional exhaustion, sense of reduced compassion and accomplishment. To note, the concept of occupational mental health in a nation with second largest workforce is nascent. Further, the utility of existing western tools in Indian subcontinent is limited by culturally inappropriateness, patented, less comprehensible and other factors. Present study attempted to develop tools to screen occupational mental health and workplace areas. Conventional steps involved in psychological tool development, viz. construct identification, drafting of pertinent questions, content validation, field testing of questions and others were adopted. After series of steps, tools for screening occupational mental health and key constructs influencing mental health at workplace (workplace assessment) were developed. The screening tools exhibited adequate test–retest reliability, internal consistency/reliability (cronbach’s $\alpha > 0.73$) and correlation (correlation coefficient > 0.6) with the general mental health in larger evaluation of 153 consenting workers. The proposed simple and easy to administer tool requires development of normative scores thereby aiding early diagnosis and management of those requiring intervention.

Key words: Occupational mental health, Burnout, Workplace key areas, Screening tools, Tool development

Introduction

A healthy workplace environment should be free from physical, chemical and psychological hazards promoting both physical and mental health (wellbeing) as working

adults spend majority of their awake hours at workplace¹. Hence, the workplace environment has a substantial role in determining the mental health (as well physical health) of the working adults. Earlier reports confirm the compromise in occupational mental health and presence of psychological hazards in the workplace environment leads to economic loss by direct (e.g., absence, retirement) as well indirect loss (such as compromise in the quality of life, subnormal productivity) to the worker and the employer^{2, 3}.

Burnout, is a psychological syndrome involving exhaustion of emotional resources, depleted compassion/empathy

*To whom correspondence should be addressed.

E-mail: balachandar.rakesh@gmail.com

(Supplementary materials: refer to PMC <https://www.ncbi.nlm.nih.gov/pmc/journals/2597/>)

©2023 National Institute of Occupational Safety and Health

to fellow individuals (depersonalization/cynicism) and a perception of incompetence and lack of achievement/adequate productivity at work (personal accomplishment) as a consequence of extended exposure to psychological hazards (occupational stress) at work environment⁴). The concept of burnout was initially reported among human service related occupations (health care workers, banks, teachers), however is lately being recognized among other occupations as well⁴).

Occupational mental health is a balance between the impact of workplace stressors (negative factors) on mental health (psychosocial load) and availability of resources (positive factors) to successfully overcome harsh workplace factors²). Leiter & Maslach investigations on specific workplace factors and resources, observed “*Workload*”, “*community*”, “*reward*”, “*control*”, “*fairness*” and “*values*” as the 6 key areas of the workplace to predict the occupational mental health (i.e. development of burnout)⁵).

The “*workload*” dimension is the quantum of work (physical and mental) the individual is entitled to complete^{6, 7}). The “*reward*” dimension refers to the power of reinforcement to shape the behavior of the worker, and points to the extent to which rewards (monetary, social and intrinsic) are consistent with the individual’s expectations^{8, 9}). The overall quality of social interaction and inter-individual coordination and cooperation at work is assessed by the “*community*” dimension¹⁰). The “*control*” dimension encompasses the perceived capacity of workers to influence decisions relating to their work, to exercise personal autonomy, and to gain access to resources¹¹). The “*fairness*” dimension captures the extent to which decisions and resource allocation at work are perceived as fair and equitable¹²). Finally, the ideals and motivation that attract people to their jobs are covered by the “*values*” dimension¹³). Notably, these factors are variably prevalent in various occupational profiles and are reported to variably influence the workers’ mental health. wherein, workload, reward and community are the commonly observed factors, while control, fairness and values are particularly reported among occupational groups at higher levels of occupational/wage hierarchy (e.g. manager, team leaders, etc.)^{14, 15}).

The research pertaining to occupational mental health and psychological hazards of workplace are quite nascent in developing countries such as India. Considering the second largest workforce in the world, there exists scarce reports on occupational mental health among the Indian workforce. Current literature reporting occupational mental health in the developing countries are limited by usage

of culturally inappropriate and incomprehensible western/invalidated tools¹⁶⁻²¹). Detailed review of Indian studies is included in the supplement material. Hence, current study recognizing the need for tools to evaluate the occupational mental health and the workplace factors (potential psychological hazards), aimed at developing tool for screening the occupational mental health, as well the key areas of the workplace known to influence the workers’ mental health, and evaluate its feasibility of application and reliability.

