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Black Rhino Conservation and Ranger Wellness in Namibia

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May 20, 2024

A thesis submitted to the faculty of the Environmental Studies Department in partial fulfillment of the graduation requirements for the Degree of Bachelor of Arts with honors in Environmental Studies

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ABSTRACT

Wildlife rangers play an essential role in conserving biodiversity worldwide. Until recently, little was known about ranger working conditions and welfare. In 2019 the World Wildlife Fund (WWF) released a report that summarized survey results about ranger wellness from 7,110 rangers across multiple continents. However, the WWF study had geographic gaps and did not survey rangers from southern Africa, including the Republic of Namibia. In Namibia, rangers in the Kunene region are central to the conservation of the desert-adapted black rhino. Save the Rhino Trust (SRT) is a Namibian organization that supports rhino rangers and black rhino conservation. The aim of this thesis is to compare the status of Namibian rhino ranger welfare to the welfare of rangers in other African countries surveyed by the WWF using the WWF survey data and survey data from a 2021 SRT survey of 55 rangers. Additionally, this thesis aims to evaluate the impact of a welfare intervention implemented in 2021 by SRT using the 2021 survey and a 2024 SRT survey of 25 rangers. I find that Namibian rangers have improved welfare compared to other rangers in Africa related to exhaustion, access to clean drinking water, and the belief that the basic necessities provided to them are sufficient. However, rangers in Namibia have less access to medical treatment and insurance than rangers in other African countries. The results of this thesis suggest that SRT's welfare intervention to date has had mixed results. The SRT interventions have helped rangers to address selected ailments, such as headaches, scorpion stings, and diarrhea, but there is remaining need for ongoing programming such as regular doctor's visits and continual first aid training to continue to support and improve ranger welfare. Understanding the status of ranger welfare as well as what can be done to improve ranger welfare is critical not only for black rhinos in Namibia but for the conservation of many other species around the world.

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INTRODUCTION

Global Biodiversity Crisis

Biodiversity is threatened globally. Out of an estimated eight million species on Earth, one million are currently threatened with extinction, and current rates of extinction are hundreds of times higher than the background rate of extinction (UNEP, 2022; *UNEP and Biodiversity*, n.d.). Since 1970, wildlife populations monitored by the World Wildlife Fund (WWF) have decreased an average of 69% despite decades of national and international policies and agreements to promote global biodiversity. Major drivers of biodiversity loss include land-use change, climate change, habitat fragmentation and degradation, illegal harvesting, invasive species, and pollution (Almond et al., 2022; UNEP, 2022). In order to conserve global biodiversity and protect human life well into the future, transformative efforts are needed to address these threats.

Large Mammal Conservation and Poaching

Large mammals are particularly threatened with extinction. Large mammals, such as rhinoceros, elephants, and lions, support ecosystem services and serve vital roles in the ecosystem functioning, thus supporting a healthy and sustainable planet for humans as well as other wildlife (Knight et al., 2022).

Poaching, or illegal killing, is a particularly serious threat to many large mammals. Illegal harvesting of large mammals threatens these species directly and has ripple effects across trophic levels and impacts human societies (Kahler & Gore, 2015). Poaching can result in extinction of species, and its destructive effects can be exacerbated if breeding females are targeted (Knight et al., 2022). The susceptibility of any given animal to extinction is influenced by many biological, ecological, and societal factors (Kahler & Gore, 2015; Knight et al., 2022). Poachers illegally kill animals for multiple reasons, including retaliatory killing or other killing fueled by human-wildlife conflict, and because of the economic benefits that come from poaching animals for horns, tusks, or other body parts (Kahler & Gore, 2015).

The rhinoceros is one of the world's most threatened large mammals. There are five species of rhino left in the world. The black rhinoceros (*Diceros bicornis*) is one of the world's most at-risk rhinoceros species. Black rhino populations declined to an estimated 2,300

individuals in the mid-1990s, primarily due to demand for their horns for medicinal or ornamental purposes in Southeast Asia (State of the Rhino, 2020; Emslie, 2020). While black rhino populations have since increased, they remain critically endangered (Emslie, 2020). As of 2020, there are an estimated 6,487 black rhinos individuals in the world, and 2,196 of them are in Namibia (*State of the Rhino*, 2020). The Kunene region, a vast desert area in the north-west of Namibia, is home to many large mammal species including lion, elephant, and the majority of desert-adapted black rhino (*Diceros bicornis bicornis*) in the world. (Wilderness, n.d.; Save the Rhino Trust, n.d.). Ending rhino poaching and the illegal rhino horn trade is a lofty challenge (Knight et al., 2022).

In Namibia as well as other countries in southern Africa, most poaching is undertaken by organized crime syndicates who rely on local people for information about where valuable species reside and how they are protected (Naro et al., 2020). Thus, local people can play a powerful role in either aiding poaching operations, or inhibiting them.

Role of Rangers

In many regions, wildlife rangers have an important role in protecting biodiversity. Rangers are individuals who are either employed or volunteer to safeguard natural areas, historic sites, and cultural sites. Worldwide, rangers play a major part in preventing biodiversity loss, but also engage in monitoring wildlife, managing wildlife, outreach, and education. Many organizations, including government agencies, nonprofit organizations, private conservation companies, or communities may utilize rangers (Singh et al., 2021).

In addition to providing physical protection for wildlife, rangers often also engage in community education and other aspects of conservation (Singh et al., 2021). The International Ranger Federation, an international organization dedicated to representing and supporting rangers, regularly convenes a World Ranger Congress. At these events, rangers and those that work with rangers meet to share knowledge, discuss issues, and build community (Singh et al., 2021). At the 2019 World Ranger Congress, delegates passed the Chitwan Declaration. This declaration states that rangers have an “indispensable role in protecting the cultural heritage, natural resources, and ecosystem services of the countries in which they work, thereby significantly contributing towards mitigation of... climate change and to the achievement of the 2030 Agenda for Sustainable Development” (*Chitwan Declaration*, 2019).

Despite their important work, rangers often face harsh working conditions, and their efforts are often undervalued and understudied (Moreto et al., 2021; Singh et al., 2021). Multiple studies have shown that increasing the number of rangers and improving ranger welfare and job satisfaction can improve conservation outcomes (Farhadinia et al., 2023; Spira et al., 2019). The 2019 World Ranger Congress similarly called for specific improvements to ranger welfare, such as ensuring access to resources like clean drinking water, first aid, and physical and mental health care (*Chitwan Declaration*, 2019).

Objectives

This study seeks to better understand Namibian ranger welfare by exploring three questions. First, how does the welfare of rangers supported by Save the Rhino Trust (SRT) in the Kunene region of Namibia compare to the welfare of rangers in six other African countries in terms of exhaustion levels, perceptions of danger, and access to water resources and medical services? Second, how has the SRT welfare intervention impacted ranger welfare in terms of exhaustion levels, perceptions of danger, and access to water resources, medical services, and first aid? Lastly, what can be learned from SRT's welfare program that may be applicable to programs supporting ranger welfare and the conservation of other species in other regions of Namibia or in other countries?

In this thesis, I first introduce the importance of rangers and ranger welfare in the context of global biodiversity, Namibia's unique community-based black rhino conservation efforts, and the organization Save the Rhino Trust (SRT). I then use survey data from the WWF and SRT, as well as qualitative interviews with Namibian rhino rangers, to compare ranger welfare and evaluate the impact of SRT's welfare intervention. I discuss the results of these analyses, including how and why Namibian ranger experiences differ from other African rangers, the importance of the welfare intervention, and the implications the results of this study for the future of conservation in Namibia and elsewhere.

