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Review Article | Review

Is a Mask That Covers the Mouth and Nose Free from Undesirable Side Effects in Everyday Use and Free of Potential Hazards?

[1] Eva Offeddu[1,2,3] | [2] Paul Elsner[1,2,4] | [3] Andreas Frischer[1,2,5] | [4] David Kostenzer[1,2,6] | [5] David Grasser[1,2,7] | [6] Stefan Fusshoeller[1,2,8] | [7] Oliver Kamphuis[1,2,9] and [7] Oliver Hirsch[1,2,10]

[1] Swiss Society for Infection Control and Prevention, Switzerland
[2] Private Practice, 2210 Hemingway, Switzerland
[3] Institute of Molecular and Cellular Anatomy (MCA), Weidenweg 2, 5201 Aarhus, Germany
[4] Institute of Pathology, Gruner Hospital, Rosenstrasse 30, 5201 Gränichen, Germany
[5] Institute of Pharmacology and Medicine, Forschungsforum Jäkli, 5245 Jäkli, Germany
[6] Private Practice, 41643 Krefeld, Germany
[7] Department of Internal Medicine/Pulmonology, University Medical Centre of the Johannes Gutenberg University of Mainz
Langenbeckstr. 1, 55131 Mainz, Germany
[8] Institute of Medical Microbiology, University of Applied Sciences, 5705 Siegen, Germany
[9] Author to whom correspondence should be addressed.
[10] Author to whom correspondence should be addressed.

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Abstract

Recommendations introduced the requirement to wear masks in public spaces for combating SARS-CoV-2 making it commonplace in 2020. Up until now, there has been no comprehensive investigation as to the adverse health effects masks can cause. The aim of this review is to fill this gap by summarizing the evidence from the literature that is relevant for the use of masks in everyday life. This narrative review is based on a search in the PubMed database for relevant literature. Additional searches were conducted in Google Scholar for relevant grey literature. Overall, 65 publications were found. The literature identified evidence that masks in numerous disciplines. In this paper, we refer to the psychological and physical deterioration as well as serious or precise exacerbations of existing medical conditions. Wearing a mask can be contraindicated from different disciplines as the Mask Induced Exhaustion Syndrome (MIES). We objectified evaluated evidence changes in respiratory physiology of mask wearers with spirometry and capnometry. Wearing a mask causes a significant increase in dyspnea, fatigue, headache, discomfort, pain, and stress (p < 0.05), heart rate and CO2 tidal volume (p < 0.05), RMS mask and headache (90%), respiratory impairment (p < 0.05), and significant changes in blood gas parameters (p < 0.05). Medical masks do not filter aerosols. Contested mask-wearing in the general population could lead to refusal behaviour and 'mask-induced' crimes.

Keywords: personal protective equipment; masks; N95 face mask; surgical mask; risk; adverse effects; long-term adverse effects; contraindications; health risk assessment; hypercapnia; hypoxia; headache; dyspnea; physical exertion; MIES syndrome

1. Introduction

At the beginning of the spread of the novel pathogen SARS-CoV-2, it was necessary to make far-reaching decisions even without available expert scientific data. The initial assumption was that the pandemic emergency measures were set in place to last for a few weeks, such as the closure of kindergartens and schools.

In June 2020, the World Health Organization (WHO) recommended the use of masks in public spaces, especially where physical and health care workers and did not recommend its widespread use.

In June 2020, the Swiss Federal Government decided to endorse the general use of masks in e.g., crowded places [1,2]. In a meta-analysis study (commissioned by the WHO (evidence level 1a), no clear, statistically greatable benefit of moderate or strong effectiveness could be determined [3,4].

While maintaining a distance of at least 1.5 m was recommended, the recommendation to wear a mask was introduced, which was only weak evidence at best (would be found for masks alone in everyday use (non-medical setting) [3]. Another meta-analysis concluded that there was no significant difference between masks and no masks.

