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A Scoping Review of Causal Associations between Occupation and Cancer Occurrence and Legal Burden of Proof

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Abstract

Occupational diseases, characterized by the gradual accumulation of work-related harmful effects over extended periods, often lack a distinct, identifiable incident causative of the disease. This ambiguity in pinpointing the work-relatedness of such diseases stems from the intricate interplay between occupational risks, workers' pathophysiological predispositions, and pre-existing health conditions, all of which evolve slowly over time. Consequently, establishing a definitive causal relationship between occupational exposure and disease manifestation becomes a pivotal, yet challenging, aspect in securing industrial accident insurance benefits. In contrast to occupational accidents, where causality is relatively more discernible, the complexity escalates in the context of occupational diseases. Typically, employers maintain the majority of data pertinent to establishing causality, but this data is frequently inadequate. Furthermore, the onus of proving the work-relatedness of a disease falls on the worker, a process that necessitates specialized medical knowledge, thereby compounding the difficulty. Imposing the burden of proof on workers in occupational disease litigation could lead to a lapse in worker protection. This paper critically explores methodologies to safeguard workers, focusing specifically on the burden of proof concerning causality in occupational diseases. This analysis aims to highlight the challenges workers face in establishing a connection between their work and disease, proposing potential legal and policy solutions to ensure more equitable and just outcomes in occupational disease claims.

Keywords: Occupational disease- cancer- burden of proof- South Korea

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Introduction

In the paradigm of the modern capitalist economy, the employer's liability for work-related incidents initially aligned with general tort liability but has progressively integrated into the realm of social security law to enhance worker protection. However, the judicial assessment of causality in occupational diseases predominantly adheres to the theory of probable causality. Consequently, the burden of proof typically resides with the worker, the plaintiff, mirroring the structure of a general tort case. Occupational disease encompasses any illness contracted by a worker due to exposure to harmful factors in the course of employment, or diseases medically linked to physical harm resulting from an occupational injury. Under industrial accident insurance, occupational diseases are categorized into two types: accidental diseases, which arise unexpectedly in correlation with work, and occupational diseases, attributed to the work environment or harmful factors therein. Accidental diseases are identifiable by specific disasters, with clear temporal and spatial dimensions. In such instances, establishing work-relatedness is comparatively straightforward, as the physical trauma resulting from the accident is apparent and can be correlated with bodily harm. Conversely, occupational diseases develop insidiously, stemming from prolonged exposure to harmful work-related factors. The absence of a clear, singular causative event complicates the attribution of these diseases to work conditions. The complexity in discerning causality is further exacerbated by the interplay of these harmful effects with the worker's existing pathological predispositions and diseases, coupled with the gradual onset of symptoms. Occupational diseases can be broadly classified into two scenarios: exposure to hazardous substances and exposure to excessive workload or stress. Both scenarios significantly impact worker health, potentially leading to illnesses. This paper delves into case law examples where the onset of tumors as an occupational disease was contentious, scrutinizing the challenges inherent in establishing causality in such diseases. By examining various case types, the paper aims to elucidate the multifaceted nature of causality determination in occupational diseases, highlighting the intricacies and legal challenges faced in these adjudications.

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General legal theory of causality

For claims for damages to be acknowledged in civil law, legally significant factual causation must exist [1][1]. When direct violence consecutively gives rise to succeeding damages, liability for damages is established in terms of the extent to which causation is to be legally acknowledged. The causation demanded by liability for default (non-performance of obligations; Article 390) and liability for illegal acts (torts; Article 750) in the South Korean Civil Act is factual causation [2]. As for compensation for damages due to default, general damages are the limits; and, as for damages due to special circumstances, debtors have liability for compensation only when they were aware of those circumstances (Article 393).