Existing Literature on Ranger Job Satisfaction and Motivation

An emerging literature on ranger welfare has investigated ranger job satisfaction, motivations, and working conditions of rangers (but these are fairly geographically limited). One factor that influences ranger job satisfaction and motivations is salary and promotional

opportunities. Moreto et al. (2016) and Spira et al. (2019) find that increasing ranger salaries and opportunities for promotion is positively associated with increased job satisfaction, motivation, and morale. Moreto et al. (2016) find the importance of ranger salary extends beyond individual rangers because rangers often spend their wages supporting their families and educating their children. Ranger salaries vary by country and region. In some locations, such as Queen Elizabeth National Park in Uganda, rangers report they are well compensated (Moreto et al., 2016). In a study of rangers across 33 countries in Asia, Farhadina et al. (2023) find that, on average, rangers are paid 1.9 times minimum wage and about 1.2 times as much as “alternative employment options” (such as agriculture or forestry).

However, low and irregular wages remain a source of stress. Concerns about wage are frequently reported as one of the worst parts of ranger jobs globally (Moreto, 2016; Singh et al., 2020). Moreto et al. (2019) conclude that rangers surveyed across Asia cited low salaries and lack of promotional opportunities as a reason they did not want their children to become rangers.

In addition to low pay, the challenging physical working conditions rangers often face are commonly cited as a detriment to job satisfaction. These include harsh natural conditions, lack of access to water, and encounters with dangerous wildlife and poachers (Moreto, 2016; Parker et al., 2022; Singh et al., 2020). One recommendation to improve ranger job satisfaction is to provide bonuses for rangers who worked in higher risk areas (Spira et al., 2019). However, some studies also suggest that rangers enjoy the physical nature of the work, and that the difficulty of the job enhances their self-legitimacy (Moreto et al., 2016, 2021).

One reason that rangers may enjoy the physical nature of the job is because they can spend time in nature interacting with wildlife. Proximity to wild animals has been found to be a positive contributor to job satisfaction for rangers. In some cases, rangers had not seen much wildlife before becoming rangers, and the ability to play a role in protecting wildlife is a positive contributor to motivation (Moreto et al., 2016; Singh et al., 2020).

Finally, several studies have shown that the frequency with which rangers see their families is a major component of job satisfaction (Singh et al., 2020; Spira et al., 2019). Singh et al. (2020) find that African rangers in particular reported rarely seeing their families as a negative aspect of their job (Singh et al., 2020). Relatedly, studies have also shown that local rangers (rangers that live near where they are employed) spend more time with their families and thus have improved job satisfaction (Parker et al., 2022). Local rangers have improved

satisfaction and experience lower levels of emotional exhaustion than non-local rangers because they spend more time with their families and have strong, positive, relationships with local communities (Parker et al., 2022). Such connections between rangers and communities does not only improve ranger welfare but is hypothesized to improve conservation outcomes by positively connecting communities with conservation (Moreto et al., 2017).

Life on the Frontlines 2019 Report

While many studies have looked at ranger job satisfaction, most are geographically limited and focus on ranger job satisfactions and motivations and do not consider aspects of health and welfare. In order to address this gap in research and knowledge, the WWF surveyed public-sector patrol rangers across the globe between 2016 and 2019, including six African countries (Belecky et al., 2019).

The WWF survey asked about employment, equipment, health and insurance, training, community relations, misconduct, workplace dynamics, and conservation laws. This comprehensive study culminated in a 2019 report entitled *Life on the Frontline 2019: A Global Survey of the Working Conditions of Rangers* (Belecky et al., 2019). One of the main takeaways of this report is that “rangers are facing excessive safety and health risks that could be significantly reduced with the appropriate interventions” (Belecky et al., 2019). The report furthermore recommends greater analysis of collected data, as well as additional data collection on rangers at sites elsewhere in the world.

WWF Africa Study Sites

The WWF surveyed rangers in six African countries: Cameroon, Uganda, Central African Republic, Republic of Congo, Kenya, and Tanzania (Belecky et al., 2019). Cameroon is home to several biomes, including savanna, desert, and rainforests (Farrows, n.d.). Major conservation challenges for species such as leopard, chimpanzees, pangolins, and gorilla, include high rates of deforestation for logging and agriculture, as well as poaching (Forest Conservation Fund, n.d.; Farrows, n.d.). In terms of community involvement in conservation, in 2022 the government of Cameroon gave local communities management rights to a forest that connects critical western lowland gorilla habitat (Forest Conservation Fund, n.d.).

In Uganda, poaching and habitat loss threaten endangered species such as gorillas, elephants, chimpanzees, and giraffes across rainforests, woodlands, and grasslands (WCS, n.d.; Uganda African Wildlife Foundation, n.d.). Local people are engaged in conservation in Uganda through revenue sharing. About 20% of conservation park revenue, as well as a portion of income from gorilla-tracking permits for tourists, goes to communities who border park land (UWA, n.d.).

In the Central African Republic, endangered species such as elephants and gorillas are threatened by poaching and the illegal wildlife trade, as well as political and social instability that has made conservation management tumultuous (African Parks, n.d.; European Commission, n.d.; WWF in the Central African Republic, n.d.). Despite such instability in management, in recent years, some conservation projects have involved and supported local community development (IUCN, n.d.; European Commission, n.d.).

The Republic of Congo is home to a portion of the Congo Basin, a biodiverse area with many endangered species including elephants, gorillas, chimpanzees, and bonobos. The major threats to wildlife in this area are deforestation, illegal harvesting, and the illegal wildlife trade (Wildlife Conservation Society, n.d.; WWF, n.d.).

In Kenya, major threats to biodiversity include habitat loss, population growth, human wildlife conflict, and poaching (Kenya, African Wildlife Foundation, n.d.; Kenya Wildlife Trust, n.d.). Giraffe, elephants, zebra, lions, and other predators are all species of concern in Kenya (Kenya, African Wildlife Foundation, n.d.; Kenya Wildlife Trust, n.d.). Kenya utilizes community conservation through formalized community conservancies, which are legally recognized entities who benefit from and have rights over natural resources on their land (Nature, n.d.). However, the benefits from participating in conservancies are not equitably distributed. Conservancy participation requires land ownership, meaning that those who benefit most from conservancies are older men who own land (Ogutu, 2024).

In Tanzania, wildlife such as endangered species of rhino, elephant, lion, and giraffe, are threatened by human-wildlife conflict, habitat degradation, and illegal harvesting for wildlife trafficking (Tanzania African Wildlife Foundation, n.d.). Though Tanzanian conservation authorities engage in revenue sharing with local communities, benefits of revenue sharing are low compared to the costs of living near conservation to local people (Mwakaje et al., 2013).

Namibian Community-Based Natural Resource Management

The WWF survey investigated rangers around the world, but the study has geographic gaps, especially in southern Africa. One country where the WWF did not survey rangers is the Republic of Namibia. Namibia is a country in southwest Africa which was colonized by Germany in the 1800s and later by South Africa before gaining independence in 1990 (BBC, 2011; CIA, 2024). Namibia has a very low population density and only 3.0 million residents (World Bank, 2024). The country is characterized by a hot and arid environment, including the Namib desert which is thought to be the oldest desert in the world (CIA, 2024). The Namib desert is known for its diverse wildlife, including the presence of the world's last population of free-ranging southern black rhinos, which helps to fuel the country's tourism industry (Muntifering et al., 2020; CIA, 2024).