The utility of existing western tools in regional context are limited by, usage of terms that are less comprehensible/less used among Indian population (e.g. “How often are you emotionally exhausted”, “Is your work emotionally exhausting” from Copenhagen burnout tool, “I feel exhilarated after working...”, “I’ve become more callous toward people...” from Maslach Burnout Inventory (MBI)), sensitive questions that may potentially bias the recipient’s response (e.g. “I don’t really care what happens...”, “I feel I treat ... if they were impersonal objects” in Maslach Burnout Inventory (MBI) and “It happens more and more often that I talk about my work in a negative way” from Oldenburg tool) and patented (e.g. MBI requires payment for their usage). Further, these tools have been scarcely administered/reported among blue collared workers/nature of work not involving direct human services. Lastly, the primary literature on these tools involves self-administration, which would be impractical among blue collared workers, particularly for reasons of no/minimal formal education. Hence, there is need for tools to screening the above mentioned constructs, with relatively simpler language, shorter questions (relatively less cognitively taxing) of relevance to regional workforce/workplace and requiring less effort for administering the tool/ training the interviewer.

Subjects, Methods and Results

Development of occupational mental health (burnout) screening tool

Construct identification and selection of questions:

Questions pertaining to the symptoms (dimensions) of occupational mental health from previous studies were extracted, modified and customized to the needs of indigenous workforce by the group of experts (committee) consisting of clinical psychiatry, psychology, sociology, humanity sciences and occupational health (including the authors RB, SB, AK). The committee identified the constructs of burnout, viz. emotional exhaustion, depersonalization and impaired accomplishment from tools used in previous studies MBI, MBI-General Survey²²), CBI

(Copenhagen Burnout Inventory)²³⁾, Oldenburg Burnout Questionnaire²⁴⁾ and Shirom-Melamed Burnout Questionnaire²⁵⁾ and developed questions pertinent to these constructs.

Question phrasing and finalizing:

The committee listed questions by both deductive and inductive methods during series of meetings. During this process, the committee ensured the questions were simple (adopting commonly used terms), avoided potentially sensitive terms, phrased shorter questions (requiring less effort to comprehend / respond) and finalized 21 questions for evaluating “emotional exhaustion” (11 questions), “depersonalization” (5 questions) and “personal accomplishment” (5 questions) with each of the questions being responded with 7-point scale i.e. “everyday”, “few times a week”, “weekly”, “few times a month”, “monthly”, “occasionally” and “never”. The questions were drafted combining positively and negatively worded items, as they are regarded superior over one-sided scales from psychometric point of view, as the one sided questions can lead to artificial factor solutions in which positively and negatively worded items are likely to cluster or may show artificial relationships with other constructs²⁶⁾. The committee ensured to avoid the possibility of stereotyped response patterns and confusions due to double negation response situations while drafting the questionnaire²³⁾.

Workplace screening tool development

Construct identification and selection of questions:

The committee in similar steps adopted for drafting the “Burnout screening tool” drafted questions revolving the six key areas (constructs) influencing the mental health at workplace, by identifying the constructs from previous studies, and customizing to the needs of indigenous workforce. The committee referred the previous tools, job content questionnaire²⁷⁾, Copenhagen psychological questionnaire²⁸⁾, MBI-General Survey²²⁾, occupational stress index²⁹⁾, Occupational role scale³⁰⁾, job stress scale³¹⁾ and other scales described in the recent systematic reviews^{32, 33)} to prepare the initial draft of questions.

Question phrasing and finalization:

The committee drafted the final list of questions ensuring they are simple, shorter and relatively neutral (similar to that adopted during developing “Burnout screening tool”) after series of meetings by both deductive and inductive methods. The final list consisted of 25 questions for evaluating the 6 areas of the workplace, namely “work-

load” (5 questions), “reward” (3 questions), “community” (3 questions), “control” (6 questions), “values (4 questions) and fairness (4 questions) with each of the question being responded with 5-point scale with “0” being “never” and “5” being “always”. The committee ensured content validity, comprehensibility of the questions (in terms of simple language and relatively shorter questions).

Pilot analysis: feasibility and utility:

The tools were initially piloted with 58 consenting participants in the vernacular language to evaluate the feasibility, comprehensibility and utility after obtaining necessary permission from the institute human ethics committee. All participants were employed for a minimum 1 yr at the same place. All participants were briefly interviewed by the clinical experts (AK & RB), to ensure they were free from major psychological/psychiatric disturbances/ alcohol use disorders. The details of the responders are provided in Table 1. Briefly, the pilot sample consisted of participants employed in both formal workforce (working conditions abided by labor laws) and informal workforce (working conditions not regulated by labor laws), varying job roles, education and work experience.

Few participants willing to share the feedback, confirmed the ease of comprehension and length of interview in relevance to their workplace and its effects on mental health. The participants expressed a shorter response scale (i.e. possibly 2–3 point) in place of the wide scales (i.e. 7-point occupational mental health scale and 5-point workplace assessment scale) would improve the ease of comprehension and response rate. All but 5 questions from “Burnout screening tool” and 6 questions from “Workplace screening tool” were rated with “1”, “2” and “3” corresponding to “never”, “sometimes” and “Always”, while the 5 questions from “Burnout screening tool” and 6 questions from “Workplace screening tool” were rated in opposite direction. Therefore, higher cumulative scores for each tool indicated poor occupational mental health and workplace constructs. Based on the feedback observations, the committee decided to scale these questions with 3-point scale i.e. “Never”, “Sometimes” and “Always”.