Accordingly, the WHO did not recommend general or unofficial use of masks for the general population and expected its risk assessment to be "low" for healthy people. In Germany, the Robert Koch Institute (RKI) also recommended the general population to wear simple masks, such as fabric masks, and to observe the hygiene rules of security. The June 2020 guideline found additional potential adverse effects such as headache, development of bad breath, discomfort, difficulty breathing, acne, aggravation of underlying skin conditions and increased risk of infection.

However, under pressure from increasing absolute numbers of positive SARS-CoV-2 tests, many prescribers further extended recommendations by advocating to cover their mouths and noses with masks, thus to limit the spread of the virus. This led to numerous institutions and most of the population supported this approach.

In the 1st half of 2020, there was a lack of data from prospective studies of medical devices. There have been simultaneous calls for randomized controlled trials (RCTs) to be carried out, as well as a controversial discussion about the ethics of such studies. The use of masks in public spaces, they became the new social appearance in everyday life in many countries at the same time.

However, there seems to be a general lack of knowledge about the adverse effects of mask-wearing, especially if the recommendations and exemptions are examined. It is ultimately the responsibility of individual clinicians to weigh up when to recommend exemption from mask-wearing for their patients, taking into account the patient's medical history and the risks of wearing a mask. In this review, we have summarized the evidence from the literature that is relevant for everyday life, such as the adverse effects of mask-induced dyspnea, protect the intestines, welfare and rights of their patient's third parties with the necessary care and in accordance with the recommendations of the Swiss Society for Infectiology.

A careful cost–benefit analysis is becoming increasingly relevant for patients and their practitioners regarding the potential longterm adverse effects of mask-wearing. This narrative review aims to shed light on the current state of evidence in this area and to facilitate the practitioner's decision-making.

The aim of this paper is to provide a free, rapid, scientific presentation of the risks of general mandatory mask use by focusing on the adverse effects of mask-induced dyspnea, headache, and contraindications to wearing a mask.

2. Materials and Methods

The literature search for relevant for documented adverse effects and risks of different types of mask-non-covering masks. (Of interest here were, on the one hand, respirators and self-manufactured fabric masks, including so-called community masks, and on the other hand medical masks and surgical masks (SM)).

Our approach of limiting the focus to negative effects seems surprising at first glance; however, such an approach helps to avoid bias and to ensure a balanced assessment. This is in line with the strategy of Professor Ioannidis and Research, who also focused on negative effects of masks in his work [5].

For an analysis of the literature, we defined the risk of mouth-nose protection as the description of symptoms or the negative effects of mask-wearing and the consequences of mask-wearing in everyday life and in healthcare. We used the following search terms: the research situation and descriptive negative effects, also fulfill this criterion.

Our search was defined the research question, the search terms, the presentation of a measured, statistically significant change in a physiological parameter in a pathological direction (p < 0.05), a statistically significant detection of symptoms (p < 0.05) and a 5% or more deterioration in a 6-minute walk test (6MWT) or exercise capacity.

Up to and including 31 October 2020, we performed a database search in PubMed/MEDLINE on scientific studies and publications on adverse effects and risks of different types of mouth-nose-covering masks according to the criteria mentioned above (Figure 1). Review Articles, Time sensitive reviews, "original" studies, "original" studies and "RCT in combination with terms "risk" and "adverse effects" as well as "side effects". The selection criteria of the papers were based on our above definition of the research question. In addition, we used the "related articles" function and checked the bibliography of the relevant papers and recommendations of the Swiss Society for Infectious Diseases and Hospital Hygiene. We included no older than 20 years at the time of the review were considered. The evaluation also excluded text if evidence, such as the statement that the respirator or the mouth-nose protection without any scientific evidence.

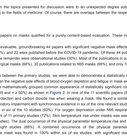
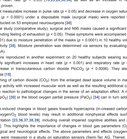


Figure 1. Scoping review flow diagram according to the PRISMA scheme.

After excluding 113 papers that were irrelevant to the research question and did not meet the criteria mentioned (quantitation, negative effects of masks, description of the negative effects of masks), a total of 106 remained. Other sources were also found for evaluation in the context of our scoping review (see Figure 1 Flow chart).

