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Assessment of Health Systems and Services Including Availability of Components for Mental Health Care in Industries of Kolar District, India

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Abstract

Background: Non-communicable diseases (NCDs) and psychological hazards are increasingly observed in industries, necessitating the need to strengthen industrial health systems to control the same. District level data on level of functioning of industrial health systems and services with special focus on systems available for mental health care is lacking in India. This information is vital to plan need-based interventions for system strengthening.

Objective: To assess the status of functioning of industrial health systems and services in Kolar district, India, with special focus on systems and services available for mental health care.

Methods: This cross-sectional study was undertaken between October and December 2014 on a stratified random sample of 69 industries located in Kolar, which were stratified proportionately by their hazardous nature. Interview and observation checklist were used to assess and classify functioning of industrial health systems and services including those available for mental health care.

Results: Occupational safety and health (OSH) policy was present in 56% and health insurance in 39% of the 69 industries assessed. Pre-placement and periodical medical examination were conducted in 23% of industries. Health systems and services in hazardous industries were functioning at less than 50% level of functioning. Health systems and services for mental health care were non-existent.

Conclusion: There is a need in Kolar district, India, to integrate the mental health components within existing industrial health systems, as per policy directives to implement setting based approaches in mental health programs.

Keywords: Health systems; Mental health services; Occupational health; Delivery of health care; Industry; Mental health; Risk; Mental disorders; Insurance, health; India

Introduction

Workers represent half the world's population and are major contributors to economic and social

development. Their health is influenced by several factors, both within and outside workplaces, thereby subjecting them to dual risk.¹ Occupational hazards like dust,

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chemicals, radiation, silica, and noise, co-exist with newer ones like stress, and altered lifestyles, which pose a risk for mental disorders and other non-communicable diseases (NCDs).² Ongoing demographic, industrial and epidemiological transition is expected to catalyze the above risk.

According to epidemiological studies conducted in India, point prevalence for psychiatric disorders in general population vary from 0.95%–13%,^{3,4} in contrast to 14%–37%,^{5,7} in industrial population. Depression and anxiety are the most prevalent mental disorders in industrial workers with educational level, work stress and job satisfaction being the determinants for the same.⁷

Mental health is both a cause and consequence of other physical illness, affects quality of life and work productivity.⁸ With nearly 325 209 industries employing 11 634 070 workers in India (Directorate General, Factory Advice Service and Labour Institutes-DGFASLI, 2011)⁹ and 13 012 industries employing 1 322 873 workers in Karnataka State alone (Department of Factories, Boilers, Industrial Safety and Health, Government of Karnataka, March 2011), the need for quality care in industrial health systems and provision of services for mental health are imminent.

Health systems in Indian industries are regulated by the Indian Factories Act (last amended 1987). The provisions under this Act relate more to control of toxic-exposure-related occupational disorders.¹⁰ System specifications for control of NCDs and mental disorders are not specified in detail in spite of an unmet need and policy backing for the same. The National Mental Health Policy 2014 advocates incorporation of management of stressful events in workplace policies, both in organized and unorganized sectors (Sec 5.2.8), provision of funds for mental health and establish intersectoral links between health department and other related government de-

partments and private sectors to address mental health (Sec 4.4.2, and Sec 4.6).¹¹

Health systems assessments in industries to understand their level of functioning and status of mental health service components towards planning interventions is limited in Indian settings. With huge number of industries and disproportionately lesser manpower for monitoring the same, there is a need for rapid, reliable and objective tool to assess and grade the level of functioning of health systems and services in industries. This would help in quantifying level of functioning of health systems and monitor system development over time periods. Therefore, we conducted this study to objectively assess the status of industrial health systems and services among industries in Kolar district, India, with a specific focus on assessment of systems and services available for mental health care.

Materials and Methods

This cross-sectional study was conducted on a random sample of 69 industries in Kolar district, India, where the National Institute of Mental Health and Neurosciences (NIMHANS) has established a public health observatory to strengthen public health response towards control of NCDs and mental disorders. During the study period, there were 229 industries in Kolar of which 8% were hazardous industries.