All participants were approached about 4–6 wk later, however a fraction (up to 25%) of the participants consented to provide responses again. These participants continued to work in the same work environment and did not report any major incidents suggestive of influencing their mental health during this interval. The “Burnout screening tool” and “Workplace screening tool” exhibited satisfactory test–retest reliability (Pearson’s correlation coefficient

Table 1. Participant (Pilot sample) characteristics

Details	Description
Formal sector: informal sector (ratio)	17:41
Female: Male reported as total numbers (&%)	10 (17.2): 48 (82.8)
Age in years as median (range)	29.5 (21–56)
Education (n)	
<5 yr of formal education including Illiterate (no formal education)	14
5–10 yr of formal education	22
>10 yr of formal education (including graduate & post-graduate)	22
Work experience in years, as Median (range)	4 (1–35)
Job profile	
Semiskilled/skilled labor: Supervisory/managerial (ratio)	44:14:00
Formal workforce: Informal workforce	16:42
Test-retest reliability*	
Burnout screening tool (Pearson correlation coefficient)^	0.67
Workplace screening tool (Pearson correlation coefficient)^	0.77

*Test-retest reliability on fraction of the participants (25%) was performed by reassessing the same participants about 4–6 wk later (refer text for detailed description).

^Statistically significant ($p < 0.001$) correlations.

of 0.67 and 0.77 respectively) with statistical significance (Table 1). The committee on reviewing the responses finalized the list of questions for occupational mental health tool and workplace assessment tool.

Description of the tools

A tool for screening the occupational mental health consisting of 21 questions and screening the key constructs influencing the mental health at workplace (workplace assessment) consisting of 25 questions were developed. Each of these questions sought responses using a 3-point scale i.e. “Never”, “Sometimes” and “Always”. The final set of questions were relatively simple, shorter, comprehensible and compliant (no rejections) as observed by the feedback obtained during the pilot (feasibility) study. The response obtained for “Burnout screening tool” and “Workplace screening scale” for the pilot sample is briefed in Supplementary Tables 1–9.

Validation

The tool was applied on a larger sample, with additionally using a screening tool for measuring their general mental health of the participants (i.e. General Health Questionnaire-5 (GHQ-5)). About 153 consenting workers residing in urban set-up with heterogeneous occupational background were interviewed in Hindi language. The validation phase of the study received necessary approval from institutional scientific advisory and ethics committee for complete application of “Burnout screening tool” and

partial application of the “Workplace screening tool”. The basic demographic and occupational details of these participants is described in the Table 2. The participants were interviewed between August–October 2020 during which the viral pandemic was prevalent across the country. The GHQ-5 scores range from 0–5, wherein zero (0) indicates no further intervention, however a score of ≥ 2 indicates the need for further evaluation by the mental health expert³⁴. All statistical analyses were performed using SPSS version 21. The response pattern obtained for “Burnout screening tool” and “Workplace screening scale” is briefed in Supplementary Tables 10–16.

Details on the internal consistency of the tools is described under Table 3. Briefly, the Cronbach’s alpha for “Burnout screening tool” and the “Workplace screening tool” was 0.82 & 0.73 respectively, indicative of good levels of internal consistency. In order to validate the data collection process, Cronbach’s alpha, inter-item correlations and corrected item-scale correlations were estimated for the validated tool GHQ-5 as well.

Occupational mental health (burnout) screening tool

The results of item scale correlations (i.e. corrected item-total correlations and squared multiple correlations) and the inter-item correlations were used for assessing the fitness of items in the tools. The corrected item-total correlations (Pearson’s correlation coefficient) for majority of the items of burnout screening tool were >0.3 and were broadly regarded as fit to assess the measure. While the

Table 2. Demographic and occupational details of the participants and fraction of the participants with score equal/greater than 2 in general health questionnaire (GHQ $\geq$ 2)