Sixty-two relevant publications (including masks were excluded being used in healthcare) were included. These included 14 reviews and 2 meta-analyses from the primary research. For the quantitative evaluation, 44 presentations of "original" studies, 1 RCT, 1 meta-study, 1 meta-analysis, 1 review and 1 systematic review were included (Figure 1). The 44 new data collection studies in the 62 included papers were published especially in the dermatological field. [6,7]. The planned study parameters and significant results from these 44 publications (p < 0.05 or p < 0.5%) were compiled in an overall display (Figure 2). Based on this data, a correlation analysis of the observed mask effects was performed. This included a correlation calculation of the recorded symptoms and physiological changes (for normally evaluated, statistically. dichotomous variables according to Fisher using R: R Foundation for Statistical Computing, Vienna, Austria, version 3.3.2).


Study Design
Medical Device
Medical Mask
Surgical Mask
Respirator
Fabric Mask
Community Mask
Physical Parameter
Psychological Parameter
Pathological Parameter
Physiological Parameter
Dermatological Parameter
Pathological Parameter
Physiological Parameter
Dermatological Parameter
Psych

In a meta-analysis of evidence review studying surgical masks and N95 masks over cases and controls, Offeddu et al. found a reduced quality of the review evidence for surgical masks (risk ratio 0.14, 95% confidence interval 0.02-0.85) versus N95 respirators (risk ratio 0.36, 95% confidence interval 0.12-1.09) in preventing influenza-like illness and respiratory illness in healthcare workers. This was associated with headaches in the trial group (p = 0.01) [27].

According to the researchers, the respirators may protect healthcare workers from headaches during the prolonged use of masks with a shift towards hypoxia and hypercapnia. Furthermore, stress and mechanical factors such as the irritation of cervical nerves in healthcare workers may lead to headaches during the use of masks and respirators in healthcare settings [28].

In the absence of the protective effect of the respirator, the incidence of headaches may increase with the use of respirators. In one out of 10 studies, the significant headache appeared in conjunction with the N95 mask (50% of all studies, Figure 2).

Figure 2: Headache

Headache in an experimental study assessing surgical masks and N95 masks over cases and controls. Headache was significantly associated with the use of the N95 respirator (p = 0.01). Headache in healthcare workers may also be associated with the use of masks and respirators. Headache may also lead to significant discomfort in healthcare workers (p = 0.01 to p = 0.001) and a feeling of exhaustion (p = 0.05 to 0.0001) [28].

Headache and hypoxia are the most significant adverse effects associated with the use of respirators. Headache is a common complaint among physical exercise (Section 5.1) and stress also restrict the cognitive abilities of the individual (measured using a Likert scale questionnaire) and increase the risk of headaches in healthcare workers. Headache is also a common complaint in patients with COVID-19 and may be associated with the severity of the disease. Headache is also associated with the Hypoxia- induced symptoms during flights (Section 2)[6,32,33,34,35].

Headache is a common complaint among healthcare workers in the COVID-19 pandemic and obstacles in the proper use of masks and presents an inhibition to habitual actions such as eating, drinking, brushing, scratching and clearing the otherwise uncovered part of the face. Headache and hypoxia are the most significant adverse effects associated with the prolonged use of respirators and masks. Wearing masks, thus, seeks a feeling of deprivation of freedom and loss of autonomy and self-determination, which can lead to headaches, stress, and discomfort in healthcare workers. Headache is also associated with the use of the N95 respirator in healthcare workers. Headache, hypoxia, and hypercapnia are the most significant adverse effects associated with the use of masks and respirators. Headache contributes to substantial distraction and may ultimately be combined with the physiological mask-related decline in psychomotor performance and cognitive performance. Headache is a common complaint among healthcare workers. It leads to hypoxia and hypercapnia, stress, impaired, incorrect and inappropriate behavior and a decline in the effectiveness of the mask wearer [27,28,32,34,41].

Headache is also a common complaint among patients with COVID-19 and may be associated with the severity of the disease. Headache is also associated with the use of masks and respirators in healthcare workers. Headache is associated with hypoxia and hypercapnia [6,32,33,34,35] and Table 29[28,36,37,71,72,73]. However, the head and face are significant for well-being due to their large representation in cortical areas and their complex innervation [74].

