50 - MINING HEALTH PROMOTION: A LITERATURE REVISION

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INTRODUCTION

The mining work process is full of peculiarities. Such characteristics expose the workers to diverse risks, that can lead them to get diseases. Chemical, physical, mechanic, biologic and ergonomic risks are commonly related when talking about mineral extractive sector mineral (LENNÉ et al., 2012; ELENGE; DE BROUWER, 2011; LANDEM et al., 2011). Osteomuscular disturbances related to work, auditory problems, cancer, pneumoconiosis, tuberculosis, occupational asthma, dermatosis, among others diseases are some of the aggravating aspects (VEARRIER; GREENBERG, 2011; ZUBIETA et al., 2009).

In the past, the idea of persons getting ill and the early diagnosis and treatment in the prerogative of extinguishing sequels has being discussed but less applied (FARIA, 2007). In this scenery, it is opportune to implement the prevention and HP principles, especially in the mining sector, once these interventions are fundamental for the worker population health indicators and life quality (LQ) improvement (CARVALHO et al., 2009).

Nevertheless, what is prevention and health promotion? The prevention reflects the development of oriented interventions about the risk approaching for avoiding the appearance of specific diseases, diminishing their incidence and prevalence in the populations through mechanisms to attack them (BUSS, 2003; CZERESNIA, 2003). The HP is related to all the performances which objective is to increment or improve the individuals health (FLEURY-TEIXEIRA et al., 2008).

It is opportune to promote the mining workers health. For that, contemplate the three fundamental paradigms attributes to population health problems emphasized by Labonte (1996). Initially the author detaches the clinical problems, that are based in the disease existence, with actions directed to the symptoms treatment, the pathologies eradication and offenses prevention, later emphasizing the Public Health problems that would be treated with prevention, based in the adoption and promotion of healthy habits, and, finally, contemplate the environmental problems in which is necessary the creation of physical and social surroundings that beneficiate the subjects health and welfare.

In the worker health area, are involved measures directed to the worker, his family, work environment and life style. In this search, the strategies linked to the HP in primary prevention level focuses each disease, nevertheless, are designed to meliorate the general health and welfare (BUSS, 2003). Beside this, there are many ways of actions founded in the prevention and HP in favor to a work free of diseases in the mineral extractive sector. Therefore, it is proposed to identify the scientific production published in indexed bases about HP, Risks and Diseases Prevention in Mining, through the comprehension of the scope of the iniciatives related to the interventions in the mineral sector.

METHOD

With the aim to reach the objective of this investigation, it was adopted the Literature Integrative Revision method. To carry them out, six phases were developed (BOTELHO; CUNHA; MACEDO, 2011):

- Theme choice and guide question elaboration: it is a study about HP. Prevention of risks and diseases in mining, being questioned: Which are the initiatives/interventions in HP field, Prevention of risks and diseases in extractive mining sector?

- Determination of inclusion and exclusion criteria: included: publications in abstract or scientific article, indexed in Nursery Data Base (NDB), Caribbean and Latin-American Literature in Health Science (LILACS), Electronic Medical Index of National Library of Medicine (MedLine) and Scientific Electronic Library Online (SciELO), published between 2008 and 2013 in english, Portuguese and Spanish. All repeated articles in more than one base were excluded as well as the ones that didn't approach the study object;

- Identification of pre-selected and selected studies: a search in Health Virtual Library in June of 2013 was carried out, indexing the data bases previously related. As main term of search was used the Descriptor Controlled Health Sciences (MeSH) - mining, followed by one of the MeSH: primary, accidents prevention, health promotion or promotion in health. The first search found 154, however, 114 were out of the period of 2008-2013, one was in russian, seven were repeated in more than one data base and 18 weren't about the study object, resting, this way, 14 articles, which were definitely considered for the study.

- Categorization of the selected studies: the data were extracted from successive reading, categorized in publications profile and characterization according to the study object;

- Analysis and interpretation of results: the analysis matrix (KLOPPER; LUBBE; RUGBEER, 2007) was used for the included articles analysis, once it is an specific instrument for data concatenation. It was contemplated the data base, language, authorship, year, periodical, objective, methodology and approaching about HP and Risks and Mining Diseases. The data collected in this revision were discussed according to the valid theoretical referential. Revision Presentation: it is presented in a summarized and descriptive way, considering to the categories instituted.

RESULTS AND DISCUSSION

The articles were identified in two data bases. This way, 92.9% (n=13) were available in MEDLINE and 7.1% (n=1) in LILACS. According to Pereira (2012), the MEDLINE is the more world known data base in health area. Regarding to the language, the majority had been published in english (92.9%; n=13) and only 7.1% (n=1) in Portuguese. Regarding to the periodicals, there were 14 different magazines.

