

Original Article

The Experience of Miners Relocated to Alternative Positions due to Silicosis in the Andean of CODELCO, Chile, 2010

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Objectives: To understand the personal experiences of mine workers that have experienced job relocation due to silicosis at the Andina Division of Corporación Nacional del Cobre (CODELCO), Chile. The purpose of the study was to provide useful information for the development of new local, business and public policies for the care of workers with silicosis.

Methods: A qualitative study based on a practical case study of 5 workers. The information was collected by means of structured individual interviews. The method of analysis was phenomenology.

Results: The corporal axis was the most commented upon. It included awareness of the illness, body pains, fatigue, and antagonistic mood disorders (sadness, or the difficulty in finding meaning in life). As far as personal relationships, there was evidence of strong relationships with family, coworkers and friends, as well as extended family. Over all, the experience of relocation was positive with periods of impatience and uncertainty. The job reassignment provided a new and pleasant context for the relocated workers and in the process improved their perception of their quality of life.

Conclusions: A multidisciplinary team should attend mine workers relocated because of silicosis by addressing the mental and physical aspects of their disease, along with the integral participation of close family members. It is suggested that this investigation be maintain over time to record the personal experiences in the medium-term, adding new cases with the intention of shedding more light on the phenomenon being studied. As a preventive measure, continual workshops are needed on the proper use of respiratory protection in addition, a group of monitors is required.

Key Words: Silicosis, Job Relocation, Quality of Life, Experiences, Phenomenology, Miners

Introduction

Silicosis is an irreversible, potentially life-threatening occupational disease of the respiratory system that can cause physical disability. In the year 2003, the monitoring program of the Asociación Chilena de Seguridad (Chilean Association of Security)

evaluated 5,939 workers exposed to silica dust. Of these, only 17 workers ($2.85 \times 1,000$) developed the disease silicosis. Additionally, 69 workers ($11.62 \times 1,000$) were classified as suspicious (1/0 of the Organización Internacional del Trabajo [OIT] Classification). Of the 5,939 workers exposed, 44% were miners [1]. The mine worker that develops this condition, should be relocated or transferred to another job position.

To date, the evaluation of the ability to work and the limitations caused by chronic respiratory disease is a complicated issue, quite empirical and has personal and social repercussions [2]. Furthermore studies have revealed that individuals experience respiratory diseases in different ways. For example,

Received: August 24, 2011, **Revised:** March 12, 2012

Accepted: March 13, 2012, **Available online:** June 8, 2012

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there are studies of the quality of life, as related to health and negative emotions in patients diagnosed with chronic obstructive lung disease. It was noted that the patients experienced difficulties that limited their physical activity and personal care, which implied moderate or intense efforts. The disease caused significant impact in their daily activities (work and studies). Low energy levels and vitality (due to fatigue and exhaustion) manifested itself at a moderately high rate in silicosis patients [3].

Nevertheless, later the quality of life was studied as related to health and social support was perceived in patients diagnosed with pulmonary tuberculosis. Contrary to the results of previous studies, a good quality of life was observed in general. Physical ability was one of the highest dimensions indicating that there was no difficulty with limited moderate physical activity and there was self sufficiency in such activities as walking, climbing stairs, personal hygiene, and alimentation. The illness did interfere to a certain extent in daily activities such as work and recreational activities. As far as physical pain, the patients noticed little interference of pain in their daily activities at work and at home. Few patients complained of a lack of energy or vitality despite feelings of fatigue and exhaustion. There were few problems due to physical emotional health, which would have interfered with the normal social life of silicosis patients. Significant negative emotional levels (anxiety, depression, stress) were not observed, which allowed these people to have good control of their behavior and general sense of well being [4]. On the other hand, a nurse (1 case) who suffered from De Quervain's Syndrome, perceived the seriousness of the disease as she lived with the limitations of her own illness. This caused her to have feelings of loss, rebellion, and sadness. Nevertheless, once she came to terms with her illness and her newly developed condition, she defined new goals, which gave significance to her life [5].

On the other hand, concerning the reassignment of workers to new positions, the Social Security for Prevention of work related accidents and illnesses in Chile [6] in Article 71 defines it as the change of work location for those who contracted an illness because of exposure to an agent of risk and that this relocation assure that the person is free of the agent which caused the illness. Proposals and studies on this issue have been made in some countries.