Namibia is a unique place to study ranger wellness and conservation because of its unique Community-Based Natural Resource Management (CBNRM) program. CBNRM is a bottom-up, community-centric approach to conservation. This novel conservation model began in 1996 when the Namibian Ministry of Environment and Tourism established the communal conservancy program (Kahler & Gore, 2015). CBNRM allows for formalized, self-governing conservancies made up of communal land residents and private landowners (Muntifering et al., 2020). Once formed, these conservancies are granted management rights over the wildlife and natural resources on their land, and are able to run and benefit from tourism operations in their conservancy (Muntifering et al., 2020). Since their creation, conservancies have reported increases in the abundance of wildlife on their land (Kahler & Gore, 2015). Conservancies positively and formally engage people with conservation and allow the economic benefits of tourism to directly benefit local communities (Kahler & Gore, 2015; Naro et al., 2020).

As opposed to CBNRM, many other African countries practice what has been called “fortress conservation” (Brockington, 2002; Dowie, 2009). Governments using the more typical top-down approach to conservation are more likely to employ highly militarized methods, such as relying on heavily-armed public sector guards. While this approach can be successful, it has been controversial (Brockington, 2002; Dowie, 2009). One argument against the “fortress conservation” approach is that rangers may focus on keeping local people outside of protected areas and wildlife habitat instead of engaging and involving local communities (Dowie, 2009).

Namibian Black Rhino Conservation

In order to both conserve the black rhino and strengthen rural economies, the Namibian government established the Rhino Custodianship Programme in 2005. The Rhino Custodianship Programme returned black rhinos to communal conservancies and the communal lands on which they had historically lived (Muntifering et al., 2017). By returning black rhinos to conservancy land, local communities directly financially benefit from the conservation of black rhino. Following the adoption of CBNRM and the creation of the Rhino Custodianship Programme, Namibian rhino populations have grown to over double their population before 1990, and rates of poaching in the Kunene area have decreased as collaborative conservation efforts deter poachers (Muntifering et al., 2017; NASCO, 2021).

Save the Rhino Trust's Welfare Intervention

Save the Rhino Trust (SRT) is a Namibian black rhino conservation organization founded in 1982. The organization has several programs to promote black rhino conservation, but the oldest is their rhino ranger program. This program employs local people to patrol an area of 25,000 square kilometers in the Kunene region of Namibia and track and collect data on the desert-adapted black rhino (Save the Rhino Trust, n.d.).

Rangers supported and employed by SRT patrol the remote Kunene region for about three weeks at a time in small teams. All their patrol work is done on foot, except for one patrol team that uses mules. Due to the isolated nature of the patrol region, rangers are dropped off in the field with food and water that lasts them for the duration of the patrol. Nearly every day during their time in the field, rangers spend tracking black rhinos. When they find the rhinos, they must get close enough to take a photo of the animal and collect basic data such as sex of the animal and its health condition. These rhino rangers spend long hours in the sun and heat every day while tracking rhinos, and are additionally in danger from rhinos themselves which can charge humans, as well as animals such as snakes and scorpions.

The Rhino Ranger Program provides invaluable data on black rhinos, and SRT has the longest running black rhino database in the world. The Rhino Ranger Program also contributes to local livelihoods by employing rangers to conserve black rhino (Save the Rhino, n.d.; Save the Rhino Trust, n.d.). This is in addition to the economic benefits that communal conservancies can reap by participating in wildlife tourism. Today, SRT supports over 100 local rhino rangers.

These are both local people employed directly by SRT, as well as rangers employed by communal conservancies who are trained, supported, and supervised by SRT.

In response to the recent research into ranger welfare and the recommendations of the WWF 2019 Ranger Report, in 2021 SRT conducted a survey of its own rangers. In December 2021, SRT implemented a welfare intervention to improve the health and wellness of their rangers. The welfare intervention consisted of three components: basic first aid training for rangers, first aid kits to be taken into the field, and regular, ongoing doctor check-ups. SRT conducted a follow-up survey of their rangers in early 2024.

METHODS

This study used survey data from the World Wildlife Fund (WWF) (Belecky et al., 2019) and Save the Rhino Trust (SRT) (J. Muntifering, personal communication, September 29, 2023; April 2024). RStudio was used to compare surveys (R Core Team, 2024). I carried out qualitative interviews of rangers in January 2024 in Namibia.

World Wildlife Fund Survey

WWF surveyed 7,110 patrol rangers between September 2016 and October 2019. The results of the 197-question survey were published in a 2019 report *Life on the Frontlines 2019* (Belecky et al., 2019). The goal of the WWF study was to better understand ranger lives and working conditions. The survey was designed with input from rangers and those that work with rangers and carried out by regional teams who had received training on survey protocols. Rangers in 28 countries were surveyed using convenience sampling to select rangers (Belecky et al., 2019).

Within Africa, WWF surveyed rangers in the countries of Cameroon, Central African Republic, Kenya, Republic of Congo, Tanzania, and Uganda. Out of 10,324 rangers in these countries, 2,061 rangers were surveyed. Responses from African rangers to the health and welfare section of the survey were used to compare Namibian ranger welfare and the welfare of rangers elsewhere in Africa.

Save the Rhino Trust Survey

In 2021, SRT conducted a survey of a subset of rhino rangers, including both rangers employed directly by SRT and community rangers supported by SRT. The goal of this survey was to evaluate the status and health and welfare of rangers hired to protect black rhinos in the Kunene region of Namibia in response to the outcomes of the WWF survey and *Life on the Frontlines 2019* report. The SRT survey consisted of 48 questions and was based on the WWF survey. SRT surveyed 55 out of about 95 total rangers (57.9%) using convenience sampling. In early 2024, SRT staff conducted a follow-up survey of 25 rangers out of 129 rangers total (19.4%) using the same survey instrument. From this sample, 15 rangers had received training and benefits from the welfare intervention implemented by SRT in December 2021, while 10 rangers were newly hired and had not yet received the training and benefits.

Data Cleaning and Analysis

To compare data from the WWF and SRT survey, I first cleaned the data. I used RStudio to analyze the survey data (R Core Team, 2024). I used Pearson's chi-square Test for count data and a Monte Carlo simulation with 50,000 replications to account for the low number of responses (<5) in the Namibia data (Lock et al., 2013). A chi-square test is a hypothesis test that measures if observed frequencies differ significantly from expected frequencies (Lock et al., 2013). I also used a two-sample Wilcoxon Rank Sum and Signed Rank Test (also known as a Mann-Whitney test) which is a non-parametric test that tests if the distribution of two populations are different. I ran three different comparisons. First, in order to understand Namibian ranger wellness in regional context I compared WWF survey data from African rangers and the health portion of the survey to the 2021 SRT survey data. To understand the impact of SRT's welfare intervention I compared 2021 SRT survey data to 2024 SRT survey data. Finally, within the 2024 SRT survey data, I compared responses from new rangers who had received the welfare intervention with those who had received the welfare intervention.

In the WWF *Life on the Frontlines 2019* report, ranger responses are reported as percentages. These percentages needed to be converted into count data in order to compare to Namibian ranger count data in the chi-square analysis. I multiplied each percentage by the total sample size of 2,061 rangers to convert this into count data.

For many questions, the SRT survey offered an “Unsure” response option to rangers that was not included in the WWF report. These “Unsure” answers were omitted from analysis because there is no equivalent to compare them to from the WWF.

For the questions “During patrol at our fly camp, I have access to toilets” and “During patrol at our fly camp, I have access to running water,” a Likert scale of “Never,” “Rarely,” “Often,” and “Always” was provided for ranger responses in both the WWF and SRT survey. However, the SRT survey also provided a “Sometimes” response option to rangers. For these two questions, no Namibian rangers answered “Sometimes” and so this did not require additional analysis. For the “On patrol, I have access to clean drinking water” and “At camp, I have access to clean drinking water,” the same Likert scale was used. For these questions, some Namibian rangers did answer “Sometimes.” Two Chi-square tests were run. In one, the “Sometimes” counts were combined with the “Rarely” category. In the other, the “Sometimes” counts were combined with the “Often” category. Both results are presented in the results section.

