

Occupational Health and Safety Risks Associated with Grass Trimmers in One of the Universities in Zimbabwe

الأخطار الصحية والسلامة المهنية المرتبطة بقصات العشب في إحدى الجامعات في زيمبابوي

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Abstract:

Objectives: This research intends to investigate occupational health and safety risks associated with grass-trimming activities at a local university in Zimbabwe and recommend on ways to reduce the risks.

Methods: A mixed-method approach was adopted and the research was based on a case study design. Data was collected using questionnaires, observations, and interviews, with a total of 27 participants involved in the study. Data was analysed using thematic analysis and ranking and scoring using a ranking matrix.

Results: The findings revealed that the most prevalent risks were attributed to factors such as physical hazards which include noise, dust, solar radiation, and ergonomic issues. Among the identified causes of these risks were a lack of training, and improper use of personal protective equipment.

Conclusion: The research concluded that grass-trimming operations introduce various health and safety risks that need to be effectively managed to ensure the well-being of workers and the general public. The researchers recommended the implementation of comprehensive training programs for employees, proper use of protective clothing and equipment to avoid noise and dust such as the use of earplugs, masks and regular maintenance of the grass trimming equipment and machines.

Keywords: Grass Trimming; Hazards; Occupational Health and Safety; Risks; Universities.

الملخص:

الأهداف: تهدف هذه الدراسة إلى استقصاء مخاطر الصحة والسلامة المهنية المرتبطة بأنشطة قص العشب في جامعة محلية في زيمبابوي، وتقديم توصيات بشأن كيفية الحد من هذه المخاطر.

المنهجية: تم اعتماد منهج بحث متعدد الأساليب، والذي استند إلى تصميم دراسة حالة. تم جمع البيانات باستخدام الاستبيانات والملاحظات والمقابلات، مع إشراك ما مجموعه 27 مشاركاً في الدراسة. تم تحليل البيانات باستخدام التحليل الموضوعي والترتيب والتقييم باستخدام مصفوفة الترتيب. النتائج: كشفت النتائج أن المخاطر الأكثر شيوعاً كانت نتيجة عوامل مثل المخاطر المادية، والتي تشمل الضوضاء والغبار والإشعاع الشمسي والقضايا الإروغونومية. من بين أسباب هذه المخاطر المحددة كان هناك نقص في التدريب واستخدام معدات الحماية الشخصية بشكل غير صحيح.

الخلاصة: خلصت الدراسة إلى أن عمليات قص العشب تُدخل مخاطر صحية وسلامة متعددة يجب إدارتها بفعالية لضمان رفاهية العاملين والجمهور العام. أوصى الباحثون بتنفيذ برامج تدريبية شاملة للموظفين، واستخدام الملابس والمعدات الواقية بشكل صحيح لتجنب الضوضاء والغبار مثل استخدام سدادات الأذن والأقنعة، والصيانة المنتظمة لمعدات وآلات قص العشب.

الكلمات المفتاحية: قص العشب؛ المخاطر؛ الصحة والسلامة المهنية؛ الجامعات.

1 Introduction

Grass-trimming is a ubiquitous task carried out in various settings, including schools, universities, public spaces, and agricultural environments such as farms, orchards, and gardens. Grass-trimming activities conducted in universities, schools, public areas, and municipal green spaces pose potential hazards to both employees and passersby. This activity often involves the use of machinery and tools (Lim et al., 2021). Landscaping is a significant aspect of agricultural operations, and the job responsibilities of agricultural workers are closely aligned with those of gardeners, encompassing activities like lifting, carrying, stretching, bending, twisting, and handling heavy loads (Lim et al., 2021). Consequently, it is crucial to identify and address the associated risks to ensure the safety of all stakeholders. According to Kearney et al. (2017), the United States employs nearly one million full-time workers in the grass-trimming and groundskeeping field, these include school and universities. These workers are responsible for using power and non-power tools to maintain the grounds of various establishments, including businesses, institutions, homes, and parks. Their duties involve a range of tasks, such as cutting grass, planting, removing thatch, spreading mulch, applying fertilizer, digging, raking, and planting, among others. Unfortunately, many of these tasks are hazardous and put workers at an elevated risk of occupational injuries and even fatalities (Kearney et al., 2017).