In the legal framework of South Korea's Damage Compensation Act, the prevailing theory and judicial precedents concerning legal causation adhere to the theory of proximate causal relations. This theory recognizes liability for compensation in cases where causal connections possess substantial significance. The majority theory evaluates the substantiality of causation without differentiating between the conditions for establishing liability for damages and the extent of compensation for such damages. However, the assessment of causation legally presupposes the existence of factual causation. This prerequisite is essential for attributing liability for damages to debtors or perpetrators in relation to incurred damages. In instances of compensation for default damages, the linkage between contractual non-fulfillment and resultant damages is typically unambiguous. Similarly, in cases of illegal acts where no contractual ties exist between the parties, the factual causation between the act of violence and the resultant damages is evident. The same applies to medical malpractice cases, where there is a factual causal link between the medical intervention and subsequent damages. Nevertheless, certain scenarios, such as environmental pollution or medical malpractice, present complexities in conclusively ascertaining whether the damages are directly attributable to the actions of the alleged perpetrators. In medical malpractice, the variability in patients' underlying conditions and their individual responses to treatment complicates the determination of damages directly caused by medical actions.

To specifically identify the components of medical actions that constitute harmful or violent acts, the focus shifts to scientific and medical assessments. However, legal evaluations, in the context of medical lawsuits, necessitate normative assessments that incorporate medical expertise [3]. In medical malpractice litigation, establishing factual causation is crucial for determining liability for compensation and the extent of responsibility. When physical reactions vary among individuals, and damages arise from multiple contending actions, ascertaining substantiality becomes challenging. Thus, in medical malpractice cases, once liability for damages is established, compensation typically covers all damages within the causal chain.

In such cases, the burden of proof lies in demonstrating the causal relationship between the medical actions and the patient's injuries or death. Direct evidence, although ideal, is often impractical in medical malpractice cases, leading to reliance on circumstantial evidence [3]. The plaintiffs, usually patients, must establish a causal link between medical actions and damages to a degree that convinces the judge of its high probability [4]. Although medical knowledge is requisite in these lawsuits, the nature of evidence differs from that in scientific contexts. Applying the general principle of proving causation to convince judges verbatim in medical malpractice cases encounters practical challenges. The variability in patients' physical predispositions and treatment responses negates the empirical assumption that identical measures yield identical outcomes. Therefore, demanding proof of causation to a degree that convinces judges significantly increases the probability of plaintiffs, who bear the burden of proof, losing the case. In recognition of the objectives of compensation systems, which aim to fairly and validly allocate damages, there is a case for moderating the standard of proof in medical malpractice cases. Indeed, numerous rulings in such lawsuits have accepted causation based on substantial probability, rather than demanding an unequivocally high degree of probability[2].

In medical malpractice litigation, establishing causation is intricately linked to ascertaining physician negligence, which is considered the causative action. Courts have recognized de facto causation based on judicial precedents when there is temporal proximity between the medical action and the resultant harm, the likelihood of damage occurring due to the medical intervention is non-negligible, and it is implausible for causes other than the medical action to have intervened. Thus, the imposition of liability on physicians hinges on their negligence, constituting the causative action. However, patients often face substantial challenges in proving the presence or absence of medical negligence. Judicial precedents have, therefore, shifted the onus by presuming negligence and lessening the proof burden on patients when medical negligence seems evident to the common sense of the public. Nonetheless, the complexity of adjudicating breaches in the duty of care, contingent on professional medical knowledge, necessitates a more lenient burden of proof for patients to facilitate more equitable legal causation judgments.

In civil law, responsibility for default or illegal actions is predicated on factual causation. Hence, the establishment of factual causation is essential for recognizing claims for damages based on the theory of proximate causal relations. However, in medical malpractice lawsuits, it is arduous for plaintiffs, the patients, to demonstrate a causal link between their medical providers' actions and the ensuing damages to a level that convinces judges of its high probability. Therefore, in scenarios where violent presumptions are plausible, where there is a significant statistical likelihood, or where alternative causes are

[1], The Decision of the Supreme Court of Korea 99Da67147 (2000. 3. 28.). [2], The Decision of the Supreme Court of Korea 2009Da82275 (2012. 1. 27.); The Decision of the Supreme Court of Korea 2008Da22030 (2009. 12. 10.); The Decision of the Supreme Court of Korea 2004Da52576 (2005. 9. 30.)

unlikely to have intervened, the burden of proof borne by the plaintiffs is alleviated. This mitigation acknowledges the inherent difficulties faced by patients in proving causation and aligns with the principles of fairness and justice in medical malpractice claims.