For the question, “In my opinion, the basic necessities I am provided are enough,” the Likert scales provided by the WWF and SRT were different (see Table 1). SRT provided a scale from never to always, while the WWF survey provided a scale of strongly disagree to strongly agree. In order to compare results from this question, “Never” responses from the Namibian survey were compared to “Strongly Disagree” responses from the WWF survey, “Rarely” responses were compared to “Disagree” responses, “Often” responses were compared to “Agree” responses, and “Always” responses were compared to “Strongly Agree” responses. Additionally, the SRT survey also included an “Unsure” and “Sometimes” option. As above, “Unsure” responses were not included in analysis as there is no equivalent response in the WWF survey. “Sometimes” responses were combined with “Rarely” and “Often” responses and two analyses were run.

Table 1: Differences Between Save the Rhino Trust (SRT) and World Wildlife Fund’s (WWF) Survey Question Likert Scales

Save the Rhino Trust’s Likert Scale	Survey Question and Number	Differences Between SRT and WWF Likert Scales
	<p>“I feel emotionally exhausted”</p> <p>“I feel physically exhausted”</p>	No “Unsure” option from WWF
Never / Rarely / Sometimes / Often / Always / Unsure	<p>“On patrol I have access to clean drinking water”</p> <p>“During patrol at our fly camp, I have access to toilets”</p> <p>“During patrol at our fly camp, I have access to clean drinking water”</p> <p>“During patrol at our fly camp, I have access to running water”</p>	No “Sometimes” or “Unsure” option from WWF
	<p>“In my opinion, the basic necessities I am provided are enough”</p>	WWF Likert scale: Strongly Disagree / Disagree / Agree / Strongly Agree
Strongly Disagree / Disagree / Agree / Strongly Agree / Unsure	<p>“I think that being a ranger is a dangerous job due to the chance of encountering poachers”</p> <p>“I think that being a ranger is a dangerous job due to the chance of encountering dangerous animals”</p> <p>“When needed, the medical treatment that I am provided is enough”</p>	No “Unsure” option from WWF
Yes / No / Unsure	<p>“My employee insurance scheme provides compensation in cases of a serious injury on the job”</p> <p>“My employee insurance scheme provides compensation in case I am killed on the job”</p>	WWF Likert scale is the same

Qualitative Interviews

I carried out qualitative interviews with a subset of SRT rhino rangers on January 22, 2024. Interviews were conducted offsite from the SRT field base in Palmwag, Kunene. In total, I completed 13 interviews. Interviews were conducted in English. SRT administrative staff translated three of the interviews for rangers who did not speak English. This study was approved by Colby College's Institutional Review Board IRB approval number #2023-127 and funded by the F. Russell Cole Student Research Fellowship through the Colby College Environmental Studies Department. In addition to interviews, I spent several weeks over January 2023 and January 2024 interacting with and watching SRT rangers work in the field. These experiences and observations informed this study and strengthened my relationships with rangers and SRT.

Detailed notes were taken during interviews, and respondents' answers were later characterized in order to create a codebook in Google Sheets. This codebook was used to identify themes in respondents' answers (Creswell & Clark, 2011). Interviews were spot checked as needed for quotes.

RESULTS

Comparing World Wildlife Fund and Save the Rhino Trust Survey Data

For many questions, responses from Namibian rangers to the health portion of the Save the Rhino Trust survey differed from the responses of other African rangers to the health portion of the World Wildlife Fund survey. These include questions related to exhaustion, access to medical necessities, danger and medical treatment, and insurance. The average age of WWF respondents from African countries was 35.6 years old, and 11.2% (n=225) of respondents were female and 88.8% (n=1,777) of respondents were male (Belecky et al., 2019). Rangers surveyed by the WWF had on average spent 9.4 years as a ranger (Belecky et al., 2019). Out of Namibian rangers surveyed by SRT in 2021, the average ranger age was between 36 and 45 years old and 7.3% (n=4) of respondents were female, 92.7% (n=51) were male. The average time spent as a ranger was between 1 and 10 years.

Exhaustion

Namibian rangers reported feeling emotionally and physically exhausted less frequently than African rangers surveyed by the WWF (Figures 1a and 1b). Twenty-two (40.8%) Namibian rangers “Never” or “Rarely” experienced physical exhaustion compared to 698 (33.9%) rangers surveyed from other African countries. Many rangers in both the Namibian (n=27, 50%) and broader African survey (n=950, 46.1%) responded that they were “Sometimes” physically and emotionally exhausted. Only 9.3% (n=5) of Namibian rangers “Often” or “Always” experienced physical exhaustion as opposed to 19.9% (n=410) of surveyed African rangers from other countries. For emotional exhaustion, 56.5% (n=26) of surveyed Namibian rangers “Never” or “Rarely” experienced emotional exhaustion, compared to 40% (n=44) of rangers surveyed from other African countries.

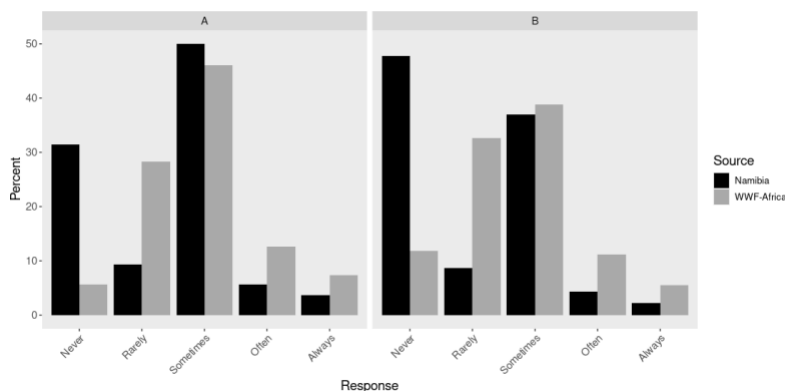


Figure 1 (left): *Distribution of responses from Namibian rangers surveyed by Save the Rhino Trust (SRT) and African rangers surveyed by the World Wildlife Fund (WWF) to the statements (a) “I feel physically exhausted” and (b) “I feel emotionally exhausted.”*

Access to Basic Necessities

Rangers in Namibia were more likely to report that they had consistent access to clean drinking water on patrol than African rangers surveyed by WWF, regardless of how the “Sometimes” responses from the Namibian survey were categorized. A majority (n=42, 76.4%) of Namibian rangers reported that they “Often” or “Always” had access to clean drinking water compared to only 31.8% (n=655) of rangers surveyed in other African countries (Figures 2a and 2b).

Namibian rangers also reported more frequent access to clean drinking water at patrol camps compared to their African peers surveyed by the WWF regardless of how the “Sometimes” responses from the Namibian survey were categorized. Over 75% (n=42) of Namibian rangers surveyed “Often” or “Always” have access to clean drinking water on patrol, compared to only about 40% (n=818) of rangers surveyed in other African countries (Figures 1c and 1d).

About a third (n=20, 36.4%) of Namibian rangers responded that the basic necessities they were provided were “Always” sufficient compared to only 9.1% (n=188) of rangers from other African countries. Twenty-one (38.2%) surveyed Namibian rangers responded “Sometimes” to this question. Regardless of how “Sometimes” responses are grouped and analyzed, significantly more Namibian rangers believe that the necessities they are provided are adequate than rangers elsewhere in Africa (Figures 1e and 1f).