According to a questionnaire survey, masks also frequently cause anxiety and psycho-vegetative stress reactions in children - headache, fear, and difficulty breathing are the most common complaints. Fear and difficulty breathing are also associated with increased anxiety, social withdrawal and increased irritability in children with COVID-19 when the mask wearers experience the sensation of expiratory feelings [74]. Additional fear inducing and often exaggerated media coverage can further intensify this. A recent meta-analysis of 24 studies found that between the years 1918 and 2014 Ebola outbreak was associated with a significant increase in the risk of all publicly published information [75]. Researchers classified a total of 28% of the information as provocative and polarizing and 46% of the information as fear inducing. The fear induced by the media may be associated with increased anxiety and stress. The fear of contagion with masks and the fear of government mask wearer need is belong [76], causes a social dilemma that seems partly unfounded from a medical and scientific point of view.

Fear and difficulty breathing are the most significant complaints associated with masks in children and may be associated with anxiety and stress. The WHO, for example, has the advantage of the use of masks by healthy people in public to include a potentially positive psychological effect of masks as a sense of contribution to preventing the spread of the virus and a reminder to comply with other measures [2].

Psychiatric Side Effects and Dangers

As explained earlier, masks can cause increased rebreathing with an accumulation of carbon dioxide in the wearer due to insufficient dead space volume (Section 5.2). Hypercapnia (or CO2 retention) is associated with significant increases in cerebral blood flow (CBF) levels in sufferers [14,17,18,20,21,22,23,24,25,26] (Figure 3). However, changes that lead to hypercapnia are also associated with a decline in CBF [77,78,79,80,81,82,83] and cerebrovascular reactivity increases in CO2 levels, which may be a sign of impaired CBF [84].

Interestingly, breath provocation tests by rebreathing CO2 are used to differentiate anxiety states in panic disorders and hypercapnia sufferers from other patients with respiratory complaints and healthy controls [85,86,87,88,89,90,91,92,93]. Panic attacks in susceptible sufferers [15-18,21] The rental accepted at CO2 levels of 5 vol.% [94].

Hypercapnia is also associated with a significant increase in the cerebrovascular response in the respiratory papers in the absence of significant changes in the cerebral blood flow velocity in the middle cerebral artery (MCA) [95,96].

The activation of the locus coeruleus by CO2 is used to generate panic reactions via respiratory pears [79,78]. This is because the locus coeruleus is sensitive to changes in the pH of the cerebrospinal fluid (CSF) and extracellular fluid (ECF) and the brain stem reacts to an appropriate stimulus and changes in the gas concentrations in the blood by releasing the stress hormone norepinephrine [97].

Hypercapnia Side Effects and Dangers

As a cerebral vasodilator, a time-lapsed carbon dioxide level in pregnant women is maintained and an increased respiratory minute ventilation is observed. Hypercapnia is associated with increased anxiety in the unborn child, there is a increased risk of panic in the child, and maternal carbon dioxide (CO2) gradient. The mother's blood carbon dioxide level should always be lower than that of the unborn child's blood to ensure the transfer of the gas across the placenta. The fetal carbon dioxide is excreted by the mother.

Therefore, mask-related phenomena described above (Section 3.1 and Section 5.2), such as the measurable changes in cerebral blood flow (CBF), cerebrovascular reactivity, and respiratory minute ventilation, may be a sign of the mask-induced increase in carbon dioxide (CO2) and hypercapnia. Hypercapnia is associated with a significant increase in the cerebral blood flow, increased cerebral carbon dioxide increases, and as a disturbing variable of the fetal-maternal CO2 gradient increasing over time of pregnancy. Hypercapnia is associated with panic in the child, increased respiratory minute ventilation, and increased anxiety and NSD levels is viewed critically [98].

In addition, it is unknown whether the substances contained in industrially manufactured masks that can be inhaled over longer periods of time (e.g. formaldehyde as an ingredient of the textile and therein as an ingredient of the ear bands) are teratogenic or carcinogenic [99].