A study in North Carolina examined the health and safety risks faced by workers in 17 public universities, which often have extensive landscaping and grounds to maintain. The risks encompassed various factors, such as prolonged exposure to loud noise, extreme temperatures, contact with harmful chemicals, insect bites, poor ergonomics, vibrations, equipment-related injuries, falls, and vehicle-related accidents (Kearney et al., 2017). Similar health and safety risks have been observed among agricultural workers in Canada, including plantation workers, farmers, gardeners, and grass trimmers (Lim et al., 2021). Another study conducted in Tanzania on landscaping activities in universities found that agricultural workers perceived the risk of injury to be high, particularly related to the use of sharp tools such as machetes and knives (Mrema et al., 2018).

While several studies have examined the broader issue of occupational safety and health in the agricultural and landscaping sectors, including the use of grass-trimming machines, there is limited research focusing on the specific occupational safety and health risks associated with grass-trimming activities in university settings (Chen & Chen, 2018). However, it remains unclear what specific occupational safety and health risks and injuries the workers involved in landscaping, including grass-trimming, are exposed to in university settings in Zimbabwe and how these risks can be effectively mitigated. This research aims to investigate the occupational health and safety risks associated with grass-trimming activities at a local university in Zimbabwe and provide recommendations for risk reduction.

1.1 Problem Statement

In universities, physical labour is primarily used in jobs including grass trimming and landscaping. For example, the university grounds need to be swept, raked, cleared of dried leaves, watered, the drains cleaned, and the trees and hedges trimmed. As a result, the landscaping and grass trimming workers are also exposed to many health risks. Grass trimming is a very common activity in most universities in Zimbabwe. It is carried out for various purposes, including institute maintenance and agricultural purposes such as hay collection in preparation of stock feed. As it is a routine activity, grass trimmers tend to become complacent and fail to appreciate the dangers it can cause to themselves, to others, as well as potential damage to assets such as glass windows of buildings and vehicles in the vicinity. The operators tend to overlook the danger and some are not aware of risks associated with these activities and how to keep themselves and other people protected from risks that arise.

1.2 Objectives

1.2.1 General Objective

To explore health and safety risks among grass trimmers at one of the universities in Zimbabwe.

1.2.2 Specific Objectives

- To identify the potential occupational health and safety risks associated with grass trimming operations.

- Evaluating health and safety measures in place for minimising risks associated with grass trimming operations.

1.3 Research Questions

- What are the potential occupational health and safety risks associated with grass trimming operations?
- What are the health and safety measures in place for minimizing risks associated with grass trimming operations?

1.4 Significance of study

1.4.1 Theoretical significance

The study builds upon existing research that has investigated the health and safety risks associated with manual tasks, outdoor work, and specific occupations. The study reviewed and incorporate relevant findings from these existing studies to strengthen the theoretical foundations and provide a comprehensive understanding of the risks specific to grass trimming activities. The study on health and safety risks associated with grass trimming in one of the universities is supported by established theoretical frameworks in occupational health and safety, ergonomics, and risk management. By integrating existing knowledge and contributing new insights, the study will advance the body of knowledge in these fields, providing valuable guidance for the university and other organizations in managing occupational risks associated with grass trimming activities.

1.4.2 Practical significance

The study will benefit the grass trimmers and the institution on the risks associated with operating different types of grass cutting machines both electric and manual machines. The trimmers will benefit as the study will provide them with knowledge on the importance of following job procedure. By analyzing the existing measures, their effectiveness can be evaluated and identify any gaps or areas for improvement. The evaluation will provide valuable insights into the strengths and weaknesses of the existing approaches and help guide future improvements. By conducting this study, the researcher will gain practical experience in conducting risk assessments, analyzing safety measures, and developing risk mitigation frameworks. The study results will provide evidence-based recommendations for improving safety protocols, training programs, and equipment selection, ultimately enhancing the effectiveness of the Safety Health and Environment (SHE) department in ensuring the well-being of the university's workforce.

2 Materials and Methods

The researchers employed a mixed methods approach, which involved both qualitative and quantitative methodologies. The concept of mixed methods research emerged in the late 1980s and involves the integration of both qualitative and quantitative data within a single study (Creswell, 2013). In this study, there are 24 grass trimmers and 3 supervisors resulting in a total of 27 participants. As this is a relatively small number, all of them will be included in the study.