Namibian rangers had less frequent access to toilets on patrol than African rangers in six other African countries. Nearly 95% (n=49) of Namibian rangers surveyed “Never” had access to toilets while on patrol as opposed to only 20% (n=412) of other African rangers (Figure 1g).

Namibian rangers also reported less access to running water than rangers elsewhere in Africa. The majority (n=49, 92.5%) of Namibian rangers “Never” had access to running water, while only 30.2% (n=622) of rangers elsewhere in Africa “Never” had access to running water (Figure 1h).

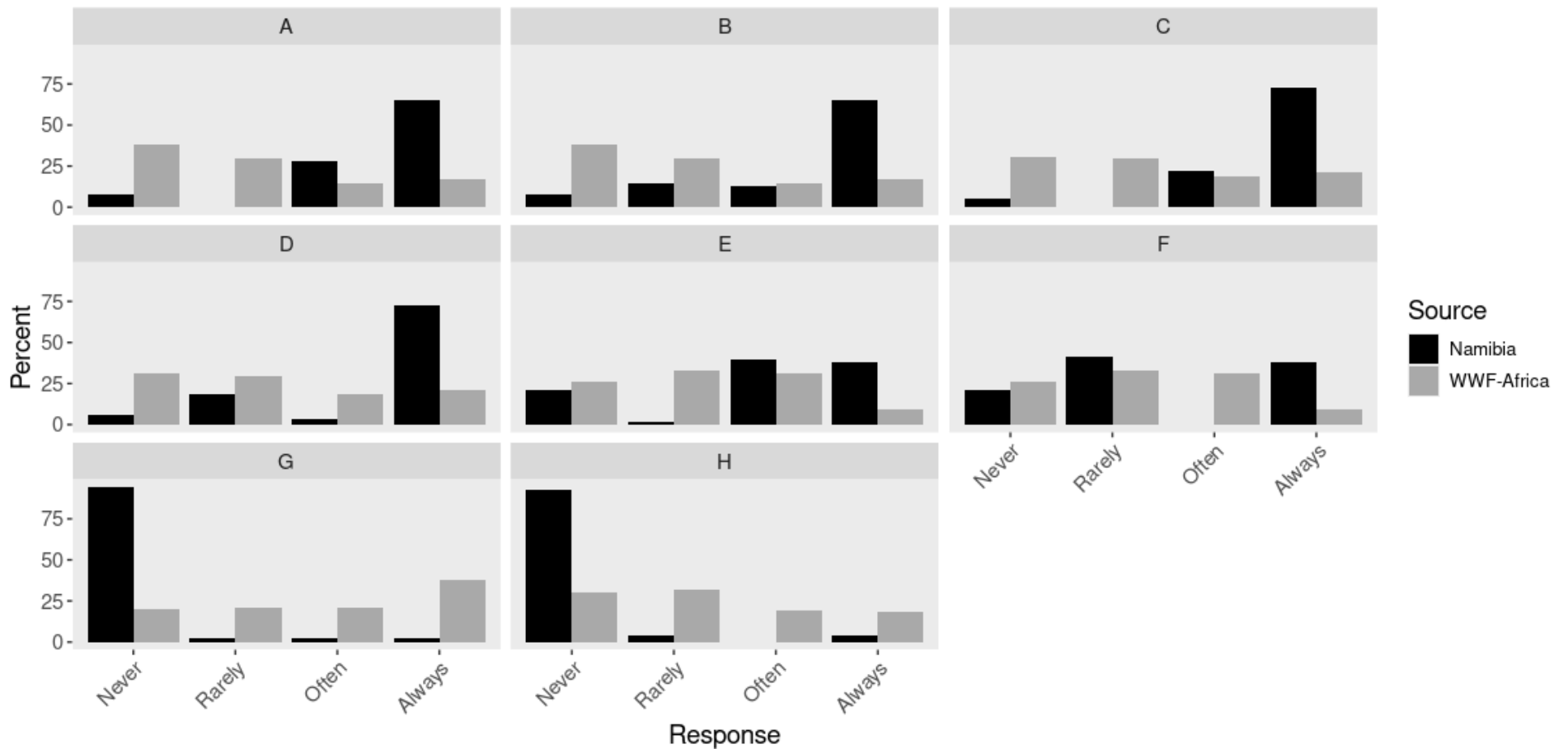


Figure 2: Distribution of responses from Namibian rangers surveyed by Save the Rhino Trust (SRT) and African rangers surveyed by the World Wildlife Fund (WWF) to the statements “On patrol I have access to clean drinking water,” (a) shows “sometimes” responses from the Namibian survey grouped with “often” responses, (b) “sometimes” responses are grouped with “rarely” responses, “During patrol at our fly camp, I have access to clean drinking water,” (c) shows “sometimes” responses grouped with “often” responses and (d) shows “sometimes” responses grouped with “rarely” responses, “In my opinion, the basic necessities I am provided are enough,” (e) shows “sometimes” responses grouped with “often” responses, (f) shows “sometimes” graphed with “rarely” responses, (g) shows “During patrol at our fly camp, I have access to toilets” and (h) shows “During patrol at our fly camp, I have access to running water.”

Danger and Medical Treatment

Namibian rangers were more likely to strongly agree that being a ranger is dangerous because of the chance of encountering both poachers and dangerous wildlife than African rangers surveyed by WWF. Out of the surveyed Namibian rangers, 68.5% (n=37) “Strongly Agree” that being a ranger is dangerous because of poachers and 75.9% (n=41) “Strongly Agree” that being a ranger is dangerous because of dangerous wildlife, compared to 42.7% (n=880) and 38.5% (n=793) of African rangers, respectively (Figure 3a and 3b).

Namibian rangers disagreed more frequently that medical treatment provided is sufficient than African rangers surveyed by the WWF. Out of surveyed Namibian rangers, 65.9% (n=29) disagree to some extent with the statement “When needed, the medical treatment I am provided is enough”, whereas 54.8% (n=1,130) of African rangers surveyed in other countries disagree to some extent with this statement (Figure 3c).

Insurance

Fewer Namibian rangers have insurance, both for serious injury and for death, compared to African rangers surveyed by WWF. The majority (n=38, 69.1%) of Namibian rangers reported that they do not have insurance in cases of serious injury, while only 37.6% (n=775) of rangers in other African countries reported they have insurance.

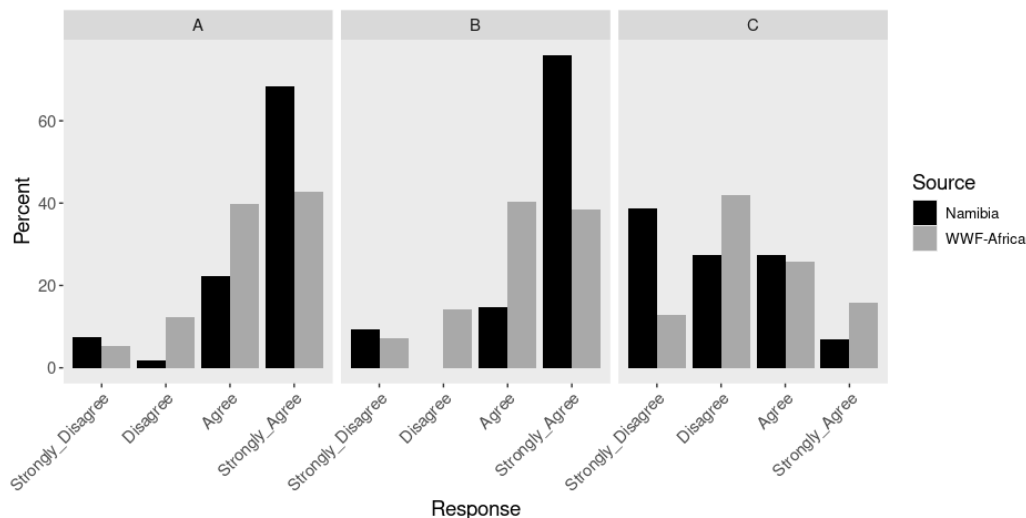


Figure 3: Distribution of responses from Namibian rangers surveyed by SRT and African rangers surveyed by the WWF to the statements (a) “I think that being a ranger is a dangerous job due to the chance of encountering poachers,” (b) “I think that being a ranger is a dangerous job due to the chance of encountering dangerous wildlife,” and (c) “When needed, the medical treatment I am provided is enough.”

