

## Absolute Risk vs Relative Risk: Clarifying Their Roles in Risk Assessment and Decision Making

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### Abstract

In risk assessment and decision-making, understanding both absolute risk and relative risk is crucial for accurately interpreting health data and guiding patient care. This paper explores the distinctions between absolute risk and relative risk, highlighting their respective roles in evaluating and communicating health outcomes. Absolute risk quantifies the probability of an event occurring in a specific population over a defined period, providing a concrete measure of individual risk. In contrast, relative risk compares the risk of an event between two different groups, offering insights into how risk factors or interventions alter risk levels in a comparative context.

The discussion integrates examples from clinical studies to illustrate how absolute risk and relative risk can be used together to provide a comprehensive understanding of health risks. Emphasis is placed on how each measure impacts clinical decision-making and public health recommendations. By clarifying these concepts, the paper aims to improve the application of risk assessment tools in clinical practice and enhance the effectiveness of health communication strategies. Understanding these risks helps clinicians and patients make more informed decisions regarding preventive measures, treatments, and lifestyle changes.

**Keywords:** Absolute risk; Relative risk; Risk assessment; Health outcomes; Clinical decision-making; Risk communication

### Introduction

Risk assessment is a fundamental component of clinical practice and public health, guiding decisions related to prevention, treatment, and lifestyle modifications [1]. Two critical concepts in this field are absolute risk and relative risk. Understanding these metrics is essential for interpreting health data, making informed decisions, and effectively communicating risks to patients and stakeholders. Absolute risk refers to the likelihood of an individual experiencing a specific health event over a defined period. It provides a direct measure of an individual's probability of developing a condition, such as cardiovascular disease or cancer, based on population data [2-5]. For example, an absolute risk of 5% means that, out of 100 individuals, 5 are expected to experience the event within the specified timeframe. Relative risk, on the other hand, compares the risk of an event between two distinct groups, such as those exposed to a risk factor versus those not exposed. It is a ratio that indicates how much more likely an event is to occur in the exposed group compared to the non-exposed group. For instance, if individuals with a high-fat diet have a relative risk of 2.0 for heart disease compared to those with a low-fat diet, it suggests that the former group is twice as likely to develop heart disease. Both measures play distinct but complementary roles in health risk assessment. Absolute risk provides a clear, quantifiable perspective on an individual's risk, which is crucial for personalizing healthcare and making preventive decisions. Relative risk helps in understanding the impact of risk factors or interventions in comparative terms, guiding research and public health strategies. This paper aims to elucidate the differences between absolute risk and relative risk, demonstrating their respective applications in risk assessment and decision-making. By exploring these concepts through practical examples and clinical scenarios, we seek to enhance the understanding and use of these tools in evaluating health risks and communicating effectively with patients.

### Results and Discussion

The analysis of case studies reveals that absolute risk provides a straightforward measure of the likelihood of an individual developing

a specific condition. For example, a study on cardiovascular disease found that an absolute risk of 10% over 10 years means that 10 out of 100 individuals are expected to experience the disease within that period. In contrast, relative risk offers a comparative measure. For instance, a study on smoking and lung cancer indicated a relative risk of 3.0, suggesting that smokers are three times more likely to develop lung cancer compared to non-smokers [6]. This relative measure helps in understanding how much more or less likely an event is in one group compared to another. In clinical settings, absolute risk is critical for individual risk assessment and decision-making. For example, a patient with a 5% absolute risk of stroke in the next 10 years might be advised to adopt preventive measures if the risk is deemed significant based on their personal health profile. Relative risk is valuable for evaluating the effectiveness of interventions and understanding the impact of risk factors. For example, if a new medication reduces the relative risk of stroke by 30%, it indicates a significant reduction in risk compared to standard treatment, though the absolute reduction might be modest depending on the baseline risk. Public health guidelines often use absolute risk to provide clear recommendations for population-based interventions. For instance, if the absolute risk of diabetes in a population is high, public health strategies may focus on broad lifestyle changes and screenings. Relative risk is frequently used in research to assess the strength of associations between risk factors and health outcomes [7]. It helps in identifying high-risk groups and justifying the allocation of resources for targeted interventions. Communicating absolute risk helps patients understand their individual likelihood of developing a condition, making it easier to engage in shared decision-

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**Received:** 02-Aug-2024, Manuscript No. jomb-24-146321; **Editor assigned:** 05-Aug-2024, Pre QC No. jomb-24-146321 (PQ); **Reviewed:** 17-Aug-2024, QC No. jomb-24-146321, **Revised:** 22-Aug-2024, Manuscript No. jomb-24-146321 (R); **Published:** 30-Aug-2024, DOI: 10.4172/jomb.1000226

**Citation:** Davie E (2024) Absolute Risk vs Relative Risk: Clarifying Their Roles in Risk Assessment and Decision Making. J Obes Metab 7: 226.

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making. For instance, conveying a 1 in 20 chance of developing a disease can be more relatable than statistical percentages. Relative risk can sometimes lead to misunderstanding if not accompanied by absolute risk context. For example, a relative risk reduction of 50% might sound impressive, but without knowing the baseline absolute risk, the actual benefit might be less dramatic.

Combining absolute and relative risk provides a more comprehensive view of health risks. Absolute risk gives clarity on an individual's likelihood of an event, while relative risk offers insights into how risk factors or interventions modify that likelihood [8-10]. Using both metrics helps in making balanced clinical decisions and formulating effective public health policies. For clinicians, absolute risk is crucial for personalizing care and discussing the potential benefits and harms of treatments. Relative risk, on the other hand, is useful for understanding the effectiveness of interventions in a broader context and comparing different treatment options. Risk communication can be challenging, particularly when conveying relative risk without context. Patients may find it difficult to grasp the significance of relative risk reductions without understanding the baseline risk. Providing both absolute and relative risk information can enhance patient understanding and improve decision-making. Further research should explore how best to integrate absolute and relative risk information in clinical practice and public health communication. Studies could investigate the effectiveness of different approaches to presenting risk information and their impact on patient understanding and decision-making. In summary, understanding and effectively communicating both absolute and relative risk are essential for accurate risk assessment, informed decision-making, and effective public health strategies. By leveraging these concepts together, healthcare providers can better address individual and population health needs.

## Conclusion

This study highlights the critical distinctions and complementary roles of absolute risk and relative risk in health risk assessment and decision-making. Absolute risk provides a direct measure of an individual's likelihood of experiencing a specific health event, offering a clear and actionable basis for personalized healthcare decisions. In contrast, relative risk compares the risk between different groups, helping to understand the impact of risk factors or interventions in a comparative context. Integrating both absolute and relative risk metrics enhances our ability to evaluate health risks comprehensively. Absolute risk is essential for communicating individual probabilities and making informed clinical decisions, while relative risk provides valuable insights into the effectiveness of interventions and the strength of associations between risk factors and health outcomes. Effective communication of risk requires presenting both types of information to ensure that

patients and healthcare providers can make well-informed decisions. Absolute risk helps translate statistical data into meaningful personal implications, whereas relative risk highlights the relative benefits or harms of different interventions or risk factors. Future research should focus on improving strategies for integrating and communicating these risk metrics in clinical practice and public health. By enhancing our understanding and application of both absolute and relative risk, we can better address individual health needs, optimize preventive measures, and improve overall health outcomes.

## Acknowledgement

None

## Conflict of Interest

None

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