List of registered industries (hazardous and non-hazardous) located in Kolar (obtained from Department of Factories, Boilers, Industrial Safety and Health, Government of Karnataka as on September 2013) served as the sampling frame, from which “functioning” and “industries providing informed consent” were included for the study. Industries involving hazardous process as listed in “The First Schedule (Sec 2(cb))” of the Indian Factories Act are defined as “hazardous industries.”

For more information on worker attitudes towards mental health problems and disclosure see <http://www.thejoem.com/ijoem/index.php/ijoem/article/view/463>



Data regarding industrial health systems assessment is limited in the region. Health systems and services are expected to be better in hazardous industries (which constitute 8% in Kolar) due to stringent legal mandate and regular enforcement visits; hence, sample size was estimated expecting health systems to be optimally functioning in 8% of industries in Kolar. Assuming an expected proportion of 8%, an acceptable error of 5%, 95% confidence interval, and a finite population size of 229 industries, the minimum sample size was calculated to be 69 industries. Sample size was calculated using Open-Epi software.

Organization and delivery of industrial health systems and services differ between hazardous and non-hazardous industries, as specified in the Indian Factories Act. Therefore, a stratified random sampling technique (stratified proportionately by “hazardous nature of industry,” ie, 8% hazardous and 92% non-hazardous) was adopted to select the final sample of 69 industries.

two strata: hazardous (18 industries) and non-hazardous (211 industries). Within each stratum, simple random sampling was adopted to select eight hazardous industries and 61 non-hazardous industries by using a table of random numbers.

Each industry was visited in person by the investigator between October and December 2014 to collect data after obtaining informed consent from industry representative. Data were collected by key informant interview and visual inspection of available systems and services by using a data collection sheet containing an observational checklist. The data collection sheet consisted of items to ascertain the status of existing health system and services (compliance) as specified by the Indian Factories Act plus items pertaining to systems for mental health care. Some of the items specifically pertaining to mental health care were adapted from Center for Disease Control–Health Worksite Score Card.¹² The term “mental health” was operationally restricted to depression, anxiety, substance use (alcohol and tobacco) and work stress in the present study as literature review revealed these to be the most common neuropsychiatric problems in workplaces.

The study instrument contained several variables (Table 1). Specific enquiries were made with regards to systems and services available for care of alcohol, tobacco use, work stress and mental disorders (depression, anxiety) in terms of presence of policy, pre-placement examination, screening, periodical examination, training, counseling, treatment, health education and incentives. A pilot study was done among seven industries to finalize the study instrument and rectify operational barriers for data collection.

A positive compliance with the expected norms was scored ‘1,’ and ‘0’ for non-compliance (eg, periodical examination system is present = ‘1,’ not present = ‘0’). Positive

Table 1: Variables in the study instrument

Section	Variables
Industry profile	Type, location, working hours and employee statistics
Health systems	<i>Macro Areas:</i> Occupational safety and health (OSH) policy, committee, training and health insurance
	<i>Infrastructure:</i> Occupational Health Clinic/Centre /Ambulance room, Ambulance, First Aid kit, Drugs and Health records.
	<i>Manpower:</i> Physician/surgeon, nurse, first aider, dresser cum compounder, welfare officer, safety officer, psychologist, social worker and counselor
Health services	<i>Health Examinations:</i> Pre-placement, periodical medical examination.
	OPD services
	Health education programs

responses for items pertaining to assessment of systems for mental health care were scored '1' (*eg*, counselling services for alcohol de-addiction present = '1,' not present = '0'). Each industry was assessed in the above manner using the study instrument and the maximum possible score that could be obtained for each industry having total compliance to "expected" was 155 (health systems related score = 65, health services = 34, and mental health related = 56). "Expected" refers to mandated health systems and services to be present in a particular industry of a particular size as mentioned in the Indian Factories Act (*eg*, a hazardous industry even with 100 workers is mandated to have an occupational clinic in industry premises, whereas a non-hazardous industry of same size is not mandated to have a clinic within premises).

Level of functioning of each industry was calculated as:

$$\frac{\text{Score obtained}}{\text{Maximum possible score}} \times 100$$

Each industry was further graded based on the level of functioning of their health systems and services into "grade A" (>75% functional level), "grade B" (50% to 74%), "grade C" (25% to 49%), and "grade D" (<25% functional level).