3.7. Dermatological Side Effects and Dangers

Masks permeate sweat and moisture, which, masks cover body areas close to the mouth and nose, i.e., body parts that are covered with respiration.

Moisture in the mask is a measurable temperature rise [74,94,95], but also due to a severe increase in humidity due to respiration. Moisture in the mask is a measurable temperature rise [74,94,95], but also due to a severe increase in humidity due to respiration [38,61,62]. It also increases the risk, therefore, pH, fungal, flora through the skin, antibiotic use, increased hydration and sebum production, increased temperature, and occlusion. Moisture in the mask is a measurable temperature rise [74,94,95], but also due to general, the skin becomes more susceptible to infections and acne.

Acne is a common side effect of masks and is due to the occlusal barrier function of the skin after only a 1-4 weeks of wearing and in 20 healthy volunteers. Moisture in the mask is a measurable temperature rise [74,94,95], but also due to general, the skin becomes cumulative on the outside and inside of the masks due to the warm and moist environment [38,61,62,95]. They can cause clinically significant changes in the skin's function and structure. Moisture in the mask is a measurable temperature rise [74,94,95], but also due to General Robert Koch Institute (RKI) from [100] [100] could be another indication of this phenomenon.

The pressure of the masks also causes an obstruction of the flow physiology of sweat and blood vessels in the face, with the exception of the forehead and the area around the eyes [101]. Moisture in the mask is a measurable temperature rise [74,94,95], but also due to pressure and friction, which can cause or exacerbate acne.

Other researchers examined 322 participants with N95 masks in an observational study and detected acne in up to 59.4% of participants and folliculitis in 51.8% as side effects [102].

In up to 16.8% [27] of the 1383 wearers of different masks (commonly masks, surgical, N95 masks), itching could be observed in the face and ears, and in up to 12% of healthcare workers in a questionnaire study [103]. Itching in the face and ears is a sign of use was significantly related to the risk of itching (p = 0.01) [27].

Other dermatological side effects of masks, in a study of 1061 healthcare workers of different types (commonly masks, surgical masks, N95 masks) in healthcare workers with a significant increase in the risk of dermatitis, itching, and pimples on the face were found: Itching (21.5%), spread sensitization (12.2%) and difficulty breathing (39.8%) (p = 0.01) [27].

Moisture in the mask is a measurable temperature rise [74,94,95], but also due to pressure and urticaria [94] are generally described in connection with hypersensitivities to ingredients of the industrially manufactured masks (surgical mask and N95) such as formaldehyde, glutaraldehyde, and ethylene oxide. Moisture in the mask is a measurable temperature rise [74,94,95], but also due to pressure and urticaria are also described in connection with the use of masks and respirators. Formaldehyde is a known allergen and carcinogen and is used as a disinfectant in the industry.

Pressure ulcers and pressure hyperpigmentation as a result of post-inflammatory or pigmented contact dermatitis has been described by dermatologists after prolonged mask use [104].

3.8 Eye Damage Side Effects and Dangers

There are reports from dental consultants about negative effects of masks and are accordingly titled "mask mouth" [105]. Dermatologists and dental consultants report that the use of masks can lead to "mask induced" skin lesions and oral mucosal manifestations with Candida albicans and cheilitis (inflammation of the lips), especially of the corners of the mouth, and even plaque and tartar on the teeth. The use of masks can lead to "mask induced" skin lesions and oral mucosal manifestations with Candida albicans and cheilitis (inflammation of the lips), especially of the corners of the mouth, and even plaque and tartar on the teeth. Mouth breathing causes surface dehydration and reduced salivary flow rate [97,98]. Dry mouth is scientifically proven due to mask wearing and is a sign of the mask-induced hypercapnia. Dry mouth is scientifically proven due to mask wearing and is a sign of the mask-induced hypercapnia. Dry mouth

Abstract

The potential diseases and undesirable effects found in multidisciplinary areas illustrate the general scope of global decisions on the environmental impacts of the use of mask-wearing. Mandatory mask-wearing has been a hot topic of debate and has generated contradictory perspectives from the world's leading experts in the medical and social and physical fields.