The majority (92.9%; n=13) was published in an international periodical and only 7.1% (n=1) in a national one. The data can represent a greater foreign interest about the questions that involve mining worker Health and an indicative that Brazil didn't wake up to the specifities that fall back HP, in which the scenery is gaudy, with work conditions among the degrading ones (LANDEM et al., 2011; BOSE-O'REILLY et al., 2010).

The publication period instituted for search were the scientific articles published between 2008 and 2013, however, no production was identified in 2013. Despite this, it was observed an increase in the researchers interest about the theme, once in 2008 were published 14.3% (n=2) articles, 7.1% (n=1) in 2009, 14.3% (n=2) in 2010, 21.4% (n=3) in 2011 and 42.9% (n=6) in 2012. According to the publication period it is verified the existence of current theoretical base, once 64.3% (n=9) were published in the last three years.

Regarding to the study type classification, the majority was characterized as Applied Research (experimental) or case study, both with 21.5% (n=3); lately the documental and intervention research had distinction with 14.4% (n=2), each. The case report, the action research, the observational study and bibliographic revision obtained 7.1% (n=1), each.

Handen et al. (2008) emphasizes the case study value, when affirm that this modality gives the exhaustive knowledge of a marked reality, in which the obtained results can reverberate in new hypothesis formulation serving to other researches sprout. About the Applied research it searches to product knowledge to be applied in the practice and implemented for specific problems resolution, as it is proposed when the ways for HP are established, mining diseases and Risks prevention.

In the studies characterization, three theme approaching (TA) were identified: TA1 – HP strategies and risks prevention; TA2 – occupational risks; and TA3 – effects over the health (table 1).

Table 01– Studies Central Approach

TA1 – HP STRATEGIES AND RISKS PREVENTION	
AUTHORS/YEAR	**CENTRAL APPROACH**
Bealko; Kovalchik; Matetic (2008)	To Discuss the Prevention workshop through the design mission in mining and the role of the four functional areas: the practice, the politics, research and education.
Di Giulio et al. (2012)	To analyze the risk communication strategies adopted with the local communities and evaluate their engagement in risk managing process.
Kailas; Chong; Watanabe (2012)	To propose two algorithms (probabilistic and no probabilistic) that followed tension states and turned possible to calculate a welfare index according to the stress levels.
Ghorbani; Bahrami; Farasati (2012)	To Verify the local ventilation systems efficacy and integrated collectors for atmospheric pollutant control in mining.
Apud (2012)	To analyze the present state of the knowledge about chilean mining ergonomy;
Monforton; Windsor (2010)	To evaluate the impact of a se curity training program implemented by the Mining Work Security and Health Administration Department (MWSHAD) of EUA in 1999, with rubble mining operation accident taxes. .
Sammarco et al. (2012)	To describe an experiment to verify if a visual alert syst em can improve the dangerous movement detection of machines that can result in accidents.
TA2 – OCCUPATIONAL RISKS	
AUTHORS/YEAR	CENTRAL APPROACH
Devine; Muller; Carter (2008)	To identify the personal perception of types and sources of security and oc cupational health in mineral extraction in the northeast of Queensland
Eger et al. (2010)	To measure simultaneously the posture and seat position during the operation of a load vehicle in a subterranean mining environment, in order to understand better th e relation among these variables and the vehicle design.
Lenné et al. (2012)	To create a greater comprehension of the systemic factors involved in mining sector accidents and examine the organizational failures that are predictors of performanc e below the pattern.
Elenge; De Brouwer (2011)	To identify risks in work places of the artisanal mining in Katanga
Patel; Robbins (2011)	To describe the characteristics of the work process in agate and silicosis industry in Khambhat, India
TA3 – EFFECTS OVER THE HEALTH	
AUTHORS/YEAR	CENTRAL APPROACH
Vearrier; Greenberg (2011)	To revise the literature about the adverse effects to the health and toxic expositions associated to mining operations carried out in altitude and discuss selection, presetting naturalization problems, and vigilance strategies in place.
Zubieta et al. (2009)	Evaluation of the work conditions and health status of the miners in a copper mine outdoor in Cananea, México.

From the defined TA, it was noted that in 50.0% (n=7) was approached the HP strategies and risks prevention, the occupational risks were approached in 35.7% (n=5) of the studies and the health effects in 14.2% (n=2). The data can reflect the link among the TA, as well as the comprehension that is through the risks identification that is possible the intervention strategies establishing over them, impacting positively over the health and LQ od=f the workers. Berkenbrock; Bassani (2010) affirmed that the risk managing is essential in work places, once it analyzes the risks, dangers and events to modify the reality found during the working process. Then, it is of fundamental relevance for the mineral extractive industry once is common the presence of physical, ergonomic, biologic, of accidents, chemical and psychosocial risks (LANDEM et al., 2011; BOSE-O'REILLY, 2010).