Fischer's exact test was used to compare various systems and services between hazardous and non-hazardous industries. This study was approved by NIMHANS Ethics Committee.

Results

We contacted 116 industries to recruit and study 69 industries (47 were either not functioning or not traceable). Our study sample consisted of 90% non-hazardous industries and mostly located in Malur industrial areas. Nearly three-fourths of industries had up to 50 employees; only three

industries had more than 500 employees. Prior to assessment of systems available specifically for mental health care, an assessment of existing systems and services for general health care was done. The systems and services for general health care of workers in industries are prescribed by the Indian Factories Act. Hence, our observations related to compliance to Factories Act also.

Table 1 shows the distribution of occupational health systems and services in hazardous and non-hazardous industries. Occupational safety and health (OSH) policy was present in 34 (57%) of all industries but visually confirmed in 24 (35%) industries. Wherever present, OSH policy was part of the overall industrial policy (68%) which covered wellness, productivity, and company rules. Exclusive policy for health was present in 11 (16%) industries. Accessibility of policy in terms of its display in common areas for all to read was present in 27 (39%) industries. Notable observation was that health staff in industries were not formally trained in OSH. Only 27 (39%) industries provided health security to the employees, majority through Employee State Insurance scheme (ESI).

Assessment of physical infrastructure for health in industrial premises revealed that 10 (14%) had health clinics that provided first aid and out patient services (OPD), though none had laboratory facilities. OPD health data was manually collected and maintained in hard format with exception of two industries that reported using software for the same. Infrastructure was similar in both hazardous and non-hazardous industries.

Drugs present in the Occupational Health Center (OHC) were for first aid and treatment of common ailments (*eg*, musculoskeletal, skin, and respiratory problems). First aid kits were observed in 33% of industries though all had varying contents. Services of a qualified doctor either part-

Table 2: Health systems and services: Hazardous versus non-hazardous industries

Parameter	Hazardous n (%), (n=8)	Non-hazardous n (%), (n=61)	Total n (%), (n=69)
Health System			
<i>Macro Areas</i>			
OSH policy	5 (63)	29 (48)	34 (57)
Safety committee	2 (25)	6 (10)	8 (12)
Health insurance for workers	6 (75)	21 (16)	27 (39)
<i>Infrastructure</i>			
OHC/Ambulance room	1 (13)	9 (15)	10 (14)
Ambulance van	1 (13)	5 (8)	6 (9)
First aid dressing kits	1 (12)	4 (7)	5 (7)
Drugs for common ailments	1 (12)	9 (15)	10 (14)
Computer systems	1 (12)	2 (3)	3 (4)
<i>Manpower</i>			
Physician/surgeon	2 (25)	4 (7)	6 (9)
Nurse	0 (0)	2 (3)	2 (3)
First aider	4 (50)	14 (20)	18 (26)
Welfare officer	0 (0)	3 (5)	3 (4)
Safety officer	2 (25)	3 (5)	5 (7)
Health Services			
<i>Health Examination</i>			
Pre-employment examination	7 (88)	9 (15)	16 (23)*
Periodical examination	8 (100)	8 (13)	16 (23)†
<i>Health education/promotion</i>			
Focussed IEC programs for workers	3 (50)	6 (19)	9 (13)
Display of posters, banners, videos, etc.	4 (67)	9 (29)	13 (19)
Observation of special health days	4 (67)	11(35)	15 (22)

Fischer's exact test, *p=0.02, †p=0.01

time or visiting was available in 6 (9%) industries and the predominant health personnel onsite was the first aider 18 (26%).

Pre-placement examination and periodical examination was conducted in 16 (23%) industries. These services were contracted out to external private agencies in most industries. Pre-placement examination was done mainly to certify fitness for employment. Guidelines for pre-placement and periodical examination was present in 4 (6%) industries. Eleven (16%) of industries revealed that medical examinations were customized to identify industry specific health risks. The results of the examination were shared with the employees in 11 (16%) industries.

Health education/promotion activities related to OSH for their employees within the past one year was conducted in 16 (23%) of industries of which 13 (18%) displayed health educational material in industries but they were mostly related to safety and no-smoking and were mostly not in local language (60%). Observation of health days was limited to “safety day” observation. Health systems and services were better in hazardous industries (Table 1) as provisions of law and enforcement is more stringent necessitating system development.