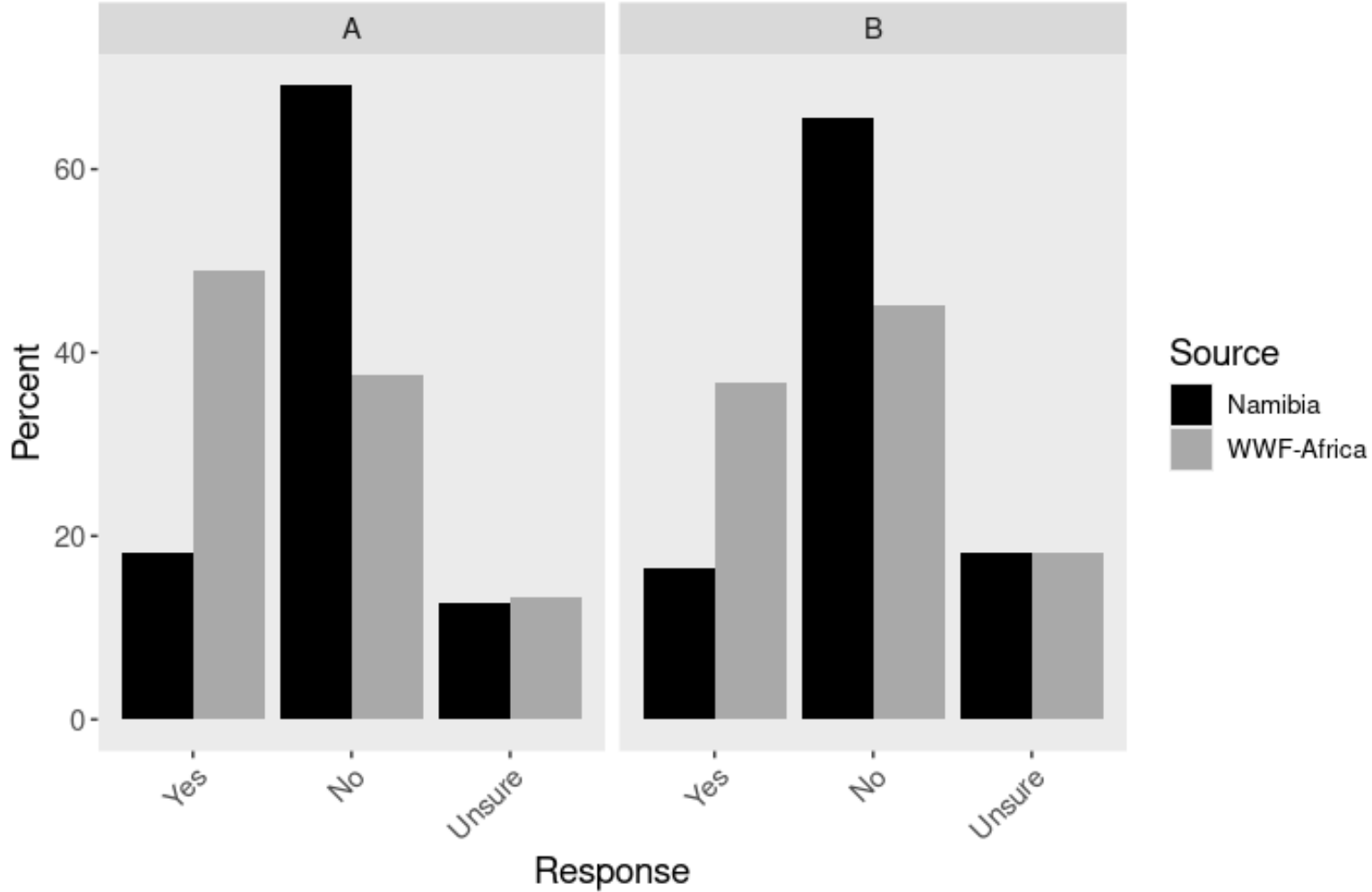


Figure 4 : Distribution of responses from Namibian rangers surveyed by Save the Rhino Trust and African rangers surveyed by the World Wildlife Fund to the statements (a) “My employee insurance scheme provides compensation in cases of a serious injury on the job,” and (b) “My employee insurance scheme provides compensation in case I am killed on the job.”.

Table 2: Summary statistics and significance levels (*<0.05, **<0.01, ***<0.001) of chi-square and Wilcoxon test comparing the responses to questions in the health section of the WWF and SRT surveys. Responses to Q2, Q3, Q6, and Q8 were averaged as 0 = “Never,” 1 = “Rarely,” 3 = “Often,” 4 = “Always.” Responses to Q11, Q12, and Q15 were averaged as 0 = “Strongly Disagree,” 1 = “Disagree,” 3 = “Agree,” 4 = “Strongly Agree.” Responses to Q13 and Q14 were averaged as 0 = “No,” 1 = “Yes.” The WWF sample size for all questions is assumed to be 2,061 (100%).

Question	2021 SRT n (%)	2021 SRT \bar{x}	WWF \bar{x}	Wilcoxon Significance	Chi-square Significance
Q2 “I feel physically exhausted”	54 (98.2)	1.4	0.9	0.005**	<0.001***
Q3 “I feel emotionally exhausted”	54 (98.2)	1.0	0.7	<0.001***	<0.001***
Q6 “During patrol at our fly camp, I have access to toilets”	54 (98.2)	0.2	2.4	<0.001***	<0.001***
Q8 “During patrol at our fly camp, I have access to running water”	53 (96.4)	0.2	1.6	<0.001***	<0.001***
Q11 “I think that being a ranger is a dangerous job due to the chance of encountering poachers”	54 (98.2)	2.5	2.2	<0.001***	0.001**
Q12 “I think that being a ranger is a dangerous job due to the chance of encountering dangerous animals”	54 (98.2)	2.6	2.1	<0.001***	<0.001***
Q13 “My employee insurance scheme provides compensation in cases of a serious injury on the job”	55 (100)	0.2	0.6	<0.001***	<0.001***
Q14 “My employee insurance scheme provides compensation in case I am killed on the job”	55 (100)	0.2	0.4	<0.001***	0.004**
Q15 “When needed, the medical treatment that I am provided is enough”	55 (100)	1.0	1.4	0.124	<0.001***

Table 3: Summary statistics and significance levels (*<0.05, **<0.01, ***<0.001) of chi-square and Wilcoxon test comparing the responses to questions in the health section of the WWF and SRT surveys for questions where the SRT survey offered rangers a “Sometimes” response option, but the WWF did not. Responses were averaged as 0 = “Never,” 1 = “Rarely,” 3 = “Often,” 4 = “Always.” The WWF sample size for all questions is assumed to be 2,061 (100%).