In Spain, work relocation is supported by a method of evaluation of damage of muscular/skeletal injury, which is based on correcting, the sequence of ergonomic problems through redesigning the workplace or the relocation and alternative job position [7]. Molina et al. [8] observed that the reinsertion of workers with colorectal cancer into the workplace

influenced the sequela from the tumor or treatment, despite the fact that the majority of the patients did not believe that the illness would negatively affect them in their work.

In Santiago, Chile, the process of social and work-related reintegration was evaluated in workers who had suffered accidents in the workplace (82 employees). It was proven that 89% of the population returned to work, of whom 66.7% were totally or partially satisfied with the process of reintegration into the workplace [9]. At the same time, a case study of the factors which affect the severity of the workers disadvantaged with bronchial asthma was evaluated. It was found that the participants were interested and motivated improve themselves although there did exist a conflict between the negative perception of that the illness impact had on their daily lives and social participation, and the positive perception that they had experienced in general. A significant group was found to once again expose themselves to the risk factors with the possibility of worsening the symptoms of their illness, because they could not imagine other employment options besides that in which they formerly were employed [10].

Materials and Methods

Interpretive case studies were realized with naturalistic generalization through which we intend to discover elements, situations or processes not previously established to interpret the cases in the context in which they were presented.

The spatial parameters included the Andina division, a mining company that pertains to the National Copper Corporation, Chile located in the city of Los Andes, Fifth Region Cordillera. The temporal parameters, including the establishment of protocol, the development of the investigation and drafting of the documents was in the period comprised of April 2010 to January 2011.

First, the location of all the Andina division workers in process of relocation because of a silicosis diagnosis during the period of January to April of 2010 was mapped out mentally. Mapping is one of the basic elements in the beginning of qualitative work, which is rarely mentioned. It has to do with mentally positioning oneself in the place where the investigation will be carried out. Sandoval [11] indicates that it means to figuratively chart the map, since the real intention is to mentally approach the social reality or cultural object of a study, where the participants are clearly defined, the events and the situations in which the actors interact; the variations of the time and place of the actions that these develop; in other words, a complete picture of the most relevant features of the situation or phenomenon to be analyzed. In this study, charting the map,

or mapping meant identifying the people with Grade I silicosis, who were in process of having their workplace relocated, discovering the date they acquired the illness, and determining the medical diagnosis, and finding out the moment and precise place of the job relocation.

For the selection of the participants, a convenience sampling was used. The procedure for sampling was based on the taxonomy of Patton [12], which has its origin in practical consideration in that looks to obtain the most information in the least amount of time possible, in accordance with the concrete circumstances that surrounded both the investigator as well as the subjects.

Five workers from the Andina division of Corporación Nacional del Cobre (CODELCO)-Chile with a medical diagnosis of silicosis were selected. They had maintained their radiographic evaluation of the thorax with OIT technique in category 1 [13] during the relocation process and their diagnosis was made during the period between January to April 2010 (Table 1).

For the selection of the places, situations, events, and most appropriate timing, an open sampling was used [14]. The people chose the places and moments, and they were only asked to choose a date and a place where they would feel comfortable to talk freely without interruptions and that they plan for sufficient time. Of the five subjects relocated because of silicosis, three chose the gardens located at the Occupational Health Unit of the Río Blanco Clinic, and the other two chose their own home.

The data was collected through structured individual interviews recorded in audio. This type of interview is characterized by the advance preparation of a questionnaire guide that strives to protect the structure and objectives of the interview in a format that allows the interviewer to immediately deal

with any contingency which could arise during the interview without losing the thread of conversation, such as checking the operation of the recorder, or to resolve any issue which could arise unrelated to the conversation in progress. These things require the momentary attention of the interviewer, but should not greatly interrupt the interview. The qualitative focus of this type of interview opens the opportunity for exploring aspects derived from the answers of the interviewee in an unstructured manner (in other words, not in an overly planned but still systematic way) [11].

The interviewers began with a general, open ended question that allowed the person interviewed to respond in their own words. The first answer served as a base for the general questions which centered on the experiences, knowledge, feelings, opinions, values, sensory perceptions and context of the participants.

The analysis method was the phenomenological method, which proposes categories of analysis such as subject, subjectivity and significance, whose mutual affiliation are found in the concepts of inner life and experience [11]. According to Lanigan [15] the analysis of the interviews were done in three primary phases: description, reduction and interpretation. In the first 2 phases, they worked with the semantics of the interviews (facts), and operationally, it was carried out with the support of a computer program for analysis of qualitative data called Atlas/Ti version 2.4 (Universidad Técnica de Berlín, Berlin, Germany). In the interpretation they tried to include the experiences of each person in the sense of their life experiences in order to establish a sense of the information. The topics covered were interpreted according to the experiences of the four basic existential axis of phenomenology as proposed by Merleau-Ponty [16], which includes the physical experience (corporeity), the space (spatiality) the time (temporality) and of human relations (communality).