Systems and service requirements in industries are prescribed by the Indian Factories Act and requirement varies with hazardous nature and size of industry (defined by worker strength). Adjusting for the same, the compliance to various requirements is presented in Table 2.

Compliance levels to various health system provisions are presented in Table 3. None of the industries reported conducting training in OSH for industrial health staff. Hazardous industries were graded as A, B, C, and D, based on the level of functioning of their health systems. Most of industries (6 out of 8) were functioning at less than 50% level of functioning and

Table 3: Compliance for health systems in all industries as mandated by the Factories Act

Health systems in industries	Mandated by Factories Act	Available (% compliance)
*OSH policy	18	7 (39)
†Safety committee	8	3 (38)
‡Training to health staff in OSH	69	0 (0)
§ ESI provision	69	13 (19)
¶OHC	4	1 (25)
Ambulance room	2	2 (100)
**Ambulance van	8	3 (37)
††First aid dressing kits	37	17 (46)
††Physician/surgeon	6	2 (33)
‡‡Nurse	5	2 (40)
§§Dresser cum compounder	3	0 (0)
¶¶Ward boy	3	0 (0)
First aider	69	13 (35)

Note: As per Factories Act .

*OSH policy is mandatory in all industries with above 50 employees

†Safety committee is mandatory in all hazardous industries,

‡Training to health staff in OSH is mandatory for all health staff wherever employed,

§ ESI is mandatory for all factories registered,

¶OHC is mandatory in hazardous industries with above 50 employees

||Ambulance room is mandatory in all non hazardous industries with 500 or more employees,

**Ambulance van is mandatory in all hazardous industries and all non hazardous industries with 500 or more employees,

††Physician/surgeon is mandatory in all hazardous industries above 200 employees,

‡‡Nurse is mandatory in all hazardous industries above 200 employees all non hazardous industries above 500 employees,

§§Dresser cum compounder is mandatory in all hazardous industries above 200 employees,

¶¶Ward boy is mandatory in all hazardous industries above 200 employees,

|||First aider is mandatory in all factories.

graded as C or D (Table 4).

Our assessment of general health systems revealed that even mandated systems and services were still evolving and sub-optimally functioning. In a situation where mandated provisions are yet to be complied totally, assessment of components related to mental health care proved dismal. We observed that systems for mental health care were non-existent, except that two industries had a written policy stating the ban on use of tobacco and alcohol in the premises (data not provided in Tables). Even systems for periodic assessment of work stress were absent. Screening for depression/anxiety or work stress was not part of annual medical examination nor treatment/follow-up care for the above disorders available in OHC. Neither policy systems nor service-related mechanisms in the industries possessed any mental health-related components. When criteria for grading industries was reworked by including items related to care of mental disorders, none of the industries were beyond 50% level of functioning. The silver lining however, was that screening and referral for diabetes and hypertension was present in 23% of industries, giving signals that NCDs control in industries are slowly gaining recognition.

Discussion

Organization and delivery of health sys-

tems and services differ between hazardous and non-hazardous industries and further by the size of the industry, as specified in the Factories Act. Our study sample was proportionately stratified to adjust for these differences.

We believe that mental health care components in industries need to be integrated and built upon existing industrial health systems. However, evidence regarding situation of industrial health systems and services from Indian settings was scarce. Therefore, assessment of systems available for general health care was done in the present study instead of solely mental health care systems assessment. Mental health being a stigmatized condition. We also felt that cooperation from industrial stakeholders would be discouraging, if we were to inform them that the sole purpose of our study was to assess the ability of their systems to manage mental health problems.

It has been predicted that by 2020, mental health problems, in particular depression, will rate as the leading cause of work disability⁸ and they continue to increase by the day. The burden of mental health in industrial settings has not been documented in Kolar. National Mental Health Survey pilot study conducted by NIMHANS in 2014 in Kolar has estimated the prevalence of neuropsychiatric problems as 11.6%.¹³ Assuming equal prevalence in industrial population and notwithstanding the role

Table 4: Functional level of health systems and services in hazardous industries (n=8)

Grading	*Functional level of health systems and services in hazardous industries (%)	Based on Factories Act	Based on study criteria (Factories Act + systems for mental health, NCDs)
Grade A	≥75	1	0
Grade B	50–74	1	0
Grade C	25–49	4	3
Grade D	<25	2	5

Note: *Functional level of industry as per norms of Factories Act = (Total score obtained /Maximum score attainable)×100

of healthy worker effects, around 2514 cases would be expected among workers in Kolar.