Case review

#1 A case in which hazardous substances present in the work environment were claimed to be the cause of lung cancer, and there was another possibility of developing the disease due to the worker's smoking history[3].

The worker in question, now deceased, was employed as a facilities engineer responsible for the installation and maintenance of exposure equipment at a semiconductor and liquid crystal display (LCD) factory from 2000 to 2013. Diagnosed with primary lung cancer (adenocarcinoma) with metastasis to the right pleura in 2012, the worker underwent chemotherapy, yet the cancer metastasized to the brain in 2013, leading to his demise within the same year. Notably, in semiconductor and LCD manufacturing environments, such as the deceased's workplace, the presence of benzene, formaldehyde, ionizing radiation, and nickel is commonly reported. According to the International Agency for Research on Cancer, ionizing radiation and nickel are classified as substances with sufficient evidence of causing lung cancer, while benzene is categorized as having limited evidence. The relationship between formaldehyde and lung cancer, despite some positive correlations, remains inconsistently substantiated, precluding a definitive classification.

The Seoul Administrative Court recognized a work-related causation for the worker's illness. It is acknowledged that lung cancer's latency period, influenced by carcinogenic factors, can be abbreviated under exposure to multiple carcinogens. The relatively young age at which the worker developed lung cancer and the absence of known causes, pre-existing conditions, or family history of lung cancer were deemed contributory in establishing a causal link. While the worker had a smoking history of approximately 15 to 20 years prior to diagnosis, the cancer type adenocarcinoma is known to have a lower correlation with smoking. Furthermore, the rapid progression of the cancer, atypical of standard cancer trajectories and unresponsive to treatment, led the attending physician to hypothesize that occupational factors, alongside smoking, were likely contributory to the worker's lung cancer and subsequent death.

Establishing a clear causal link between specific diseases and suspected hazardous substances in high-tech industrial environments requires extensive research, often impeded by the time-intensive nature of such studies. Complicating matters further, the composition of many chemical products, such as photoresist used in semiconductor fabrication, is often a trade secret and not publicly disclosed. Given these circumstances, it is plausible that the array of hazardous substances to which the worker was exposed played a complex role in the onset and exacerbation of his lung cancer. The court, therefore, inferred that these occupational exposures, in conjunction with smoking, synergistically contributed to the development and progression of the worker's lung cancer, culminating in his death.

#2 A case where hazardous substances present in the work environment were claimed to be the cause of the brain tumor, and it was difficult to find another cause for the worker[4].

The deceased, a former worker at a semiconductor plant, was responsible for inspecting semiconductor chips for approximately five years, retiring in 2003 to become a full-time housewife. Diagnosed with a brain tumor (glioblastoma) in 2010, she underwent surgical removal of the tumor and succumbed in 2012 during chemotherapy. Prior to her employment, the deceased had no significant health issues, genetic predisposition, medical history, or family history of brain tumors. Notably, she developed the brain tumor in her 30s, significantly earlier than the average age of onset.

A 2010 epidemiological investigation by the Korea Occupational Safety and Health Research Institute, prompted by the deceased's application for medical care benefits, detected low concentrations of benzene at certain locations in her workplace. A concurrent work environment survey measured a low level of non-ionizing radiation in the facility. However, the investigation did not measure exposure to other carcinogens such as formaldehyde, ethylene oxide, and lead. Subsequent social concerns about semiconductor plant risks led the Institute to conduct further studies on the workplace environment and other workers who developed brain tumors post-employment. These studies found that benzene, formaldehyde, and non-ionizing radiation levels were below exposure standards, but lead was detected in solid dust following high-temperature testing, indicating potential smoke emission containing lead during short circuits.

The Supreme Court concluded that the deceased was continually exposed to various carcinogens for about six years. Even if carcinogen levels were within exposure standards, long-term exposure could pose health risks. The exposure standards typically assume a single carcinogen's presence, not accounting for scenarios with multiple carcinogens, extended work hours, or high work intensity. In environments with combined harmful factors, such as shift work, the disease risk may increase due to the synergistic effects of these factors. The Korea Occupational Safety and Health Research Institute's epidemiological investigation into this case, conducted years after the deceased's employment, faced limitations in accurately representing the work environment during her tenure. Given these constraints, the original judgment was overturned and remanded, acknowledging the investigation's limitations in establishing probable causality.