Neither higher level institutions such as the WHO or the European Centre for Disease Prevention and Control (ECDC) nor lower level ones such as the Centers for Disease Control and Prevention (CDC), USA (CDC), or the Centers for Disease Control and Prevention with scientific data a positive effect of masks in the public (in terms of a reduced rate of spread of COVID-19 in the population) [87,88].

In order to the scientifically unknown environmental impacts of mask-wearing, the authors have reviewed the literature and have found they issued their theoretical assessments on the masks in public places, even though the compulsory wearing of masks gives a positive feedback [89].

From an infection epidemiological point of view, masks in everyday use offer the risk of self-contamination by the wearer from contaminated surfaces of the mask and hands, which can be transferred to the face, which is suitable for bacteria and fungi to grow and accumulate infectious agents from the respiratory and also from the ambient air on the outside and inside of the mask. In addition, the wearer's hands are contaminated by touching the face and the mask. The mask is a "trap" for the wearer, which is a suitable place for the detection of microbial pathogens in the vicinity of the wearer's face [90] [91]. Such a mask is a suitable place for the transmission of infectious agents. Through further investigations would therefore be desirable.

Masks can cause by the general public, the wearer, and healthcare workers, the risk of infection because the standardized hygiene rules of hospitals cannot be followed by the general public [9]. On top of that, masks (surgical, N95, fabric masks) can cause skin irritation, acne, and other skin lesions, which can be a breeding ground for pathogenic germs and thus a source of infection, especially for healthcare workers [92].

The history of modern times shows that already in the influenza pandemics of 1918–1919, 1957–1958, 1968, 2002, or 5400 years ago, people with masks with the "beaked" shape were considered "plague doctors" and were avoided by people who fled from the agent *Yersinia pestis* [93].

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It should not go unmentioned that very recent data suggest that the detection of SARS-CoV-2 infection does not seem to be affected by the use of masks, even in the case of prolonged exposure in hospitals. Moreover, the results suggest that the use of masks might even offer a form of protection against other coronavirus infections. The subjects in question had a lower risk (odds ratio 0.14) and another 14.4% of their treaty [94].

In a Danish population-based study in a mask-wearing control cut at about 6000 participants and published in 2020, scientists found no statistically significant difference in the rates of SARS-CoV-2 infection when comparing the group of 3030 mask wearers with the control group of 3049 people who did not wear masks [95].

Indeed, in the case of non-medical masks, it is not clear how they should be sustainably recycled or disposed of so as not to contaminate biological, chemical, physical and psychological side effects [97]. Accordingly, some experts claim that well-intentioned mandatory mask-wearing may do more harm than good.

The dermatological colleagues were the first to describe common adverse effects of mask-wearing in large collectives. Dermatologists have described a new form of "mask" acne, "mane", and other dermatoses associated with mask-wearing, which occurred darker in up to 60% of those who had previously had no dermatological problems. Dermatoses included folliculitis, rosacea, dermatitis aggravated by sweat and contact, and acne formation [27,73,74].

Dermatologists have also proposed a set of recommendations to further determine effects affecting other organ systems.

In our work, we have identified scientifically validated and numerous statistically significant adverse effects of masks in various fields, especially with regard to the health of the wearer. Although the World Health Organization (WHO) has issued a recent opinion on the respiratory physiology and gas metabolism of the body (see **Figure 4** and **Figure 5**), the respiratory physiology and gas metabolism of the body, the authors have not taken into account the research results of Kisely [75], Lim [76], and Chandrasekaran [77] on the adverse effects of masks on healthcare workers. Instead, they cited a much more disadvantageous study by Cheng [78] on the effects of masks on healthcare workers (**Figure 2**). [98,99,81] leads to a rebreathing of carbon dioxide with every breathing cycle [87,17,18,92,93], with—in healthy people—nearly a doubling of carbon dioxide in the inspiratory air, which can cause headaches, dizziness, and fatigue (**Figure 2**, **Figure 3**, **Figure 4**, **Figure 5**) [18,92].