Authorization to conduct this study was given by the authorities of Clínica Río Blanco and the Andina Division of CODELCO-Chile. The persons interviewed gave informed consent. No intervention or modification of treatment was intentionally given to the individuals. This was solely done through interviews, therefore it was a study with minimal risks. Nevertheless, the authors were committed to managing the information under the standards established by the International Code of Medical Ethics [17].

Table 1. Sociodemographic characteristics of relocated mining workers

Name*	Education	Seniority at work (years)	Age (years)	Seniority at the location (month)
Dario	High school	> 20	49	3
Diego	Technique	> 20	52	3
Alberto	University	> 20	53	3
Rodrigo	High school	> 20	54	3
Honorato	High school	> 20	59	3

*The name is fictitious to maintain confidentiality of respondents.

Results

Bodily experience

It became evident that the corporeal aspect of the study became

the axis about which most commentaries were expressed. The workers proved to have been conscious of the fact that their exposure to silica dust in the workplace, could, at some point in their work life, cause them to develop the disease. This consciousness of the risk was communicated to their families since they were all aware that the illness could present itself sooner or later.

On finding out their initial diagnosis, the respondents reported feeling sad and having lost interest in life. They were not physically affected by the disease since it did not generate symptoms. They were only aware of a sense of fatigue and that their days seemed longer. Their vitality was diminished due to the disease. As regard to their mental health they did not feel affected, but they perceived that something in their life had changed, since their mind was more occupied worrying about the future and their family.

During the relocation process the majority of the workers still did not feel the physical effects of the disease.

It would appear that it was difficult to accept the illness even though they were conscious that it could appear at any time. When they heard they were to be relocated, they felt a sense of loss in terms of their role and ability at work.

Once the relocation occurred, they recovered from the sense of loss, but began to feel physical pain, especially in their back. They felt an increased vitality as their desire to be active returned. The fact that their bodies improved was probably due to the fact that they once again felt useful at work. They also described feeling nervous. This continued even after the work relocation, probably due to the uncertainty of the future.

Human relationship experiences

4 workers, 80%, once they were relocated, their familial relationships improved considerably. The social relationships centered primarily on their wives and children, developing a pleasant and joyful atmosphere. The illness seemed to play a transcendent role causing them to appreciate and care for their loved ones in a more deliberate way.

Nevertheless, the reception in their new work environment was painful. Some perceived rejection by their peers. Some colleagues seemed to look down on them. This caused insecurity, which could partially explain why their social lives revolved around their loved ones.

They recognized that the relationships they had formed in the mine were lost when they were relocated. They spoke of having shared “the miner culture” with their coworkers. Before they were diagnosed with the illness, their work relationships were very good. During the process of relocation they manifested that they had conflicts with those who would define the

location that would be the most optimal for their reinsertion into the workplace.

For the majority of the individuals, after having been incorporated into the new location for a period of time, work relationships improved. This produced a feeling of well being as they began to feel useful to the company once again. Only one of the workers expressed feeling alone against the world, since even after time he continue to feel rejected by his new coworkers. He expressed feeling like a stranger in his own home, since he had always lived much of his life in a mining camp. He told of his wife being annoyed by seeing him at home every day before he was relocated.

As time passed, the social life of the majority of the workers was not affected. They maintained their normal social ties, with coworkers, friends, and family members. The relocation allowed them to emerge from underground mining and to be able to cohabit with new fellow workers and above all, with their families.

Time experience

The workers explained how before the relocation, they felt that time passed very quickly. All their work was mechanized. They felt they spent too much time working on the interior of a subterranean mine and very little time seeing the sun. All were conscious that, at any moment in the work life, since they were being exposed to silica inside the mine, they could develop silicosis. The risk had been identified. However, they still did not always use the security equipment, specifically the respiratory protection, even though they were provided for their use by the company.