To end with the aim to answer the guide study question, as well as to make possible to reach the objective, was possible to identify in the articles, even in the ones that didn't present the central approach about HP and mining diseases and risks prevention, the interventions directed to the Worker Health. The fundamental contributions were:

- Apud (2012): suggests the implementation of participative programs. At the same time, is imperative that the projects in mining places include ergonomic concepts since the initial phases of the planning, as well as foment the ergonomy formation inside the firms, including managers and the workers, once they are directly affected by the lack of ergonomic actions. ;

- Di Giulio et al. (2012): is necessary to promote the public involvement in the discussion and decision making. Besides, the associative models (as the residents associations) are significant for promotion and stimulus to public participation in risks managing;

- Kailas; Chong; Watanabe (2012): the algorithms use (in smartphones, for example) to measure the tension land stress level may be viable to monitor the workers welfare, inducing actions to a healthy life.

- Ghorbani; Bahrami; Farasati (2012): the integrated collectors are a good option of air pollution control for industries with economic restrictions and ancient technologies

- Lenné et al. (2012): to reduce incidents and accidents in mining, is necessary to direct the actions for the organizational ambience, the operations and the inadequate supervision;

- Sammarco et al. (2012): the visual alert system makes possible to reduce accidents o involving continuous mining machines;

- Elenge; De Brouwer (2011): work surface humidification, work instruments adaptation and adoption of new technologies can reduce the impact of the work over musculoskeletal system;

- Patel; Robbins (2011): occupational health has been trying to find an efficient strategy to face these work conditions and protect the agate workers life and health. They obtained unlimited success and great challenges;

- Vearrier; Greenberg (2011): careful workers selection, acclimatization and local vigilance can help in health risks control;

- Zubieta et al. (2009): industrial hygiene to identify, evaluate, and control the health risks, including the exposition to mineral dust, acid fogs, solvents in the air, high levels of noise, high vibrations, extreme levels and temperatures;

- Eger et al. (2010): adaptations in the vehicles design permit the machine opereator yo see its inside and avoid accidents.

- Monforton; Windsor (2010): security training program with eight hours course by year;

- Bealko; Kovalchik; Matetic (2008): to implement the prevention program through the design, develop and keep the mechanism to efficient practices sharing, provide financial incentives, improve the health vigilance actions, bring up didactic books to date, create partnerships, promote trainings for all the involved social actors, stimulate the security and health cult in mining and communication;

- Devine; Muller; Carter (2008): the participative processes make possible a deep comprehension of the occupational health staff perceptions and the security risks in this environment. The Table for Health Promotion gave a relevant and useful tool to be involved with the staff and develop solutions for the problems in security and health.

The contributions for the HP field and Risks and Diseases Prevention were quite varied, with vigilance actions, social control, public policies, improvements in general work conditions, worker empowerment, among others. These results corroborate with the conjectures of Santos; Westfall (1999) for whom the area demands care and actions traditionally accepted and recognized, being politic strategies for inequality reduction, education, intersectoral cooperation, syndicalism and participation in the decisions that affect his work. In this context, Horta et al. (2009) focused the educative actions as a resolute measure.

CONCLUSION

With the appreciation of the selected and reviewed works, it is affirmed that was possible to reach the aimed objective, once the results evidenced the existence of countless ways capable of improve the miners LQ and, consequently, their health. In front of this, it isn't possible not to implement actions in HP field and Diseases and Risks prevention in mining.

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MINING HEALTH PROMOTION: A LITERATURE REVISION

ABSTRACT

To identify the scientific production published in indexed bases about Health Promotion (HP), Risks and Diseases Prevention in mining, through the comprehension of the initiatives reported in the sector interventions. Method: Literature Integrative Revision, with search in Health Virtual Library, using as main term the Descriptor Controlled Health Sciences (MeSH) “mining”, followed by ones “primary prevention”, “accidents prevention”, “health promotion” or “promotion in health”. Altogether, it was reached 154 scientific productions. After reviews careful reading, from which were applied the inclusion and exclusion criteria, they reached 14 articles. Results: It was clarified that the majority of the studies was published in english (92.9%) and in the last three years (64.3%). Regarding to the type of research, the greater part was characterized as a case study and applied research (21.5%, each). Considering the central approach, they were framed in three theme approaching: HP strategies and risks prevention (42.9%), occupational risks (42.9%) and health effects (14.2%), with varied contributions to HP field and Risks and Diseases Prevention. Conclusion: In front of so much possibilities, it isn't possible search for implementing HP and prevention actions in mining.

KEY-WORDS: Work. Mining. Occupational Risks. Health Promotion. Primary Prevention.