According to the results of the study, the WHO also issued a separate guideline on the use of masks in children in the context of COVID-19 [100] and stated that children under the age of 6 years should not wear masks, children aged 6–11 years should wear masks in some circumstances, and children aged 12 years and older should wear masks in the same way as adults. The guidelines are based on the principle of rational use of masks, which is based on the principle of benefit, harm, feasibility, acceptability, and cost-effectiveness, and are accurate and conservative concerns [100].

According to experts, masks have been shown to hinder effective communication and the exchange of emotions and not only hinder learning but deprive children of the positive effects of smiling, laughing and emotional memory [92]. The effectiveness of masks in children is also questionable, and there is a lack of evidence for their widespread use in children. This is also addressed in more detail by the scientists of the German University of Bremen in their thesis page 2.3 and 3.3 [101].

3.10 Effects on the Environment

According to WHO estimates of a demand of 89 million masks per month, then global production will continue to increase significantly in the coming years. Due to the increasing demand, the production of masks, disposable gloves and other PPE, polypropylene, polyethylene, polyurethane, polystyrene, polyethylene terephthalate, polyamide and polycarbonate [102], an increasing global problem is the disposal of these plastics, which will inevitably end up in landfills or in the environment, where they will gradually disintegrate into smaller and smaller particles, the so-called microplastics. These microplastics are also a problem for the pollution of all water cycles up to the marine environment [103].

A significant feature of microplastics is that they can absorb heavy metals in the form of microplastics after decomposition into the food chain. Likewise, contaminated microplastic disposable mask waste—especially before microscopic decay—represents an aesthetically unsightly and unhygienic nuisance in the environment, which can be a breeding ground for pathogens [104,27,28,105,106]. Thus, the contaminated everyday mask material is insufficiently regulated even in western countries.

4. Discussion

The potential diseases and undesirable effects found in multidisciplinary areas illustrate the general scope of global decisions on the environmental impacts of the use of mask-wearing. Mandatory mask-wearing has been a hot topic of debate and has generated contradictory perspectives from the world's leading experts in the medical and social and physical fields.

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It should not go unmentioned that very recent data suggest that the detection of SARS-CoV-2 infection does not seem to be affected by the use of masks, even in the case of prolonged exposure in hospitals. Moreover, the results suggest that the use of masks might even offer a form of protection against other coronavirus infections. The subjects in question had a lower risk (odds ratio 0.14) and another 14.4% of their treaty [94].

In a Danish population-based study in a mask-wearing control cut at about 6000 participants and published in 2020, scientists found no statistically significant difference in the rates of SARS-CoV-2 infection when comparing the group of 3030 mask wearers with the control group of 3049 people who did not wear masks [95].

Indeed, in the case of non-medical masks, it is not clear how they should be sustainably recycled or disposed of so as not to contaminate biological, chemical, physical and psychological side effects [97]. Accordingly, some experts claim that well-intentioned mandatory mask-wearing may do more harm than good.

The dermatological colleagues were the first to describe common adverse effects of mask-wearing in large collectives. Dermatologists have described a new form of "mask" acne, "mane", and other dermatoses associated with mask-wearing, which occurred darker in up to 60% of those who had previously had no dermatological problems. Dermatoses included folliculitis, rosacea, dermatitis aggravated by sweat and contact, and acne formation [27,73,74].

Dermatologists have also proposed a set of recommendations to further determine effects affecting other organ systems.

In our work, we have identified scientifically validated and numerous statistically significant adverse effects of masks in various fields, especially with regard to the health of the wearer. Although the World Health Organization (WHO) has issued a recent opinion on the respiratory physiology and gas metabolism of the body (see **Figure 4** and **Figure 5**), the respiratory physiology and gas metabolism of the body, the authors have not taken into account the research results of Kisely [75], Lim [76], and Chandrasekaran [77] on the adverse effects of masks on healthcare workers. Instead, they cited a much more disadvantageous study by Cheng [78] on the effects of masks on healthcare workers (**Figure 2**). [98,99,81] leads to a rebreathing of carbon dioxide with every breathing cycle [87,17,18,92,93], with—in healthy people—nearly a doubling of carbon dioxide in the inspiratory air, which can cause headaches, dizziness, and fatigue (**Figure 2**, **Figure 3**, **Figure 4**, **Figure 5**) [18,92].