Variable	Total participants <i>n</i> (%)	Participant with GHQ $\geq$ 2 <i>n</i> (%)
Sex		
Male	55 (35.9)	13 (23.6)
Female	98 (64.1)	31 (31.6)
Marital status		
Unmarried	32 (20.9)	14 (43.8)
Married	115 (75.2)	28 (24.3)
Widow(er)/separated/divorced	6 (3.9)	2 (33.3)
Educational status		
Middle school and lower (<5 yr)	26 (17)	0 (0)
High school and higher secondary (6–12 yr)	46 (30.1)	10 (21.7)
Diploma	16 (10.5)	6 (37.5)
Graduate	36 (23.5)	11 (30.6)
Post graduate and above	29 (19)	17 (58.6)
Monthly income (INR)		
<5,000	13 (8.5)	2 (15.4)
5,001–10,000	29 (19)	2 (6.9)
10,001–20,000	42 (27.5)	6 (14.3)
20,001–50,000	32 (20.9)	8 (25)
>50,000	32 (20.9)	25 (78.1)
Employment status		
Contractual/ad-hoc	95 (62.1)	23 (24.2)
Regular	58 (37.9)	21 (36.2)
Occupation		
Outdoor data collection	14 (9.2)	2 (14.3)
Paramedical staff (outdoors)/drivers	19 (12.4)	5 (26.3)
Nurse	29 (19)	7 (24.1)
Doctor	23 (15)	18 (78.3)
Laboratory staff	16 (10.5)	7 (43.8)
Sanitary workers/outdoor workers	23 (15)	2 (8.7)
Security guards/police	23 (15)	2 (8.7)
Administrative/indoor desk job workers	6 (3.9)	0 (0)

INR: Indian Rupee.

Table 3. Psychometric properties of the scales

Tool	Cronbach's alpha	Inter-item correlations (range)	Corrected Item-scale correlations (range)	Squared multiple correlations (range)
Burnout screening tool	0.82	0.18–0.5	0.2–0.57	0.17–0.64
Workplace screening tool	0.73	0.16–0.45	0.21–0.7	0.19–0.6
GHQ-5	0.716	0.22–0.56	0.37–0.58	0.15–0.39

GHQ-5: General Health Questionnaire-5.

squared multiple correlation (R^2) for all items were >0.2 and regarded as acceptable levels of variations explained by these items³⁵). The items “*Do you work here solely for money and the job doesn't motivate/encourage you*”, “*Are you satisfied with your work*” and “*Do you satisfactorily*

complete your work for the day” exhibited item-total correlation <0.3 , however the squared multiple correlation were up to 0.2 and were part of the tools. The inter-item correlations of the items in the tool ranged between 0.18–0.5 and therefore were part of the tool³⁶) (Table 4).

Table 4. Results of the factor analysis of occupational mental health screening tool

Questions	Component
Emotional exhaustion	
Are you demotivated to attend work	3
Does the thought of going to work put you down	3
Does this work disinterest me	2
Do you work here solely for money and the job doesn't motivate/encourage you	5
Are you worried about attending work	1
Do you continue to think about work related issues even during non-working hours	1
Do you feel sleepless, loss of appetite due to continuous thoughts about work	1
Do you feel lively while being at work	1
Do you feel frustrated by your work	1
Are you satisfied with your work	5
Does the thought of work prevent you from enjoying happiness with family & friends	1
Depersonalization	
Do you express anger at workplace due to work related stress/excess of work	1
Does this job make you less caring/indifferent to your fellow colleagues/clients	2
Have you become insensitive to people around you, since you've been working here	3
Do you almost lose patience by the end of the workday	3
Have you been responsible/felt guilty for your colleague's/client's problem (s)	3
Personal accomplishments	
Do you feel you've accomplished many worthwhile things in this job	4
Do you satisfactorily complete your work for the day	4
Are you satisfied with your efforts in keeping the work atmosphere calm and relaxed	4

Workplace screening tool

The fitness of the items of workplace screening tool were similarly assessed by item scale correlations (i.e. corrected item-total correlations and squared multiple correlations) and the inter-item correlations. The corrected item-total correlations (Pearson's correlation coefficient) for majority of the burnout and workplace screening tools were >0.3 and were broadly regarded as fit to assess the respective measures. While the squared multiple correlation (R^2) for all the items were >0.2 and regarded as acceptable levels of variations explained by these items³⁵. The items "Do you get less salary in comparison to the quantum of your labor/work" and "Do you feel the working conditions are satisfactory from the point of view of our welfare and convenience" exhibited item-total correlation <0.3 , however the squared multiple correlation were up to 0.2 and were part of the tools. The inter-item correlations of the items included in the tool ranged between 0.16–0.45³⁶.

Factor analysis

An exploratory factor analysis of the screening tools' responses was taken up using conventional principal component analysis (PCA). A prior suitability of PCA was confirmed by the presence of at least one correlation coefficient >0.3 , among all the variables in the correlation

matrix, Kaiser-Meyer-Olkin (KMO) measure of sampling strategy >0.6 and statistically significant Barlett's test of sphericity. Further, the components (obtained by PCA) with eigenvalue greater than 1, explaining greater than five (5)% of the total variance, expressing deflection point in the scree plot and factor loading >0.5 in the Varimax (with kaiser normalization) rotation component matrix were considered while deciding the final number of components (Table 5).