The supervisors were selected through purposive sampling, whereby the researchers purposefully chose participants who possessed specific characteristics or experiences that were relevant to the research objectives, specifically, addressing risks associated with grass-cutting. Convenience sampling technique was used to select grass trimmers. The researchers selected participants based on their accessibility and convenience rather than following a rigorous sampling procedure, this is because grass trimmers are not found in one place, they move from one place to another. Questionnaires and interviews were used to collect data where semi-structured interviews through the use of an interview guide were done with supervisors. Conducting interviews with supervisors provided valuable information and insights because supervisors have in-depth knowledge and experience in overseeing grass-cutting operations. The researchers coordinated with the supervisors to schedule the interviews at their respective workplaces, ensuring convenience and privacy. Before the interviews, the researchers provided printed copies of the interview questions to the participants, allowing them time to prepare their responses. Each interviewee was allocated 30 minutes for the interview. To capture the participants' statements accurately, the interviewer utilized voice recording and made additional notes on the

interview guide sheet. The recordings were done after consulting the respondents to get their consent; hence the respondents were aware that they were being recorded.

The researchers also adopted a naturalistic observation where they observed how the participants responded to their workplaces this allows the researchers to observe participants' ongoing behaviour in a natural situation. In this case, the grass trimmers were observed and a checklist was used during the observation. The researchers analyzed both quantitative and qualitative data independently by using both thematic analysis for qualitative data and ranking and scoring methods for quantitative analysis. Ranking and scoring were used in analysing data on two objectives which are: i) To identify causes of occupational health and safety risks associated with grass-trimming and ii) To evaluate health and safety measures in place for minimising the occupational health and safety risks associated with grass-cutting operations. Combining the two methods which are thematic and ranking and scoring helped triangulation and improve the validity and reliability of the study. With this in mind, the researchers also used tables, pie charts, and summaries in data presentation to clearly explain and describe the findings from the data.

3 Results and Discussion

3.1 Response Rate

24 questionnaires were administered and interviews were done with all the 3 supervisors and the response rate was 100%, meaning that all the distributed questionnaires were completed and returned. The data further breaks down the response rates by gender, age and working period at the university.

3.2 Demographic Characteristics

The gender category represents the distribution of males and females among the participants. In this research, there were 27 participants in total, all were males and no females among the grass trimmer and their supervisors. According to Barclays (2013), the predominance of male employees in grass-trimming work can be attributed to a combination of historical, cultural, and societal factors. Certain jobs, including manual labour-intensive work like grass-trimming, have traditionally been associated with male workers. These stereotypes and gender norms can influence the choices individuals make when selecting career paths. Grass-trimming can involve physically demanding tasks, such as operating heavy equipment, navigating uneven terrain, and enduring long hours of outdoor work. Societal expectations and perceptions of physical strength and endurance may contribute to the higher representation of male employees in these roles (Chen & Chen 2020).

Only 5 participants are between the age group of 20 to 30 years. There can be several reasons for the difference in the number of young people aged between 20-30 years compared to those between 31-40 years in grass-trimming. One of the reasons identified by Sweeney (2020) is career progression where some individuals may start their careers in grass-trimming at a younger age but gradually transition to supervisory or management roles as they gain experience and expertise. This could result in a smaller number of individuals in the 20-30 age group actively engaged in grass-trimming work. Barclays (2013) also noted that the grass-trimming industry may experience attrition or turnover, with younger workers leaving the field for various reasons such as seeking career advancement, pursuing further education, or exploring other opportunities. This could contribute to a lower representation of the 20-30 age group in the industry. According to Sweeney (2020) grass-trimming can involve physically demanding work, including long hours, exposure to outdoor elements, and repetitive tasks. Younger individuals may be more likely to seek other employment opportunities that offer better work-life balance or less physically demanding work.

6 participants have been in the grass-trimming service for the period between 0-5years, 11 have been working for the period which ranges from 6-10years, 7 are between 11-15 and the remaining 3 have been in the service for 16 years and above. According to (Mrena et al. 2018) grass-trimming work can be physically demanding, involving repetitive tasks, exposure to outdoor elements, and operating heavy equipment. Over time, these physical demands can take a toll on the body, leading some individuals to retire early to prioritize their health and well-being. This can be the reason why there are few people with above 16 years in the service.