As earlier mentioned, our observation reveals that virtually no health systems are in place to address mental health in the studied industries. The probable reason for the same may be lack of regulatory backing, low awareness and prioritization by the industry managements. A critical relook at existing industrial health systems to integrate mental health care as a part of overall health systems strengthening is required. With evidence being scare in this area, anecdotal evidence from narrative reviews and reports available with Directorate General, Factory Advise Services And Labour Institutes (DGFASLI) is being relied upon for discussion purposes.

DGFASLI statistics (2011) mention that 90% of industries had OSH policy in India in contrast to 56% observed in our study. Similarly, nearly 88% compliance was reported for presence of safety committee in industries as compared to 11.5% in our study. A lower level of compliance for health systems and services was observed in Kolar. The probable reason for the same may be due to temporal differences between the two data sources as DGFASLI statistics refer to year 2011. DGFASLI statistics are compiled based on reports submitted by industries. Therefore, their data may have been influenced by reporting bias, whereas the present study was based on an independent primary data collection.

OSH policy, committee and formal OSH training to the health staff coupled with provision of health insurance for employees are vital components of industrial health systems. Lack of the same in majority of industries is a reflection of industry management's commitment towards health, safety, and welfare. Poor awareness of the industry managements about OSH requirements and limited availabil-

ity of courses in OSH in the country may have contributed to low compliance levels in our study units. Policy and training for mental health has to be integrated into interventions planned in future to facilitate policy development in Kolar industries.

Nearly 80% of workers from 39% of industries were covered with some form of health insurance. Non-coverage was observed mainly in construction industries, which were employing migrant, seasonal and contractual workers. Insurance coverage in industries is four times higher than health insurance coverage for the general population in Karnataka, which is around 17%.¹⁴

Health staff trained to deliver requisite basic occupational health services are an integral part of industrial health systems. Shortage of trained health staff may be attributed to limited availability of industrial health courses and inadequate focus on ongoing undergraduate health courses. There are 7464 factory medical officers for 271 085 industries employing 11 634 070 workers in India as per DGFASLI (2011).⁹ This translates into 0.02 doctors per industry and 6.41 doctors per 10 000 workers in India, in contrast to 2.7 doctors per 10 000

TAKE-HOME MESSAGE

- Health systems and services in industries in India are modelled and regulated by the Indian Factories Act.
- It is possible to conduct a quick functional assessment and grading of industrial health systems in an objective manner.
- The functional level or compliance of industrial health systems to specified standards was less than 50% in more than 50% of studied industries.
- Health systems and services were better in hazardous compared to non-hazardous industries.
- Mental health components were virtually absent in existing industrial health systems in Kolar, India.

workers in our study. Doctor population ratio of 1 per 1000 is suggested norms to achieve universal health coverage in general population.¹⁵ If provision of universal health coverage for industrial workers requires similar standards (1 doctor per 1000 workers), things are way behind.

Number of factory inspectors to inspect the existing number of industries are less and maldistributed contributing to lax implementation and enforcement, in spite of best intentions. There are 743 factory inspectors (972 sanctioned) and 19 medical inspectors (39 sanctioned) for 325 209 registered factories with total workforce of 11 634 070 across India (2011).⁹ This translates into 426 factories per inspector to be covered in one working year, though huge state specific differences may be present.

With deficiencies in manpower and monitoring mechanisms for general health care in industries where many provisions are mandated by law, facilitating inclusion

of mental health care components in these industries is a big challenge. Industrial managers may perceive mental health care as unnecessary as there is no legal backing for its enforcement.

Changing disease epidemiology in workplaces suggests that NCDs, work stress, alcohol, tobacco, and psychological distress are becoming a big concern and are as important as classical occupational diseases. A cursory comparison between classical occupational diseases and emerging health problems indicate that it is imperative that regulatory provisions be amended to incorporate mental health and other NCDs care into the existing industrial health systems (Table 5).