Occupational mental health (burnout) screening tool

The responses obtained for the burnout screening tool questions were suitable for factor analysis using PCA. As all variables (questions) had at least one correlation coefficient >0.3 , the overall KMO for the sampling strategy was 0.783 with individual KMO measures >0.5 (Supplementary Table 17) and finally the Barlett test of sphericity was statistically significant ($p<0.0001$). Factor analysis (PCA) revealed 5 components with eigenvalues greater than one, explaining 25.5%, 9.5%, 7.8%, 7.2% and 6.9% of the total variance respectively. All 5 components were retained based on the visual inspection of scree plot (Supplementary Fig. 1) and interpretability criterion (i.e. loadings >0.5). The five components cumulatively explained 57.03% of the total variance. The Varimax orthogonal rotation analy-

Table 5. Results of the factor analysis for workplace assessment screening tool

Questions	Component
Work load	
Do you have to do a lot of work in this job	1
Are you able to develop sufficient time for your domestic and personal work, considering the quantum of official work	1
Do you have to work, that requires more than one person to do	1
Do you feel completing your assignments personally unsatisfied on account of excessive work and lack of time	1
Do you have to work under tense circumstances (due to excessive work)	1
Reward	
Do you get less salary in comparison to the quantum of your labor/work	4
Are you appropriately rewarded for your hard work/labor and efficient performance	3
Do you feel the working conditions are satisfactory from the point of view of our welfare and convenience	3
Community cooperation	
Do your colleagues at workplace voluntarily cooperate with you	2
Do you feel sufficient mutual co-operation and team spirit exists among the employees of the organization/department	2
Does the workplace permit you to communicate with your colleagues	4

Table 6. Reliability statistics of the scales

Scales	Pearson's correlation coefficient with GHQ-5
Burnout screening tool	0.694
Workplace screening tool	0.586

GHQ-5: General Health Questionnaire-5.

sis exhibited ‘simple structure’, suggesting the data was consistent with occupational mental health questions was designed to measure the loadings of “emotional exhaustion” items on components 1 & 5, “personal accomplishment” items on component 4 and both “emotional exhaustion” and “depersonalization” items on components 2 & 3. The details of component loading and communalities of the rotated solution is reported in Supplementary Table 18.

Workplace screening tool

Similar factor analysis of the responses of “Workplace screening tool” was confirmed after ensuring the suitability. The responses were suitable for PCA as all variables (questions) had at least one correlation coefficient >0.3 , the overall KMO for the sampling strategy was 0.771 with individual KMO measures >0.5 and finally the Barlett test of sphericity was statistically significant ($p < 0.0001$) (Supplementary Table 19). Factor analysis (PCA) revealed four components with eigenvalues greater than one, explaining 31.4%, 12.2%, 11.7% and 10.1% of the total variance respectively. All four components were retained based on the visual inspection of scree plot (Supplementary Fig. 2) and interpretability criterion (i.e. loadings >0.5). The four component solution explained 65.5% of the total variance. The Varimax orthogonal rotation analysis confirmed the

‘simple structure’, suggesting the interpretation of the data was consistent with workplace factors questions was designed to measure the loadings of “workload” items on component 1, “community” items on component 2 and “reward” items on components 3 & 4. The details of component loading and communalities of the rotated solution is reported in Supplementary Table 20.

Performance of the “Burnout screening tool” and “Workplace screening tool” against the screening tool GHQ-5 was explored using Pearson’s correlation (ρ) and details is reported in Table 6. The scales significantly correlated with GHQ-5 assessment as well with each other ($\rho = 0.662$). Considering individuals with GHQ ≥ 2 as need for intervention by expert (for detailed evaluation and necessary management), the corresponding mean “Burnout screening tool” score, of 25 (Fig. 1) and “Workplace screening tool” score of 17 (Fig. 2), may be regarded as cut-off scores requiring further expert attention/detailed evaluation. However, a larger sample would be necessary to confirm the cut-off values.

Reliability of the tools by split half analysis

The entire 153 participants were randomly dichotomized as two groups, ensuring each group has equal representations of the occupations considered in the study

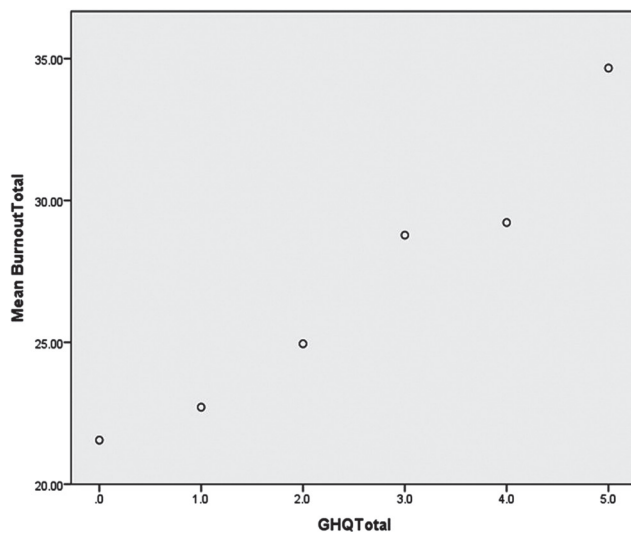


Fig. 1. Scatterplot of mean “Burnout screening tool” scores plotted against the corresponding General Health Questionnaire-5 (GHQ-5) scores.