3.4 Occupational Health and Safety Risks Associated with Grass-Trimming Operations

Some of the hazards and risks identified by participants are as follows: Out of the 27 participants, the following distribution of major risk factors was observed:

Risks from Noise

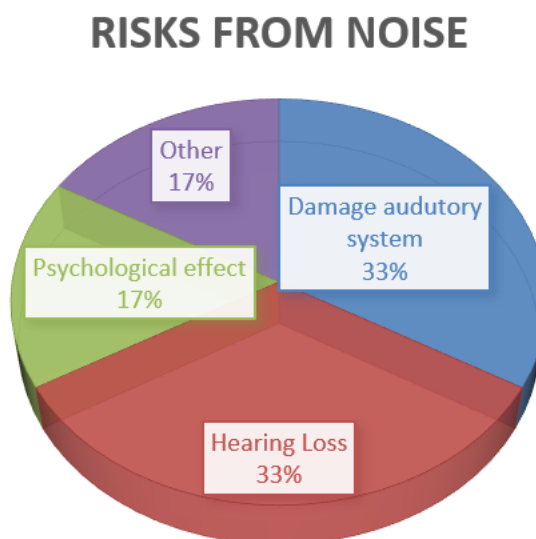


Figure 1: Risks from Noise

The research findings revealed noise as the major hazard identified by 6 participants. These individuals perceived excessive noise levels in their work environments as a potential health and safety concern. 2 out of the 6 participants further mentioned that *"while advancements in technology present new obstacles for soundscape analysis, the growing adoption of electric vehicles instead of traditional combustion engine vehicles can help alleviate the issue of noise."* The participants further explained that noise exposure can damage the auditory system and cause hearing loss which is a health risk from noise. The other 2 participants who are in their mid 40s and have been doing the job for more than 15 years mentioned hearing loss as the main health risks as a result of noise. These 2 stated that *"prolonged exposure to loud noise can lead to permanent hearing loss or impairment"* They added that, *"in grass-cutting we use machinery, such as brush cutters which generate high noise levels."* They also agreed that they are exposed to such noise without proper hearing protection".

The remaining 2 participants mentioned stress and psychological effects. These participants indicated that constant exposure to high levels of noise can cause stress, anxiety, irritability, and decreased overall well-being. They said, *"Excessive noise can impair verbal communication between workers, leading to misunderstandings, errors, and decreased productivity, which may lead to too many accidents during grass-trimming."* Noise-induced distractions and reduced concentration can impact workers' productivity and overall work performance.

A significant amount of prior research has focused on investigating and charting the impact of noise on human beings, particularly concerning health effects. There is a substantial body of evidence indicating a clear association between noise exposure and various adverse health outcomes (Sweeney, 2020). Noise exposure has been found to not only affect auditory health but also to have non-auditory effects on well-being, including sleep disturbances, annoyance, cardiovascular disease, and hypertension. Moreover, there is a link between noise exposure and mental health issues (Chen & Chen 2020).

Excessive noise levels are a common occurrence during grass-cutting activities, and several studies have shown a high prevalence of hearing loss among grass trimmers (Ulrich et al., 2016). Besides physical exertion, one major source of discomfort for workers operating grass-trimming machines is the noise they are exposed to, non-auditory effects of noise include annoyance, memory loss, and sleep disturbances (Stahl, 2020). Sweeney (2020) developed a neuron-fuzzy model to predict the effects of noise pollution on human work efficiency based on noise level, type of task, and exposure time.

In addition to damaging the auditory system and causing hearing loss, exposure to excessive noise can pose several other risks to individuals. Some of the other risks identified by grass trimmers as associated with

noise exposure include cognitive impairment where the 2 participants with only 2 years of experience said that “noise can interfere with cognitive functioning and impair concentration, attention and memory. It hinders communication among peers and productivity.” They also agreed that noise can affect their brain to such an extent that even when they are away from the workplace their sleep can be affected. They call them after effects of noise.

The respondents indicated that excessive noise can interfere with effective communication during work. They highlighted that “noise makes it challenging to hear and understand speech, resulting in miscommunication, reduced productivity, and potential safety risks”. In addition to that one of them highlighted a scenario whereby a supervisor was giving an instruction but due to noise one grass cutter could not get it and ended up using the wrong blade and as a result, his finger was cut. They also concurred that noise masks auditory cues and warnings, making it difficult to detect important sounds, such as alarms, sirens, or approaching vehicles. This can also increase the risk of accidents and injuries during grass-cutting.