[3], The Decision of the Seoul Administrative Court 2017Guhap84082 (2020. 9. 11.). [4], The Decision of the Supreme Court of Korea 2016Du1066 (2017. 11. 14.) . [5], The Decision of the Supreme Court of Korea 2000Du4538 (2001. 7. 27.)

#3 A case where a worker with a pre-existing condition rapidly worsened the condition due to overwork[5].

The deceased worker, who was identified as hepatitis B antigen positive in 1994, continued to endure a workload that was excessive relative to his health condition. He was diagnosed with a primary liver tumor in 1997 and passed away in 1998. Both the initial trial and the Supreme Court acknowledged that while the worker's hepatitis B infection in 1994 was not a direct consequence of his employment, the progression of the disease was exacerbated by the physical and mental stress associated with his continued employment post-infection. The court determined that the rapid deterioration of his health condition, surpassing the typical progression rate of hepatitis B, constituted an occupational disease. Consequently, his death was legally recognized as resulting from this occupationally exacerbated condition.

Determination of causal associations between occupational diseases

The array of occupational diseases delineated herein falls into distinct categories: those arising from exposure to hazardous substances in the workplace, and those resulting from overwork or stress. Additionally, there are instances where workers possess pre-existing health conditions or predispositions that may precipitate the onset of such diseases. These situations can be further differentiated based on whether habitual factors, such as lifestyle choices, are present or absent. Each category exhibits characteristics that may either be common across occupational diseases or unique to a specific group.

A recurring challenge in occupational disease cases is the lack of definitive evidence linking the worker's ailment to a risk factor present in the workplace. This is particularly pronounced when the workplace risk involves hazardous chemicals, and the disease in question is rare or newly emerging in high-tech industrial settings. The causative relationship between suspected factors and the disease often remains elusive due to current limitations in medical and natural science research. Despite extensive epidemiological studies in various countries, including the United States, a clear correlation between work history and cancer incidence is yet to be firmly established [5]. Additionally, companies frequently withhold information about harmful factors in the work environment, citing trade secrets. This was evident in the Samsung LCD industrial accident lawsuit, where Samsung did not fully comply with a request to submit a comprehensive workplace diagnosis report. Similarly, in a case involving POSCO workers, the composition of water-soluble cutting oil, a suspected carcinogen, remained undisclosed by the company. This paucity of information significantly hampers workers' ability to establish causal links.

Moreover, occupational cancers caused by hazardous substances pose unique challenges in proving causality due to their long latency periods and the difficulty in pinpointing the timeline from exposure to disease onset. For instance, the worker in Case 1 was diagnosed with lung cancer 12 years post-employment, while the worker in Case 2 developed a brain tumor 7 years after a 5-year tenure in a hazardous workplace. Proving causality is further complicated when workers have additional disease-causing factors beyond workplace exposure. For example, the worker in Case 1, with no known predisposing factors for lung cancer, was a long-term smoker, while the worker in Case 2 had no significant health issues or genetic risks for brain tumors. In Case 1, the Supreme Court acknowledged that workplace carcinogens and smoking had a synergistic effect, despite the low correlation between smoking and adenocarcinoma lung cancer. Additionally, overwork and stress are known to exacerbate existing conditions like liver or lung diseases. In Case 3, a significant duration elapsed between the onset of overwork and the rapid progression of an existing disease leading to death, but this is not always the case; many instances occur where diseases manifest shortly after the commencement of excessive workloads[6]. In the case of brain and cardiovascular diseases, there is often no significant difference between the time of overwork or stress and the time of onset. The claim that overwork or stress caused cancer is not well accepted. Precedents generally infer that there is a medical causal relationship directly with diseases that may be a cause of the onset or worsening of a disease, and that the cause of the onset or worsening of the disease is unknown due to overwork and stress in the course of work. They are expressing their position that it is difficult[7].