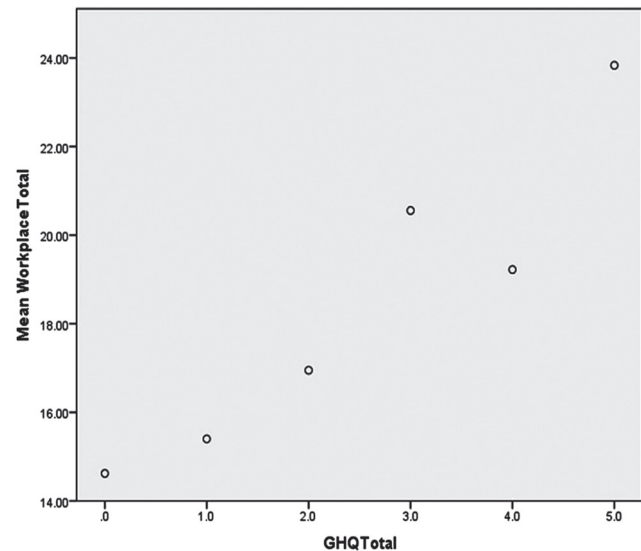


Fig. 2. Scatterplot of mean “Workplace screening tool” scores plotted against corresponding General Health Questionnaire-5 (GHQ-5) scores.

(i.e. doctors, nurses, paramedical staff, laboratory staff etc. are equally divided among the two groups (Supplementary Table 21)) using the combination of “random number generator” (RAND), “rounding up number” (ROUNDUP) and “ranking of number” (RANK) functions from Microsoft Excel-2016 program. The two groups were compared for differences in the responses of burnout and workplace questions using χ^2 test (Supplementary Table 22), while independent t -test was employed to explore the group differences in the total scores (Supplementary Table 23). The process of randomly dichotomizing and comparing the two groups was performed on 3 occasions. The randomly dichotomized groups consistently revealed no statistically significance in the responses (χ^2 test) as well the total scores (independent t -test).

Discussion

Current study aimed at developing a tool to screen the occupational mental health (burnout) and workplace factors influencing the mental health. The study followed the conventional steps for scale development and its evaluation³⁷). The “Burnout screening tool” included questions screening for “emotional exhaustion”, “depersonalization” and “personal accomplishment”, while the “Workplace screening tool” questions evaluated “workload”, “reward”, “community-cooperation”, “fairness”, “control” and “values”. The tool on confirming the feasibility in a pilot sample was applied on a larger sample in addition

to administering a standard tool for screening the general mental health (i.e. GHQ-5).

The tools included relatively shorter questions with simple language and ensured easiness in comprehending them, as reflected by 100% response rate among those participated, irrespective of their educational and occupational backgrounds. These points indicate the acceptability and feasibility of the tool in a wide range of occupational groups. “Control”, “Fairness” & “Values”, the dimensions of workplace assessment are often reported among white collar jobs. As the present study primarily included blue collar and health care professional jobs, the questions pertaining to “Control”, “Fairness” & “Values” were not permitted to be part of the current evaluation (by Institutional human ethical committee and scientific advisory committee).

Cronbach’s alpha for the burnout and workplace screening tools were respectively 0.82 and 0.73 suggestive of high level of internal consistency (Table 3). The items included in the tools exhibited acceptable levels inter-item and item scale correlations for their inclusion in the tool. The test-retest reliability of tools was established by confirming statistically significant correlations by evaluating the same participants after an interval of 4–6 wk during the pilot phase (Table 1). The constructs “emotional exhaustion” and “depersonalization” are reported to co-occur and often described as continuum, thereby exhibiting partial overlap of questions pertaining to these constructs in the exploratory factor analysis. Similarly, the “reward” and

“workload” constructs of workplace assessment screening tool exhibited partial overlap in the factor analysis. However the “personal accomplishment” construct of burnout tool and the “community cooperation” construct of workplace tool exhibited independent component.

The tools significantly correlated with the mental health questionnaire, reflecting the tool’s ability to screen the mental health burden. As the scales primarily intended to record mental health attributed to workplace and occupational factors. The strength of correlation with general mental health ranged between moderate–strong. These points favor the scales as potential tools for screening the desired latent constructs (occupational mental health and psychological hazards of the workplace).