Question	2021 SRT n (%)	SRT \bar{x}	WWF \bar{x}	Wilcoxon significance	Chi-square significance when “Sometimes” responses are combined with “Often”
					Chi-square significance when “Sometimes” responses are combined with “Rarely”
Q4 “On patrol I have access to clean drinking water”	54 (98.2)	3.3	1.4	<0.001***	<0.001***
Q5 “In my opinion, the basic necessities I am provided are enough”	54 (98.2)	2.3	1.6	0.003**	<0.001***
Q7 “During patrol at our fly camp, I have access to clean drinking water”	55 (100)	3.4	1.7	<0.001***	<0.001***

Comparing Ranger Responses Before and After the Implementation of the Welfare Intervention

In the 2024 SRT welfare survey, the average age of respondents was between 36 and 45 years old. Only 7.3% (n=4) of respondents were females, and 84% (n=21) were males. The average time respondents had spent as a ranger was between one and 10 years. Rangers surveyed after the welfare intervention were more likely to report that they experienced physical and emotional exhaustion, greater access to medical kits, lessened perception of the dangers posed by animals, and greater frequency with which they see their families compared to rangers surveyed before the welfare intervention. Rangers after the welfare intervention were also less likely to have clean drinking water access on patrol and at camp compared to rangers surveyed before the intervention.

There was little change in response from Namibia rangers pre- and post- intervention for questions related to perceptions of the adequacy of basic necessities and medical treatment, access to toilets, insurance coverage, and perceptions of the dangers of encountering poachers in the field.

Exhaustion

Rangers after the welfare intervention reported experiencing more physical and emotional exhaustion than rangers before the implementation of the welfare intervention. Most surveyed rangers after the welfare intervention responded that they were “Sometimes” physically (n=15, 60%) and emotionally (n=16, 64%) exhausted. Before the welfare intervention, 49.1% (n=27) of rangers were “Sometimes” physically exhausted and 30.9% (n=17) were “Sometimes” emotionally exhausted.

Four (16%) surveyed Namibian rangers responded that they were “Never” or “Rarely” physically exhausted after the welfare intervention compared to 22 (40%) rangers before the welfare intervention. In terms of emotional exhaustion, 16% (n=4) Namibian rangers surveyed responded “Never” or “Rarely” emotionally exhausted after the welfare intervention as opposed to 47.3% (n=26) rangers before the welfare intervention (Figures 5a and 5b).

Water Access

Rangers after the welfare intervention reported less access to clean drinking water on patrol and at camp than rangers surveyed before the welfare intervention (Figures 5c and 5d). The majority (n=16, 64%) of rangers surveyed after the welfare intervention reported “Sometimes” having access to clean drinking water while on patrol, while the majority of rangers (n=8, 14.5%) surveyed before the welfare intervention reported “Always” having clean drinking water while on patrol. In terms of water access at camp, the majority of rangers after the welfare intervention (n=15, 60%) reported they “Sometimes” had access to clean drinking water compared to the majority of rangers before the welfare intervention who “Always” had access to clean drinking water (n=35, 63.6%).

Rangers surveyed after the welfare intervention also reported greater access to running water than rangers surveyed before the welfare intervention (Figure 5e). Before the welfare intervention, 89.1% (n=49) of rangers before the welfare intervention “Never” had access to running water compared to 44% (n=11) of rangers surveyed after the welfare intervention who “Never” had access to running water.

Medical Kits

Rangers after the welfare intervention reported greater access to medical kits (Figure 5f). After the welfare intervention, 72% (n=18) of rangers “Always” had access to medical kits, as opposed to only 1.8% (n=1) ranger surveyed before the welfare intervention. Before the welfare intervention, 90.9% (n=50) of rangers surveyed “Never” had access to medical kits.

More rangers after the welfare intervention were trained in the use of the medical kits (Figure 6). After the welfare intervention, 72% (n=18) of surveyed rangers had received training on the use of the medical kits, as opposed to only 27.3% (n=15) of surveyed before the welfare intervention.

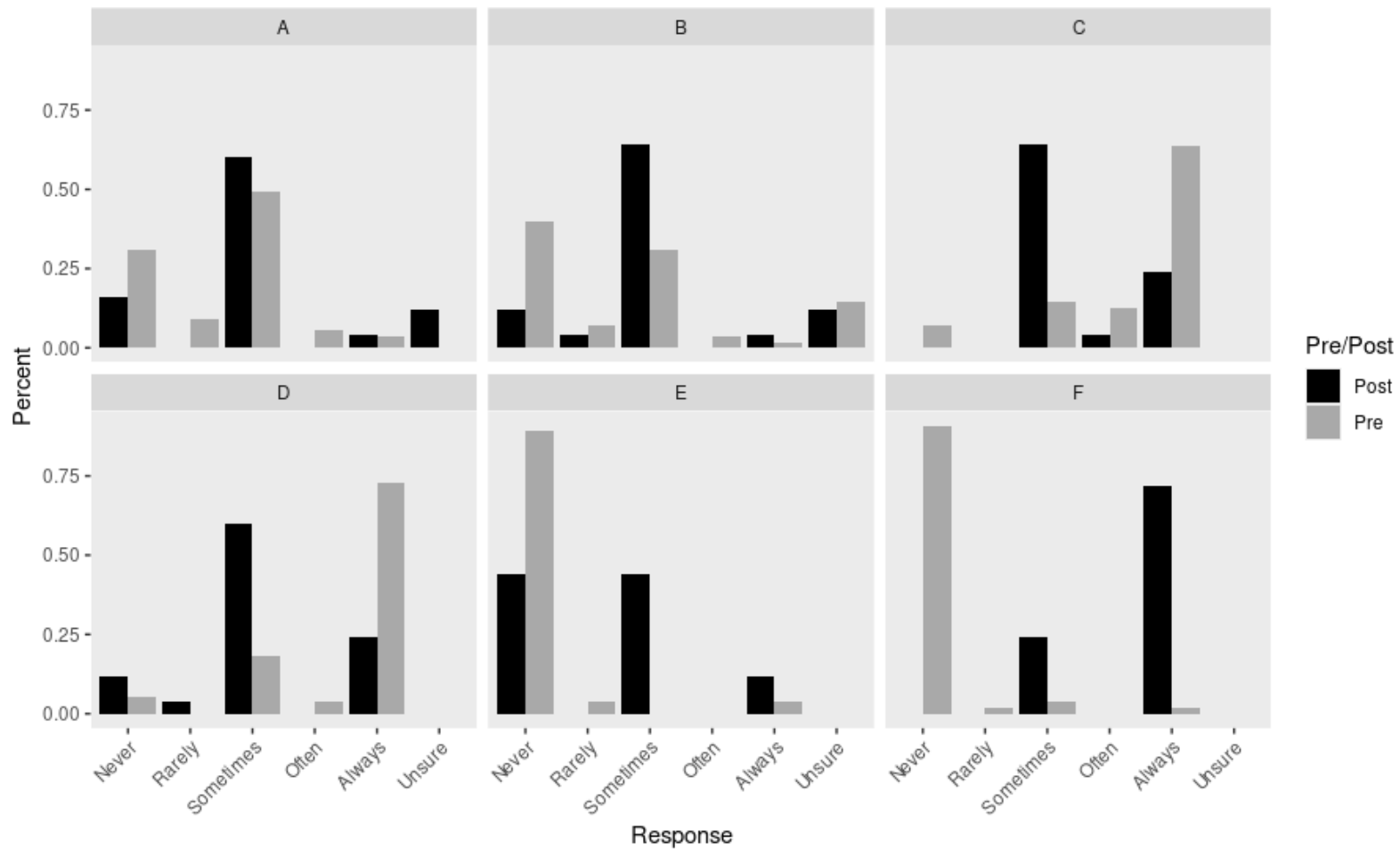


Figure 5: Distribution of responses from Namibian rangers surveyed in the pre-welfare intervention survey and post-welfare intervention survey to the statements (a) "I feel physically exhausted," (b) "I feel emotionally exhausted," (c) "On patrol I have access to clean drinking water," (d) "During patrol at our fly camp, I have access to clean drinking water," (e) "During patrol at our fly camp I have access to running water," and (f) "During patrol at our fly camp, I have access to medical kits"

Animal Danger

Rangers after the welfare intervention responded that they less strongly agreed with the statement, “I think that being a ranger is a dangerous job due to the chance of encountering dangerous animals” (Figure 7). After the welfare intervention, 10 (40%) rangers answered “Agree” with the statement and 14 (56%) “Strongly Agree” compared to 8 (14.5%) and 41 (74.5%) rangers surveyed before the welfare intervention who “Agree” and “Strongly Agree,” respectively.