In instances where overwork and stress are implicated in brain and cardiovascular diseases, establishing a causal relationship remains a complex endeavor. This complexity was evident in the 2021 ruling. The difficulty in ascertaining causality, even when the onset of symptoms closely follows periods of intense work-related stress, stems from an incomplete understanding of how such stress physiologically impacts cerebrovascular or heart diseases. While there is some understanding of how stress-induced catecholamines can affect the cardiovascular system potentially elevating blood lipid levels and increasing the risk of blood clotting, thereby heightening the likelihood of myocardial infarction the mechanisms by which continuous stress response promotes thrombotic reaction and leads to a hypercoagulable state are not fully elucidated.

The multifaceted nature of fatigue, induced by overwork, involves a range of influencing factors such as age, gender, physical and mental health, psychological condition, personality type, life experience, and overall health status. Consequently, the etiology and pathogenesis of death attributed to overwork remain largely undefined. In cases where overwork and stress are hypothesized as triggers for cerebrovascular disease, the presence of other potential causative factors, including the worker's medical history, smoking habits, or other lifestyle factors, often complicates the causal analysis. This multiplicity of potential contributing factors is a characteristic frequently observed in occupational disease cases. The lack of clear pathogenesis in most occupational diseases

[6], The Decision of the Supreme Court of Korea 91Nu4751 (1991. 10. 22.). [7], The Decision of the Supreme Court of Korea 98Du4740 (1998. 5. 22.)

further exacerbates the challenge of determining causality, underscoring the need for a more nuanced understanding of the interplay between workplace stressors and health outcomes.

Burden of proof of occupational disease

In cases of occupational disease, workers typically initiate the process by applying for insurance benefits from the Korea Workers' Compensation and Welfare Service. Decisions made by this Service constitute administrative dispositions, and any objections to these decisions are addressed through administrative litigation. Therefore, it is crucial to examine the distribution of the burden of proof in administrative litigation, particularly in the context of occupational disease lawsuits. Under the legal requirements classification theory applicable to occupational disease lawsuits, the establishment of a significant causal link between the workplace and the disease is a prerequisite for the entitlement to benefits. Consequently, the burden of proving this causal relationship primarily rests on the worker. However, considering the unique characteristics of administrative litigation, questions arise regarding a potentially different allocation of the burden of proof.

According to the theory of attribution of constitutional order, occupational disease lawsuits represent a scenario wherein injured workers pursue an expansion of their rights and interests. Therefore, it is presumed that the burden of proof should lie with the workers. This interpretation aligns with the current legal framework, which posits that demonstrating a causal link in occupational disease lawsuits is a fundamental condition for workers to qualify for protection under the accident compensation system. Consequently, it is deemed reasonable that the burden of proof is essentially borne by the worker. This stance is also consistently upheld in case law, which maintains that the responsibility for proving causality in these instances falls on the worker[8]. The evolution of the industrial accident compensation insurance system, since its inception, has seen a marked strengthening of its role as a social security mechanism. In light of the escalating risks of occupational accidents in contemporary society, the consequent jeopardy to workers' right to survival, and the absence of a robust alternative social security system to secure the livelihoods of injured workers, the industrial accident compensation insurance system undeniably assumes a critical function in safeguarding workers' financial stability. This context underscores the imperative for heightened protection of workers in occupational disease lawsuits, arguably surpassing the necessity observed in other types of modern litigation.

Given these circumstances, there is a compelling rationale to interpret the scope of occupational diseases as broadly as possible, aligning with the underlying ideology of the industrial accident compensation insurance system. Such an approach not only aligns with the system's foundational intent but also serves to extend the protective umbrella to encompass a wider range of injured workers, thereby reinforcing the system's role as a pillar of social security. This expanded scope of protection is not just a legal imperative but also a moral one, recognizing the heightened vulnerabilities faced by workers in the face of occupational hazards.