The data distribution (burnout screening tool and workplace screening tool) for each of the occupations demonstrate considerable variations, with clinical doctors reporting highest scores (high levels of burnout scores and relatively poor workplace factors) and the outdoor workers (security guards, sales, data collection) reported lower scores. Considering the pandemic time period during which the data was collected, the medical professions were loaded with clinical responsibilities of managing the contagious cases/risk of contracting the illness while executing the clinical duties. While, the outdoor workers with responsibilities essentially managing hospital visitors and relatively reduced risk of interpersonal contact (contacting the illness) exhibited relatively lower scores. Therefore, in view of these conditions it is intuitive that health care professions exhibited relatively higher burnout and workload scores as compared to the outdoor workers or those workers engaged with activities requiring none/minimal human contact or less risk of contracting the illness. These points reinforce the construct validity of the tools (i.e. ability of the tool to screen/record the desired latent construct).

The study is perhaps an earliest attempt to develop a tool for screening the workplace mental health for Indian adult population. The tool was developed involving experts in the field, adhering to the conventional steps mandated for behavioral tool development. The tools were observed to be simple (requires minimal expertise to administer), acceptable and reliable (psychometric properties such as construct and criterion validity and reliability) tool for screening the desired latent constructs (i.e. occupational mental health and workplace factors known to influence the mental health). However, considering the limitations of relatively fewer heterogeneity (skewed) in the occupations/workforce involved in the present study and participants from a particular region of the country,

the observations are largely restricted to smaller workforce and local region. Hence, large sample including wide range of occupational and demographic background with longitudinal design and periodic detailed (mental health) evaluation/investigation with the complete tools is essential to validate the tool and confirm the cut-off scores. In addition, the detailed clinical (mental health) evaluation of the participants would be necessary for accurate calculation of the receiver-operating characteristic properties (i.e. sensitivity and specificity) and predictive validity of the scales and its subscales.

Present study is an attempt to develop tool for screening adverse occupational mental health (burnout) and workplace factors that are known to be detrimental for mental health. Considering the magnitude of workforce and relatively naïve the concept of occupational mental health in the country, a tool (such as the one reported in the study) for screening the mentioned constructs are need of the hour. Hence, the proposed simple and easy to administer tool, would aid in recognizing the burnout and aid in early diagnosis and management of those requiring intervention.

Funding

No grants were received for the present study.

Author Contributions

RB: Conceptualization, data collection, analysis, result interpretation and draft preparation, revision and submission, AK: Conceptualization, data collection, manuscript review, SB: Conceptualization, result interpretation, manuscript review.

Conflict of Interest

None to declare.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy and ethical restrictions.

Acknowledgments

The authors (RB & AK) being employed at ICMR- National Institute of Occupational health would acknowledge

Indian Council of Medical Research (ICMR) and ICMR-National Institute of Occupational health for facilitating the study. Further all authors would acknowledge all the participants for their voluntary participation in the study.