Emerging problems like mental disorders, substance use and NCDs can affect the individual's ability to work, leading to sickness absence and disability in the longer run. In 2008, mental health problems were one of the top three leading causes of work disability²⁵ and are expected to increase with increasing complexities and competitiveness of industrial environments. Workplace interventions have also been prioritized in National Health Policy 2002, National Mental Health Program and National Mental Health Policy 2014.

Industry managements, especially in medium to smaller enterprises, ignore the small investments for health infrastructure without realizing the expected cost effectiveness of the same and their impact on work productivity. Healthy workplace concepts need to be strengthened and mental health needs to be integrated within the same. Industrial health systems need to look beyond the boundaries of Factories Act, as health determinants and morbidity patterns are not constricted by such boundaries.

Workplaces are relatively closed groups offering better control and hence quality mental health programs can be delivered effectively and serve as a model for general

Table 5: Occupational diseases, NCDs, Psychological problems in Workplaces

Diseases	Prevalence (%) ^{Ref}
Occupational	
Silicosis	54.5 ¹⁶
Asbestosis	9 ¹⁷
Bysinosis	30 ¹⁸
Musculoskeletal disorders	11.9 ¹⁹
Contact dermatitis	12.5 ²⁰
NCDs, Psychological problems in workplaces	
Diabetes	8.1 ²¹
Obesity	30.9 (men), 32.8 (women) ²²
Hypertension	11 ²¹ , 31 ²³
Tobacco, Alcohol use	31 ²¹ , 27.7 ²¹
Psychological distress	23 ²⁴
Work stress	10 ²⁴

population-based programs.

Our study assessed mental health components in existing industrial health systems instead of a stand alone mental health assessment. We believed this approach is necessary to get better cooperation from industry managements and will provide necessary information to integrate mental health care into existing health systems. Stigma, fear of health care costs, lack of regulatory mandate, and labor union may have led industry managements to lowly prioritize NCDs and mental health care in industries even if they are considered emerging health issues.

In conclusion, based on the observed results and estimated disease burden in the industrial population of Kolar, there is an imminent need for providing basic health services for mental disorders and NCDs in industries. Fuelled by the changing disease epidemiology, a critical relook at the existing legislative provisions related to health and safety requirements in industrial settings is necessary to facilitate health systems development for integrating mental health care in industries. Neglecting or postponing the above may result in impaired work productivity, increased spending on health care and decreased quality of life of workers.

As a short-term measure awareness programs for managers, medical officers and social workers in Kolar, regarding the need to integrate NCDs and mental health care may be organized. Guidelines for incorporating mental health components in policy, screening, training, periodical examination, and treatment systems in industrial settings in an incremental manner need to be developed. Overall system development in industries needs to be synchronized with ongoing efforts to address NCDs and mental health in the country.

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References

1. ILO. Workers Health: Global Plan of Action. Available from www.ilo.org/safework/info/WCMS_169568/lang-en/index.htm (Accessed October 4, 2014).
2. Eijkemans G. Occupational health services as a part of primary health care. Occupational Health, World Health Organization. Available from www.ttl.fj/en/publications/Electronic_publications/Challenges_to_occupational_health_services/Documents/primary_healthcare.pdf (Accessed December 13, 2014).
3. Gururaj G, Girish N, Isaac M.K. Mental, neurological and substance abuse disorders: Strategies towards a systems approach. Ministry of Health and Family Welfare, Government of India, National Commission on Macroeconomics and Health Background papers - Burden of Disease in India. Available from [www.who.int/macrohealth/action/NCMH_Burden%20of%20disease_\(29%20Sep%202005\).pdf](http://www.who.int/macrohealth/action/NCMH_Burden%20of%20disease_(29%20Sep%202005).pdf) (Accessed November 1, 2014).
4. Reddy MV, Chandrashekar CR. Prevalence of mental and behavioural disorders in India: A meta-analysis. *Indian Psychiatry* 1998;**40**:14957.
5. Ganguli HC. Prevalence of psychological disorders in an Indian industrial population. Part I, II and III. *Indian J Med Res* 1968;**56**:754-76.
6. Bhaskaran K, Seth RC, Yadav SN. Migration and mental ill health in industry. *Indian J Psychiat* 1970;**12**:102-16.
7. Kar N, Dutta S, Patnaik S. Mental health in an Indian industrial population: Screening for psychiatric