3.4.1 Risks from Dust

Based on a research study out of 27 participants 7 highlighted that dust was another hazard associated with grass-trimming to human health. Among the 7 participants, 2 of them indicated that respiratory issues such as coughing and wheezing were the most significant effects of dust exposure during grass-trimming. The other 2 reported that they experienced risks associated with prolonged exposure to dust and expressed concerns about developing asthma or the potential for severe health complications. They emphasised the fact that some of them had pre-existing asthma conditions and trimming grass without wearing proper respiratory masks increased the risk. The remaining 3 participants expressed that dust particles lead to discomfort and irritation in the eyes and skin. However they all agreed that dust effects depend on the time of the year, for example when the grass is dry the dust will be very high as compared to the rain season.

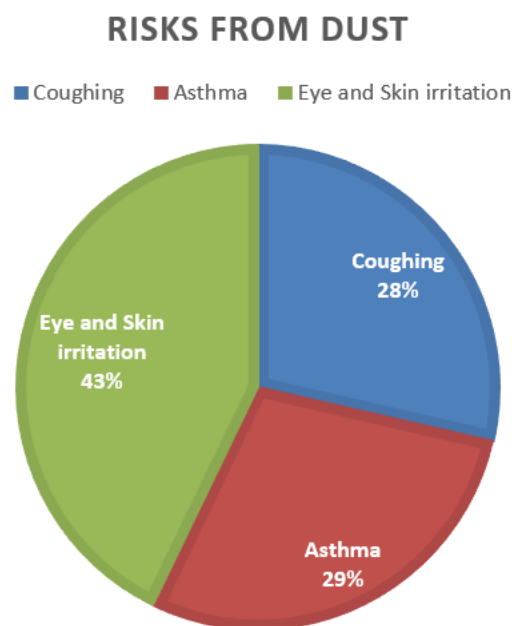


Figure 2: Risks from Dust

Maintaining lovely and healthy-looking grounds requires regular lawn mowing. Although most institutions frequently perform this task, many are unaware of the potential health dangers involved (Sweeney, 2020). Occupational asthma is one of the respiratory conditions that affects the airways and is caused by allergies to substances in the workplace, such as grain dust. It can cause swelling and tightening of the airways, leading to symptoms like coughing, wheezing, chest tightness, or breathlessness during or after work (Sweeney, 2020). Working with dust can also worsen symptoms in individuals who already have asthma. Prevention through good working practices is crucial to avoiding respiratory diseases.

3.4.2 Risks from Ergonomic Hazards

Furthermore, 5 out of 27 participants mentioned various risks from ergonomic hazards. From those 5 participants, 2 of them being in their 30s and with less than 10 years of working experience highlighted backaches caused by carrying heavy grass-cutting machines like brush cutters and blowers for extended periods as the major risk. These participants emphasized the physical strain and potential long-term consequences associated with this task. These 2 participants were quoted as: *“Carrying heavy grass-trimming machines can put strain on the muscles and joints of the body, particularly in the back, shoulders, and arms. The weight of the equipment, combined with repetitive lifting and carrying movements, can lead to musculoskeletal disorders such as strains, sprains, and fatigue.”* They went on to say that, *“the design and weight distribution of grass-cutting machines require individuals to adopt awkward postures while carrying them. This can include bending, twisting, or reaching to maintain balance or handle the equipment properly, prolonged or repetitive awkward postures can contribute to discomfort and increase the risk of musculoskeletal injuries.”*

RISKS FROM ERGONOMIC HAZARDS

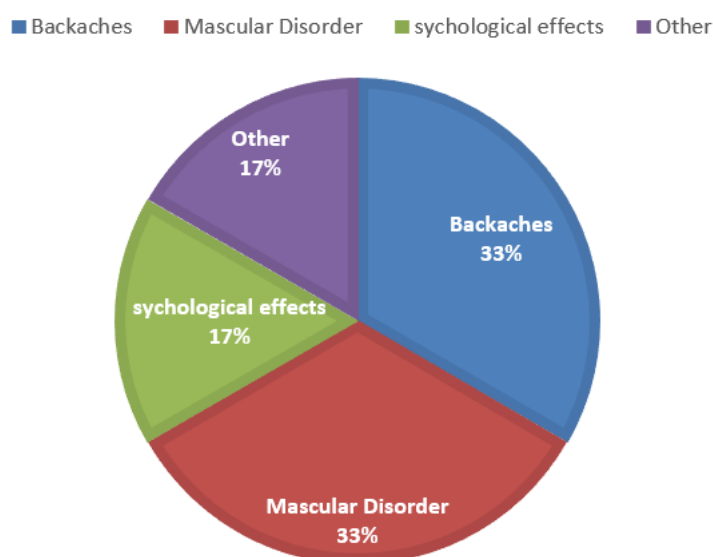


Figure 3: Risks from Ergonomic Hazards

Vibration from machines, which can lead to muscular disorders, was considered the major risk by 1 participant from those 5 participants. This participant reported that prolonged exposure to machine vibrations posed a significant risk to their musculoskeletal health. This worker had been exposed to hand transmitted vibration for more than 4 years.