References

- 1) Stoewen DL (2016) Wellness at work: building healthy workplaces. *Can Vet J* **57**, 1188–90.
- 2) Brom SS, Buruck G, Horváth I, Richter P, Leiter MP (2015) Areas of worklife as predictors of occupational health—a validation study in two German samples. *Burn Res* **2**, 60–70.
- 3) Li Y, Guo B, Wang Y, Lv X, Li R, Guan X, Li L, Li J, Cao Y (2022) Serial-multiple mediation of job burnout and fatigue in the relationship between sickness presenteeism and productivity loss in nurses: a multicenter cross-sectional study. *Front Public Health* **9**, 812737.
- 4) Maslach C, Leiter MP (2016) Understanding the burnout experience: recent research and its implications for psychiatry. *World Psychiatry* **15**, 103–11.
- 5) Leiter MP, Maslach C (1999) Six areas of worklife: a model of the organizational context of burnout. *J Health Hum Serv Adm* **21**, 472–89.
- 6) Kouvonen A, Toppinen-Tanner S, Kivistö M, Huuhtanen P, Kalimo R (2005) Job characteristics and burnout among aging professionals in information and communications technology. *Psychol Rep* **97**, 505–14.
- 7) Leiter MP, Maslach C (2004) Areas of worklife: a structured approach to organizational predictors of job burnout. In: *Emotional and physiological processes and positive intervention strategies*, 91–134, Elsevier Science/JAI Press, US.
- 8) Siegrist J (1996) Adverse health effects of high-effort/low-reward conditions. *J Occup Health Psychol* **1**, 27–41.
- 9) Siegrist J, Starke D, Chandola T, Godin I, Marmot M, Niedhammer I, Peter R (2004) The measurement of effort-reward imbalance at work: European comparisons. *Soc Sci Med* **58**, 1483–99.
- 10) Halbesleben JR (2006) Sources of social support and burnout: a meta-analytic test of the conservation of resources model. *J Appl Psychol* **91**, 1134–45.
- 11) de Lange AH, Taris TW, Kompier MA, Houtman IL, Bongers PM (2003) “The very best of the millennium”: longitudinal research and the demand-control-(support) model. *J Occup Health Psychol* **8**, 282–305.
- 12) Walster E, Berscheid E, Walster GW (1973) New directions in equity research. *J Pers Soc Psychol* **25**, 151–76.
- 13) Dyląg A, Jaworek M, Karwowski W, Kożusznik M, Marek T (2013) Discrepancy between individual and organizational values: occupational burnout and work engagement among white-collar workers. *Int J Ind Ergon* **43**, 225–31.
- 14) Hugman R (1991) Professions and hierarchy. In: *Power in caring professions*, 53–81, Macmillan Education UK, London.
- 15) Tyree A, Smith BG (1978) Occupational hierarchy in the United States: 1789–1969. *Soc Forces* **56**, 881–99.
- 16) Aadya, Kiran UV (2013) Occupational stress of women workers in unorganized sector. *Int J Sci Eng Res* **4**, 3–13.
- 17) Bandyopadhyay B, Sen D (2013) Occupational stress among women moulders: a study in manual brick manufacturing industry of West Bengal. *Int J Sci Res Publ* **4**, 7.
- 18) Bhatt RR, Desai JG, Verma BP (2015) Psychological stress among un-organized building construction workers in Gandhinagar, Gujarat, India. *J Med Res* **1**, 3.
- 19) Jayakumar J, Vidhya R (2020) Occupational stress among unorganized sector special reference with construction workers. *Adalya* **9**, 10.
- 20) Narayanan H (2017) A study on occupational stress in the unorganized sector with special reference to construction workers in Kanchipuram district. Department of Management Studies.
- 21) Prasad KDV, Vaidya R, Kumar AV (2015) A study on causes of stress among the employees and its effect on the employee performance at the workplace in an international agricultural research institute, Hyderabad, Telangana, India. *Eur J Bus Manag* **7**, 11.
- 22) Maslach C, Schaufeli WB, Leiter MP (2001) Job burnout. *Annu Rev Psychol* **52**, 397–422.
- 23) Kristensen TS, Borritz M, Villadsen E, Christensen KB (2005) The Copenhagen Burnout Inventory: a new tool for the assessment of burnout. *Work Stress* **19**, 192–207.
- 24) Bakker A (2008) The Oldenburg Burnout Inventory: a good alternative to measure burnout and engagement. *Handbook of stress and burnout in health care*, 25, Nova Science, Hauppauge.
- 25) Shirom A, Melamed S (2006) A comparison of the construct validity of two burnout measures in two groups of professionals. *Int J Stress Manag* **13**, 176–200.
- 26) Demerouti E, Mostert K, Bakker AB (2010) Burnout and work engagement: a thorough investigation of the independency of both constructs. *J Occup Health Psychol* **15**, 209–22.
- 27) Karasek R, Brisson C, Kawakami N, Houtman I, Bongers P, Amick B (1998) The Job Content Questionnaire (JCQ): an instrument for internationally comparative assessments of psychosocial job characteristics. *J Occup Health Psychol* **3**, 322–55.
- 28) Kristensen TS, Hannerz H, Høgh A, Borg V (2005) The Copenhagen Psychosocial Questionnaire—a tool for the assessment and improvement of the psychosocial work environment. *Scand J Work Environ Health* **31**, 438–49.
- 29) Srivastava AK, Singh AP (1981) Construction and standardization of an occupational stress index: a pilot study. *Indian J Clin Psychol* **8**, 133–6.
- 30) Jones J (1983) Role stress scales role stress scales manual: Udai Pareek. *Group Organ Stud* **8**, 357–63.

- 31) Shukla A, Srivastava R (2016) Development of short questionnaire to measure an extended set of role expectation conflict, coworker support and work-life balance: the new job stress scale. *Cogent Bus Manage* **3**, 1.
- 32) Aronsson G, Theorell T, Grape T, Hammarström A, Hogstedt C, Marteinsdottir I, Skoog I, Träskman-Bendz L, Hall C (2017) A systematic review including meta-analysis of work environment and burnout symptoms. *BMC Public Health* **17**, 264.
- 33) Theorell T, Hammarström A, Aronsson G, Träskman Bendz L, Grape T, Hogstedt C, Marteinsdottir I, Skoog I, Hall C (2015) A systematic review including meta-analysis of work environment and depressive symptoms. *BMC Public Health* **15**, 738.
- 34) Shamasunder C, Sriram TG, Murali Raj SG, Shanmugham V (1986) Validity of a short 5-item version of the general health questionnaire (g.h.q). *Indian J Psychiatry* **28**, 217–9.
- 35) Hair J, Black W, Babin B, Anderson R (2010) *Multivariate data analysis: a global perspective*. Pearson Education, London.
- 36) Piedmont RL (2014) Inter-item correlations. In: *Encyclopedia of quality of life and well-being research*, Michalos AC (Ed.), 3303–4, Springer Netherlands, Dordrecht.
- 37) Kyriazos TA, Stalikas A (2018) Applied psychometrics: the steps of scale development and standardization process. *Psychology (Irvine)* **9**, 30.