The wait to be relocated once they knew they suffered from the disease was considered to be the worst, which caused them to classify the time element of this phase to be a negative experience. It was a long process. The workers felt that once they had been diagnosed, time was no longer the same. They no longer contributed to the company and they feared that it would no longer be interested in their presence. Besides that, they heard many negative comments from their coworkers about their reintegration. Part of this insecurity was based on their work contract. When they were hired, it was because the company had a need and they could supply that need, for example, as an industrial mechanic. This never ending wait before relocation caused them to feel useless.

After relocation the experience of time was a positive one, since they felt that once again they could contribute to the company. They felt free. One worker considered the experience of having worked in the Andino division of CODELCO like the dream of a lifetime to have been able to work for such a great

company.

Space Experience

In general the persons agree that the context in which they were surrounded after the relocation was very good. They could spend more time at home since they did not have to work night shift nor weekends. They manifested gratitude to the company for giving them a second opportunity to continue working and therefore be able to support their family. This new life resulted in a pleasant environment in their new labors which, according to them, improved their quality of life.

The only exception to the above was the worker who began to have difficulties in his home, since being home for more time caused disputes over the control of the space which had been, until then, under control of the wife. In addition, he mentioned his loss of identity with the company when he was considered himself to be a nuisance.

All agreed that being free of a contaminated environment, improved their health considerably for which they emphasized their appreciation of being relocated except that it did affect their level of remuneration.

Discussion

The general objective of the study, that of understanding the life experiences of job relocation of mine workers from the Andina division of CODELCO-Chile who had been diagnosed with silicosis, was accomplished.

The feelings of low energy and lack of vitality found in the workers with silicosis are similar to those found in patients with chronic obstructive pulmonary disease [3] and with pulmonary tuberculosis [4]. In general, they also shared a lower level of problems with their physical health and absence of serious emotional problems.

The experience of the disease and assuming the consequences in the workplace provoked feelings of loss, worry, and sadness, as it did in the case of the nurse with De Quevain's Syndrome [5]. Once the patients were relocated, they were able to overcome these issues.

The job relocation allowed the workers to avoid the risk factors and prevent the illness from worsening in contrast to other Chilean workers who after a serious work related disease returned to the same job position since they were unable to visualize other alternative employment opportunities outside their previous field of work [10], as is also evidenced in other studies reported by the same author [9].

The information gathered was useful for the development of new local, business, and public policies, for the acceptance

of workers with silicosis, includes above all the insistence in the prevention of the disease. The workers recognized that they were conscious of the risk and still avoided using the personal protection. The workers enjoyed their work in the mine; in fact so much so that they forgot to take care of their health. Because of this, management should be strict and insistent in the prevention of the illness.

Despite the few physical and mental discomforts caused by silicosis, the removal of the workers from their workplace and keeping them waiting over a long period of time while the paperwork for the relocation was completed generates important motional effects such as loss of role, of social relationships, insecurity in life, feelings of uselessness, sadness, lack of vitality and tiredness as well as conflicts with the persons involved in defining the optimal place for their job relocation.

It is precisely during the phase of removing the worker from one place to another when the support programs should be implemented. The workers expressed that the waiting period seemed eternal. On the other hand, it is important to identify early on workers with family conflicts, since among them negative sentiments prevail, even after the end of the waiting period.

The program of intervention for the relocation of workers also should take into consideration that some fears, such as the lack of acceptance on the part of coworkers, are well founded since in the beginning the rejection was very real for the relocated workers. In this sense it is important to sensitize the new coworkers to avoid painful receptions and stigmas. The identification of foot and back pain, although not indicative of the illness, can indicate unresolved emotional or mental problems. Preparation of the workers to positively confront uncertainty for the future should be considered.

As mentioned by Montemayor et al.[2], chronic respiratory diseases are still a complex issues, very empirical and of indisputable personal impact, which therefore necessitates continued study of the issue.

To develop local, business and public policies aimed at adopting preventive measures in the mining industry in order to prevent silicosis. The mine worker with silicosis should be received by a multidisciplinary team in both physical and mental aspects, with close family members being involved in the process.

Workshops on the use of respiratory protection should be continually offered, and the formation of monitors within the workers to insure the proper and continual use of the protective gear.

Finally, keep this study in time and learn what happens to this population over the medium-term and of course, to add new cases of workers to form a cohort so that this design can

shed more light on the phenomenon studied.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Acknowledgements

To Dr. Giancarlo Roma Chahud, Director of Occupational Health for the Andina Division of CODELCO-Chile for his undeniable support in the development of this investigation. And to the workers who participated in this study, which will undoubtedly open areas of knowledge in the occupational health in the qualitative dimension.

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