The two remaining participants expressed significant concern regarding the potential consequences of prolonged vibration exposure resulting from operating a handheld grass cutter. They were particularly worried about the potential loss of hand grip strength, as well as experiencing blanching and numbness in their fingers. However, it is important to note that various specific factors contribute to this vibration-related disability in the context of grass-cutting operations, such as the forcefulness and repetitive nature of the movements involved (Lim et al., 2019).

According to Lim et al. (2021), prolonged exposure to vibration transmitted through grass-cutting machines can cause occupational diseases associated with hand-arm vibration syndrome (HAVS). This is particularly true for operators who work with small tools to manage grass and vegetation on steep slopes and riverbanks. Even though vibration risks may not be evident immediately, they can lead to symptoms years later (Mrena et al., 2018). Brush cutters are commonly used mechanical tools that are affordable and easy to use. However, they often result in work-related injuries, such as severe foot injuries when the cutting head strikes the operator, and indirect injuries that can damage the nerves in the hand due to prolonged exposure to vibrations generated by the rotating engine and cutting head. The use of professional brush cutters significantly increases the risk of developing Hand-Arm Vibration Syndrome (HAVS), which includes circulatory, sensory, and musculoskeletal disorders (Modenese et al., 2016).

According to (Lim et al. 2019) grass-cutting machines often generate vibrations during operation, especially if they are powered by engines. Carrying machines that produce vibrations can transmit these forces to the body, leading to discomfort and potential long-term health effects such as hand-arm vibration syndrome (HAVS). Holding and gripping the handles of spraying machines for extended periods can cause fatigue and strain in the hands and arms. This can lead to reduced grip strength, decreased dexterity, and an increased risk of developing repetitive strain injuries (RSIs) like carpal tunnel syndrome (Modenese et al. 2018).

3.4.3 Risks from Solar Radiation

Heat was identified as another hazard by 8 participants. 3 of them highlighted the potential risks associated with working in high-temperature environments, such as heat exhaustion or heatstroke. This is supported by Turan et al. (2019) who postulates that working in direct sun or under intense solar radiation can lead to heat-related illnesses such as heat exhaustion and heat stroke. Heat exhaustion is characterized by symptoms like fatigue, dizziness, nausea, and headaches, while heat stroke is a more severe condition that can be life-threatening. 2 participants said that *“exposure to the direct sun increases the risk of dehydration, as we may lose significant amounts of fluids through sweating.”* Turan et al. (2019) further highlighted that dehydration can lead to fatigue, reduced cognitive function, muscle cramps, and in severe cases, organ damage. Workers must drink plenty of fluids and take regular breaks in shaded areas to prevent dehydration.

RISKS FROM SOLAR RADIATION

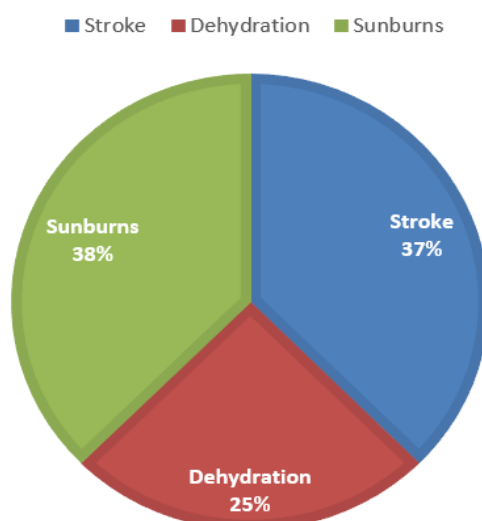


Figure 4: Risks from Solar Radiation

The other 3 participants agreed that prolonged exposure to direct sun can cause sunburn, which is characterized by red, painful, and inflamed skin. One of them who is in his mid-30s and has worked as a grass trimmer for 5 years echoed that: *“Sunburn not only causes discomfort but also increases the risk of developing skin cancer over time and as grass trimmers we need to protect our skin by wearing appropriate clothing, such as long-sleeved shirts, long pants, wide-brimmed hats, and applying sunscreen with a high sun protection factor.”*