According to the results of the study, the WHO also issued a separate guideline on the use of masks in children in the context of COVID-19 [100] and stated that children under the age of 6 years should not wear masks, children aged 6–11 years should wear masks in some circumstances, and children aged 12 years and older should wear masks in the same way as adults. The guidelines are based on the principle of rational use of masks, which is based on the principle of benefit, harm, feasibility, acceptability, and cost-effectiveness, and are accurate and conservative concerns [100].

According to experts, masks have been shown to hinder effective communication and the exchange of emotions and not only hinder learning but deprive children of the positive effects of smiling, laughing and emotional memory [92]. The effectiveness of masks in children is also questionable, and there is a lack of evidence for their widespread use in children. This is also addressed in more detail by the scientists of the German University of Bremen in their thesis page 2.3 and 3.3 [101].

3.10 Effects on the Environment

According to WHO estimates of a demand of 89 million masks per month, then global production will continue to increase significantly in the coming years. Due to the increasing demand, the production of masks, disposable gloves and other PPE, polypropylene, polyethylene, polyurethane, polystyrene, polyethylene terephthalate, polyethylene terephthalate

Figure 5. Diseases/conjunctivitis with significant rate, according to the literature found, when using masks. Indicators of the overall risk and relative risk are provided.

In addition to protecting the health of their patients, doctors should also bear their actions on the guiding principle of the 1948 Geneva Declaration, in which it states that "the health of my patient will be my first concern" and that "I will maintain the utmost respect for even under threat, not to use the medical knowledge to violate human rights and civil liberties [8]. Within the framework of these feelings, we therefore, propose to scientific medical institutions, logically, together with organized action in consideration of scientific factual reality [2,4,9,14,18,132,133,170,176,177] against a predominantly assumption-led claim to a general effectiveness of masks, always taking into account unwanted collateral effects for the patient and the medical staff, with the greatest concerned, entirely in accordance with the principles of evidence-based medicine and the ethical guidelines of a physician.

Although the use of masks is recommended by many institutions, there is no evidence of the differential diagnosis pathophysiological basis consideration of every pneumonia or conjunctivitis symptoms as proven [2,9,14,18,132,133,170,176,177]. Figure 6, in this way, the physician can draw on an entire comparison catalogue that may be associated with mask-wearing (Figure 2) and also exclude certain diseases based on the comparison catalogue (Figure 5).

For scientists, the prospect of continued trade use in everyday life suggests another opportunity for further research. In our view, further research should be carried out on the long-term consequences of the widespread use of masks, which, in our view, cannot be ruled out because the longer and the, in our view, profound consequences of a potentially risky mask use. Basic research at the cellular level regarding mask-induced triggering of the transcription factor HIF with potential promotion of immunosuppression and immunosuppression of the cellular and humoral immune system in the circumstance. Our scoping review should serve as a starting point.

The described mask-related changes in respiratory physiology can have an adverse effect on the wearer's blood gases subjective well-being and performance. In our view, these changes, which have a negative effect on the health of people, should be taken into account in the assessment of risk in a wide variety of organ systems and metabolic processes with physical, psychological and social consequences for the individual human being.

Abbreviations

Conceptualization, K.K. and D.K.; methodology, K.K. and D.K.; software, D.K.; formal analysis, K.K., D.K., F.G., J.P., B.K., D.S., S.F. and G.K.; resources, K.K., D.K., F.G., J.P., B.K., D.S., S.F. and G.K.; writing—original draft preparation, K.K., D.K., F.G., J.P., B.K., D.S., S.F. and G.K.; writing—review and editing K.K., D.K., F.G., J.P., B.K., D.S., S.F. and G.K. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

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