- symptoms. *Indian J Occup Environ Med* 2002;**6**:86-8.
8. WHO. Mental Health Policy and Service Guidance Package. Mental health policies and programs in the workplaces. WHO. **2005**. Available from www.who.int/mental_health/policy/services/essential-package1v13/en/ (Accessed December 16, 2014).
 9. Directorate General, Factory Advice Services And Labour Institute. Information and statistics on OSH. Available from www.dgfasli.nic.in/info1.htm (Accessed October 29, 2014).
 10. Factories Act 1948 and The Karnataka Factories Rules 1969. Available from www.advantagekarnataka.com/images/pdf/ (Accessed November 2, 2014).
 11. Ministry of Health & Family Welfare, Government of India. New Pathways and New Hope. National Mental Health Policy of India. Draft Report. **2014**. Available from www.mohfw.nic.in/showfile.php?lid=2965 (Accessed January 16, 2015).
 12. National Center for Chronic Disease Prevention and Health Promotion, Division for Heart Disease and Stroke Prevention. The CDC Worksite Health Score Card: An Assessment Tool for Employers to Prevent Heart Disease, Stroke, & Related Health Conditions. Health Score Card Manual. **2014**. Available from www.cdc.gov/dhdsp/pubs/docs/hsc_manual.pdf (Accessed July 1, 2014).
 13. National Institute of Mental Health and Neurosciences. Kolar pilot study – Results and implications for National Mental Health Survey. **2014**.
 14. Srinath Reddy K, Selvaraj S, Krishna DR, *et al*. A critical assessment of the existing health insurance models in India. Public Health Foundation of India, **2011**.
 15. High Level Expert Group Report on Universal Health. Coverage for India Planning Commission of India New Delhi, November, **2011**. Available from http://planningcommission.nic.in/reports/genrep/rep_uhc0812.pdf (Accessed October 10, 2014).
 16. Saiyed HN, Parikh DJ, Ghodasara NB, *et al*. Silicosis in slate pencil workers: I. An environmental and medical study. *Am J Ind Med* 1985;**8**:127-33.
 17. National Institute of Occupational Health, Ahmedabad. Environmental cum medical survey in asbestos cement factory **1981**:47-74.
 18. Parikh JR. Byssinosis in developing countries. *Brit J Ind Med* 1992;**49**:217-9.
 19. Bobby J, Pretesh RK. A stitch in time: Annual health appraisal of garment industry employees. *Pak J Med Sci* 2008;**24**:104-8.
 20. Kuruvila M, Dubey S, Gahalaut P. Pattern of skin diseases among migrant construction workers in Mangalore. *Indian J Dermatol, Venereol and Leprol* 2006;**72**:129-32.
 21. Kiran Kumar PK, Jayaprakash K, Francis NP. Monteiro, Prashantha Bhagavath . Psychiatric Morbidity in Industrial Workers of South India. *Journal of Clinical and Diagnostic Research* 2011;**5**:921-5.
 22. Reddy KS, Prabhakaran D, Chaturvedi V, *et al*. Methods for establishing a surveillance system for cardiovascular diseases in Indian industrial populations. *Bull World Health Organ* 2006;**84**:461-9.
 23. Giridhara R. Babu, Tanmay Mahapatra, Roger Detels. Job stress and hypertension in younger software professionals in India. *Indian J Occup Environ Med* 2013;**17**:101-7.
 24. Sukumar GM, Kupatira K, Gururaj G. Feasibility of integrating mental health and noncommunicable disease risk factor screening in periodical medical examination of employees in industries: An exploratory initiative Year. *Indian J Occup Environ Med* 2015;**19**:19-24.
 25. WHO. The global burden of disease: 2004 update. Geneva: World Health Organization, **2008**. Available from www.who.int/healthinfo/global_burden_disease/GBD_report_2004update_full.pdf (Accessed October 11, 2014).