Long-term exposure to solar radiation without adequate protection can increase the risk of developing skin cancer, including melanoma. Skin cancer is a serious health concern, and agriculture workers who spend significant time outdoors are particularly vulnerable. Regular skin examinations and proper sun protection measures are essential to minimize the risk (Lim et al. 2019.) Solar radiation can also harm the eyes. Prolonged exposure to UV radiation can lead to conditions such as photokeratitis (sunburn of the cornea) and cataracts (clouding of the lens). Wearing UV-protective sunglasses or goggles is crucial to protect the eyes from the harmful effects of direct sun (Turan et al. 2019).

All the participants agreed that working under intense solar radiation can cause fatigue and reduced productivity due to the physical and physiological strain imposed by the heat. High temperatures and excessive exposure to sunlight can decrease energy levels and impair concentration and decision-making abilities. Grass-trimming is often done in hot and physically demanding environments. Carrying heavy equipment in high

temperatures can contribute to heat stress and fatigue, which can impair physical performance and increase the risk of accidents or injuries.

In industries such as agriculture and construction, different tasks, such as landscaping, grass-trimming, fruit picking, or masonry work, can result in varying levels of exposure to different parts of the body. For example, tasks like picking fruit from trees or the ground in agriculture may lead to a higher exposure of the face and chest, while the work of a mason compared to that of a tiler may result in higher exposure on the back and nape. Additionally, the working posture adopted during these tasks plays a crucial role in determining which body areas are most exposed to potential hazards (Caroll, 2020). The usage of personal protection, such as appropriate clothing, hats, sunglasses, and sunscreen, has a crucial role in deciding workers' eye and skin exposure for leisure time as well as for work (Modenese et al., 2018).

3.4.5. Other Risks

The remaining participants identified other risks such as snake and insect bites as another cause of risks in grass-cutting. These risks primarily stem from the presence of plants, insects, and microorganisms in the grass and vegetation being cut. Grass and plant materials also release allergenic particles, such as pollen, mould spores, or dust, during cutting. Some workers mentioned that they are sensitive or allergic to these substances hence they always experience allergic reactions, including respiratory symptoms like sneezing, coughing, congestion, or itchy eyes.

Another respondent mentioned that; *'Some grasses or weeds, such as poison ivy, poison oak, or stinging nettle, can cause skin irritation, rashes, or allergic reactions upon contact'* These types of grasses are common. This has affected many grass cutters who come into direct contact with these plants during grass-cutting activities, the researchers were shown some rushes by one of the respondents during the research and the respondent indicated that the rush was painful. The grass trimmers also indicated that during grass-cutting they disturb insects, including bees, wasps, or ticks, which increases the risk of insect bites or stings. These bites or stings can cause pain, swelling, itching, and in some cases, allergic reactions.

The respondents highlighted the use of pesticides in grass-cutting, such as herbicides or insecticides as another cause of occupational risks. Pesticides contain toxic substances that can be harmful if inhaled, ingested, or absorbed through the skin. Prolonged or repeated exposure to pesticides can lead to acute or chronic health effects, including respiratory problems, skin irritation, or long-term risks such as cancer or reproductive disorders. The majority of grass trimmers complained that grass-cutting equipment which they use typically uses fuels diesel, and petrol and require lubricants like oil. As they handle these fuels and lubricants employees are exposed to hazardous chemicals hence inhalation of fuel vapours or contact with skin can lead to adverse health effects, including respiratory irritation, dermatitis, or systemic toxicity.

Grass cutters were of the view that after operating they sometimes use cleaning agents or solvents to clean and maintain grass-cutting equipment. These agents contain chemicals such as solvents, degreasers, or detergents. The researchers observed one of the employees cleaning with bare hands and direct contact with these cleaning agents which may be a risk of skin irritation, eye damage, or respiratory problems if proper precautions are not taken.

3.5 Strategies for Minimizing Risks Associated with Grass-Cutting

Table 2 presents survey results on strategies for minimizing risks in grass-cutting, including the corresponding scores, percentage scores, and ranks assigned to each strategy. Six strategies were identified as a way of mitigating the risks associated with grass-trimming. These included: Improving Protective clothing, Training, Maintenance of machines, adjusting working hours and purchasing new machinery.