In order to prove a fact in a lawsuit, a high degree of probability must be revealed so that the judge can be confident. However, in so-called modern litigation, there are attempts to alleviate the burden of proof for causal relationships by lowering the degree of proof according to the theory of probability. According to this, it is sufficient for the victim to prove that there is a significant possibility that a causal relationship exists, and the actual burden of proof shifts to the perpetrator. However, probability theory has problems in ensuring objectivity of judgment because the concept of probability is ambiguous. In other words, if the plaintiff's proof is sufficient to establish probability, the defendant's counterevidence only needs to contest the degree of probability. Therefore, there is criticism that it is difficult to substantially contribute to the protection of victims. In occupational disease lawsuits, precedents[9] state that the causal relationship must be proven by the party claiming it, but the causal relationship does not necessarily have to be clearly proven medically or scientifically. Taking into account all circumstances, such as the worker's health condition at the time of employment, the cause of the disease, whether there were pathogenic substances in the workplace, and the period of work in the workplace with the pathogenic substances, there is a reasonable gap between work and disease or death resulting from it. The court ruled that even in cases where it is inferred that there is a causal relationship, the causal relationship is proven. In other words, worker protection is sought by reducing the degree of proof of causality according to the theory of probability.

In a recent legal dispute involving a semiconductor factory, the causation of leukemia among workers and its potential work-relatedness was deliberated. Despite the absence of definitive evidence of exposure to harmful or risky factors during employment, and the fact that most identified risk factors in the work environment were below 1% of the exposure standard, the court presumed a strong work-related causation within the bounds of medical knowledge. The responsibility to refute this presumption was placed on the employer. This decision was reached notwithstanding the complexity of the work process, the specialized nature of the chemicals used, and the lack of consensus in expert medical opinions.

The ruling acknowledged a significant causal relationship between work activities and the onset of the disease, even though there was no clear evidence of actual exposure to harmful factors at work or that the level of exposure was sufficient to cause the disease. The plaintiffs' exposure to harmful factors such as benzene and ionizing radiation was inferred through various indirect facts. Consequently, the court concluded that the plaintiffs' acute myeloid leukemia was attributable to occupational exposure, thereby shifting the burden of proof and validating the claims of two plaintiffs.

[8], The Decision of the Supreme Court of Korea 2012Du17070 (2014.11.13.). [9], The Decision of the Supreme Court of Korea 96Nu14883 (1997.2.28.)

While the probability theory employed in this case somewhat addresses the challenge of proving causation in occupational disease lawsuits, it is not without its limitations. These include ambiguities in the extent to which probability must be established and the inherent constraints of evidence availability or medical knowledge. The lack of definitive evidence still poses a significant hurdle, making it challenging to sufficiently ease the burden of proof as a means of protecting workers. In the same case, the claims of three other plaintiffs were dismissed, suggesting that while a potential causal link between their work and the disease was acknowledged, it failed to meet a substantial degree of probability. This outcome underscores the complexities and nuances in adjudicating occupational disease claims, where the interplay of legal, medical, and occupational factors must be carefully balanced.

In a case where it was argued whether the leukemia that occurred among workers at a semiconductor factory had a causal relationship with work, the court strongly assumed that the cause of the disease was work-related, within the scope consistent with medical knowledge, and placed the burden of disproving the case on the company[10]. In particular, although the detailed work process and various chemicals used were specialized and the expert opinions submitted in the medical field were not unified, a significant causal relationship was estimated between work performance and the cause of the disease. In the above ruling, there was no clear evidence that the worker was actually exposed to harmful or risky factors at the time of work, or that the level of exposed harmful or risky factors was sufficient to cause disease. In addition, although most of the harmful and risk factors identified as a result of the work environment measurement were less than 1% of the exposure standard, the possibility that the plaintiffs were exposed to the harmful and risk factors was acknowledged through various indirect facts. Taking this into consideration, it was determined that the plaintiffs died from acute myeloid leukemia due to exposure to hazardous substances such as benzene and ionizing radiation while performing their duties, thus relieving the burden of proof and citing the claims of two of the plaintiffs. It is true that the probability theory can to some extent solve the problem of difficulty in proving workers' causal relationships in occupational disease lawsuits, but the probability theory itself has its limitations in that it is unclear to what extent probability must be proven, and there are limitations in the probability theory itself, such as the ubiquity of evidence or medical knowledge. Given that the lack of certification may still be a problem, it is difficult to alleviate the burden of proof as a sufficient measure to protect workers. Meanwhile, in the above case, the claims of the remaining three plaintiffs were dismissed, and it appears that although there was a possibility that a causal relationship existed between work and the disease, it did not reach a significant degree of probability.