PROMOTION DE LA SANTÉ DANS L'INDUSTRIE MINIÈRE: UNE REVUE DE LA LITTÉRATURE

RÉSUMÉ

Identifier la production scientifique publiée dans les bases de données indexées sur la promotion de la santé, prévention des risques et des maladies dans l'industrie minière, à travers des initiatives rapportées concernant les interventions dans le secteur. Méthode: Revue intégrative de la littérature, avec recherche dans la Bibliothèque Virtuelle de Santé, en utilisant comme terme principal le descripteur “exploitation minière”, suivi par un des descripteurs suivants: “prévention primaire”, “prévention des accidents”, “promotion de la santé” ou “promotion de la santé”. Au total, nous trouvons 154 études scientifiques. Sur la base des critères d'inclusion et d'exclusion, nous sommes arrivés à 14 articles. Résultats: La plupart des études ont été publiées en anglais (92,9%) et dans les 3 dernières années (64,3%). En ce qui concerne le type de recherche, la plupart sont caractérisés comme étude de cas et recherche appliquée (21,5% chacun). En considérant l'objectif principal de l'étude, ont été classés en 3 approches thématiques: stratégies de promotion de la santé et prévention des risques (42,9%), risques du métier (42,9%) et effets sur la santé (14,2%), avec diverses contributions au domaine de la promotion de la santé et de la prévention des risques et maladies. Conclusion: Avec autant de possibilités, se montre indispensable mettre en œuvre actions de prévention et promotion de la santé dans la industrie minière.

MOTS CLÉS: Travail. Industrie minière. Risque du métier. Promotion de la santé. Prévention primaire.

PROMOCIÓN DE LA SALUD EN LA MINERÍA: UNA REVISIÓN DE LA LITERATURA

RESUMEN

Identificar la producción científica publicada en las bases de datos indexadas acerca de promoción de la salud, prevención de riesgos y enfermedades en la minería, por medio de las iniciativas reportadas con relación a las intervenciones en el sector. Método: Revisión integrativa de literatura, con búsqueda en la Biblioteca Virtual en Salud, utilizando como término principal el descriptor "minería", seguido por uno de los siguientes descriptores "prevención primaria", "prevención de accidentes", "promoción de la salud" o "promoción de salud". En total, encontramos 154 estudios científicos. Con base en los criterios de inclusión y exclusión, llegamos a 14 artículos. Resultados: La mayoría de los estudios fue publicada en inglés (92,9%) y en los últimos 3 años (64,3%). En cuanto al tipo de investigación, la mayoría se caracterizó como estudio de caso e investigación aplicada (21,5% cada). Considerando el enfoque principal, se clasificaron en 3 abordajes temáticos: estrategias de promoción de la salud y prevención de riesgos (42,9%), riesgos ocupacionales (42,9%) y efectos sobre la salud (14,2%), con variadas contribuciones al campo de la promoción de la salud y la prevención de riesgos y enfermedades. Conclusión: Con tantas posibilidades, se muestra indispensable implementar acciones de prevención y promoción de la salud en la minería.

PALABRAS CLAVE: Trabajo. Minería. Riesgo ocupacional. Promoción de la salud. Prevención primaria.

PROMOÇÃO DA SAÚDE NA MINERAÇÃO: UMA REVISÃO DA LITERATURA

RESUMO

Identificar a produção científica publicada em bases indexadas sobre promoção da saúde, prevenção de riscos e doenças na mineração, por meio das iniciativas relatadas quanto às intervenções no setor. Método: Revisão integrativa de literatura, com busca na Biblioteca Virtual em Saúde, utilizando como principal termo o descritor "mineração", seguido por um dos seguintes descritores: "prevenção primária", "prevenção de acidentes", "promoção da saúde" ou "promoção em saúde". Ao todo, foram encontrados 154 estudos científicos. Com base nos critérios de inclusão e exclusão, chegamos a 14 artigos. Resultados: A maioria dos estudos foi publicada em inglês (92,9%) e nos últimos 3 anos (64,3%). Quanto ao tipo de pesquisa, a maior parte caracterizou-se como estudo de caso e pesquisa aplicada (21,5%, cada). Considerando o enfoque principal, enquadraram-se em 3 abordagens temáticas: estratégias de promoção da saúde e prevenção de riscos (42,9%), riscos ocupacionais (42,9%) e efeitos sobre a saúde (14,2%), com variadas contribuições ao campo da promoção da saúde e da prevenção de riscos e doenças. Conclusão: Com tantas possibilidades, mostra-se indispensável implementar ações de prevenção e promoção da saúde na mineração.

PALAVRAS-CHAVE: Trabalho. Mineração. Risco ocupacional. Promoção da saúde. Prevenção primária.