Table 2: Strategies Identified, Percentage Score and Rank

Strategy	Score (n=27)	Percentage Score	Rank
	18	66.7	2
	16	59.3	3
	22	81.4	1
	16	59.3	3
	16	59.3	3

3.5.1 Improving Protective Clothing

This strategy received the highest score and percentage score, indicating that it was perceived as the most effective strategy for minimizing risks in grass-cutting. The majority of respondents which is 81.4% (n=27) recognized the importance of improving protective clothing to enhance safety during grass-cutting operations.

Modenese et al. (2018) highlighted that wearing personal protective equipment, or "PPE," will help to reduce your exposure to potential risks at the workplace when it comes to landscape management. Sunglasses, impact-resistant safety glasses, face shields, boots, protective clothes, gloves, masks, and earplugs are a few examples of PPE. Grass trimmers should make sure that the personal protective equipment complies with the safety compliance markings advised in the operator manual for any equipment you use. In comparison to regular sunglasses or non-impact resistant prescription eyeglasses, properly chosen safety glasses will offer better protection because they are impact and dust resistant (Mrema et al., 2018). Workers who wear prescription glasses or sunglasses should also put on safety glasses over them without altering their proper positioning. If a worker wears prescription glasses or sunglasses, they should also wear safety glasses over them to prevent them from shifting from their normal positions.

3.5.2 Training

Training was the second most favored strategy, with a score of 18 and a percentage score of 66.7%. This suggests that a significant portion of the respondents acknowledged the value of providing comprehensive training to workers to mitigate risks associated with grass-cutting. Mallick et al. (2019) indicated that proper training is essential for workers operating grass-trimming equipment. This includes instruction on safe equipment usage, hazard identification, and emergency response. Workers who received training on the safe use of grass-trimming equipment were less likely to be injured than those without such training.

3.5.3 Maintenance of machines, Adjustment of working hours, Purchasing of new machinery

These three strategies received the same score and percentage score, indicating similar levels of perceived effectiveness. Approximately 59.3% of the respondents recognized the importance of these strategies in minimizing risks during grass-cutting operations.

Overheating and difficulty breathing are both caused by heat and humidity. This can also lead to headaches, sneezing, coughing, and itching eyes if you have allergies to recently cut grass. Chances of getting sick after mowing will be lower if one mows in the early morning or late evening when it's cooler and more humid (Modenese et al., 2018).

4 Conclusion and Recommendations

4.1 Conclusion

Grass-trimming operations introduce various health and safety risks that need to be effectively managed to ensure the well-being of workers and the general public. These risks range from physical injuries to exposure to harmful substances and environmental factors. One of the primary risks in grass-trimming operations is the potential for physical injuries. Workers may face cuts, lacerations, or even amputations from contact with sharp blades or rotating machinery. To mitigate these risks, it is essential to provide adequate training to workers on safe operating procedures, including the proper use of personal protective equipment (PPE) such as gloves, safety glasses, and steel-toed boots. Physical, Biological and chemical hazards were identified as the major causes of risks. Lack of training, improper use of equipment and lack of maintenance of machines are among the causes of risks as well.

Furthermore, the research identified grass-trimming operations expose workers to environmental factors that pose health risks. Extended exposure to excessive noise levels from trimmers and other equipment can lead to hearing loss. To mitigate this, the use of noise-cancelling headphones or earplugs can be encouraged, and regular breaks in quieter environments should be provided. Exposure to extreme temperatures and weather conditions should also be addressed by implementing appropriate measures such as providing shade, hydration stations, and protective clothing.

4.2 Recommendations

To address the issue of occupational health and safety risks associated with grass-trimming, several factors should be considered. Firstly, comprehensive training should be provided to all workers on grass-trimming operations and safety. Additionally, to prevent dehydration, workers should be reminded to consume ample fluids, particularly water, and have access to clean drinking water and regular hydration breaks. Procure grass trimmers with built-in dust collection systems or attachments to minimize the generation and inhalation of dust particles. Workers should be supplied with properly fitted hearing protection devices and trained on their correct usage. Access to and encouragement of appropriate protective clothing, such as hats, lightweight long-sleeved shirts, long pants, sunglasses with UV protection, and high SPF sunscreen, is essential. Training and education on the risks of direct sun exposure and the importance of sun protection measures, including recognizing signs of heat-related illnesses, should be delivered. Finally, regular health monitoring, opportunities for reporting symptoms or concerns, and encouragement to seek medical attention when needed should be implemented.

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