Future Challenges

Epidemiological evidence, the application of the law of obstruction of proof, and the establishment of systems ensuring workers' right to knowledge have inherent limitations, particularly in substantiating the causal relationship in claims for damages due to violations of safety considerations. These approaches, while potentially helpful, may not constitute comprehensive solutions to the challenges workers face in proving causation in occupational disease lawsuits. A more lenient or shifted approach to the burden of proof regarding causal relationships appears necessary to protect workers, yet current applications of probability theory, as seen in precedents, fall short in offering adequate worker protection. However, completely shifting the burden of proof raises concerns in the context of the nature of occupational diseases and the objectives of the Industrial Accident Compensation Insurance Act.

It is generally accepted that the worker bears the primary burden of proving the causal link in occupational disease lawsuits. The theory of indirect rebuttal is employed, where the worker is required to prove certain indirect facts pertinent to establishing the causal relationship between work and disease. The Korea Workers' Compensation and Welfare Service, on the other hand, should shoulder the proof burden in areas necessitating specialized knowledge or where evidence is dispersed. If uncertainty about the causal relationship persists following both parties' efforts, the resultant disadvantage unfortunately falls on the worker, making a complete shift of the burden of proof challenging.

In adjudicating the causal relationship between work and disease, it is necessary to distribute the proof burden via the theory of indirect rebuttal, particularly in terms of the litigation process's proof subject. While establishing a causal relationship is a prerequisite for workers to qualify for benefits under the Industrial Accident Compensation Insurance Act, areas demanding legal evaluation, such as causality, are not easily classified as 'facts' in the traditional sense of proof. Given the near impossibility of proving the entire causal process in detail, causality is typically inferred through indirect facts that realistically suggest its existence. Therefore, the focus should be less on who bears the burden of proving the causal relationship and more on identifying who must prove which specific indirect facts, as these are critical in forming the basis for causal judgments.

In occupational disease litigation, the establishment of a probable causal relationship is paramount in determining the outcome of the lawsuit. When the burden of proving this causality between work and disease rests predominantly on the worker, it poses a significant challenge to worker protection due to the inherent difficulties in substantiating such a claim. Even with a somewhat relaxed standard of proof, as per current probability theory precedents, this approach may not be sufficiently effective. Consequently, it is advisable that the Korea Workers' Compensation and Welfare Service

[10], The Decision of the Supreme Court of Korea 2014Du12185 (2016.8.30.)

undertake the responsibility of proving certain indirect facts, which typically fall within the workers' purview, particularly where evidence is widespread or specialized knowledge is required.

Distributing the burden of proof in this manner is expected to enhance worker protection and bolster the prevention of occupational accidents. It potentially allows for occupational disease recognition even in cases where the worker's evidence is scant or the disease's etiology is unclear, thereby broadening the scope of worker protection. Moreover, if the recognition of occupational diseases can be expanded through an appropriate allocation of the burden of proof, it could serve as an effective preventative measure against occupational accidents, transcending mere compensation determination. Employers, from their standpoint, are likely to invest more in improving and rigorously managing work environments to avoid the repercussions, such as increased insurance premiums, associated with the recognition of occupational diseases. Additionally, more diligent collection and storage of work environment data will be incentivized to facilitate verification in cases of disputed occupational diseases, contributing to proactive disease prevention.

Given that restoring health to its pre-disease state is often unachievable, a combination of apt compensation and prevention is vital for the effective functioning of the industrial accident compensation insurance system. Should the regulations concerning the burden of proof in occupational disease cases emphasize disease prevention, it would render the redistribution of proof burden not only effective but also meaningful. This approach could create a scenario where the prevention of occupational diseases is prioritized, underscoring the significance of this proposed shift in the burden of proof.

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