Families

Rangers communicated that they saw their families more after the welfare intervention than before (Figure 8). Sixteen (64%) of rangers surveyed after the welfare intervention saw their families 6-10 days per month as opposed to 28 (50.9%) rangers surveyed before the welfare intervention who did so. Only rangers in the pre-welfare intervention survey reported seeing their families less than 6 days per month. Out of rangers surveyed after the welfare intervention, eight (32%) saw their families 16-20 days per month as opposed to only five (9.1%) rangers surveyed before the welfare intervention.

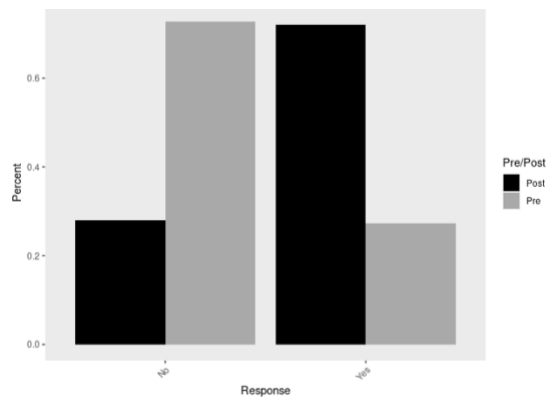


Figure 6: *Distribution of responses from Namibian rangers surveyed in the pre-welfare intervention survey and post-welfare intervention survey to the statement “I have received training on the use of the supplies in the medical kits.”*

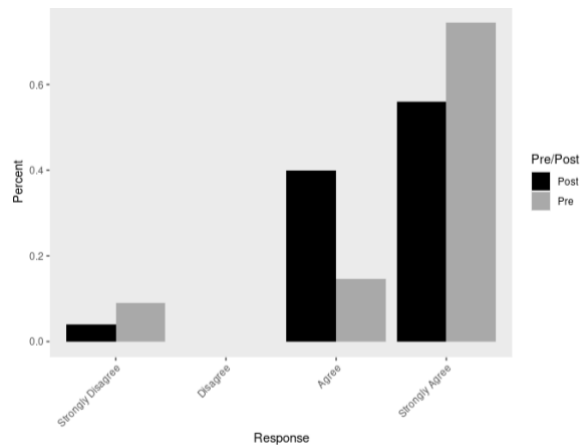


Figure 7: *Distribution of responses from Namibian rangers surveyed in the pre-welfare intervention survey and post-welfare intervention survey to the statement “I think that being a ranger is a dangerous job due to the chance of encountering dangerous animals.”*

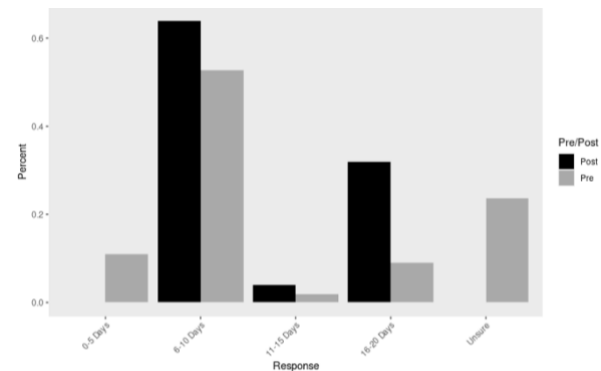


Figure 8: *Distribution of responses from Namibian rangers surveyed in the pre-welfare intervention survey and post-welfare intervention survey to the question “How many days per month do you get to see your family?”*

Table 4: Summary statistics and significance levels (*<0.05, **<0.01, ***<0.001) of chi-square and Wilcoxon test comparing the responses to questions in the health section of the 2021 and 2024 SRT surveys. Responses to Q2, Q3, Q4, Q5, Q6, Q7, Q8 and Q9 were averaged as 0 = “Never,” 1 = “Rarely,” 2 = “Sometimes,” 3 = “Often,” 4 = “Always.” Responses Q10, Q13, and Q14 were averaged as 0 = “No,” 1 = “Yes.” Responses to Q11, Q12, and Q15 were averaged as 0 = “Strongly Disagree,” 1 = “Disagree,” 3 = “Agree,” 4 = “Strongly Agree.”

Question	2021 n (%)	2024 n (%)	2021 \bar{x}	2024 \bar{x}	Wilcoxon significance	Chi-square significance
Q2 “I feel physically exhausted”	54 (98.2)	23 (92)	1.4	2.13	0.281	0.023*
Q3 “I feel emotionally exhausted”	54 (98.2)	24 (96)	1.0	1.91	0.011*	0.050*
Q4 “On patrol I have access to clean drinking water”	54 (98.2)	23 (92)	3.3	2.57	0.001**	<0.001***
Q5 “In my opinion, the basic necessities I am provided are enough”	54 (98.2)	23 (92)	2.3	1.86	0.210	0.174
Q6 “During patrol at our fly camp, I have access to toilets”	54 (98.2)	25 (100)	0.2	0.5	0.127	0.168
Q7 “During patrol at our fly camp, I have access to clean drinking water”	55 (100)	25 (100)	3.4	2.2	<0.001***	<0.001***
Q8 “During patrol at our fly camp, I have access to running water”	53 (96.4)	25 (100)	0.2	1.36	<0.001***	<0.001***
Q9 “During patrol at our fly camp, I have access to medical kits”	54 (98.2)	24 (96)	0.17	3.5	<0.001***	<0.001***
Q10 “I have received training on the use of supplies in the medical kits”	55 (100)	25 (100)	0.27	0.72	<0.001***	<0.001***
Q11 “I think that being a ranger is a dangerous job due to the chance of encountering poachers”	54 (98.2)	24 (96)	2.5	3.61	0.743	0.312
Q12 “I think that being a ranger is a dangerous job due to the chance of encountering dangerous animals”	54 (98.2)	25 (100)	2.6	3.44	0.743	0.045*
Q13 “My employee insurance scheme provides compensation in cases of a serious injury on the job “	55 (100)	25 (100)	0.2	0.14	0.481	0.81
Q14 “My employee insurance scheme provides compensation in case I am killed on the job”	55 (100)	23 (92)	0.2	0	0.0335*	0.074
Q15 “When needed, the medical treatment that I am provided is enough”	55 (100)	25 (100)	1.0	1.57	0.279	0.052

Table 5: Summary statistics and significance levels (*<0.05, **<0.01, ***<0.001) of chi-square and Wilcoxon test comparing the responses to questions in the general section of the 2021 and 2024 SRT surveys. Responses to Q1, Q2, Q5a, Q5b, Q6, Q7, and Q10 were averaged as 0 = “No,” 1 = “Yes.” Q4 was averaged as 1 = “0-5 days,” 2 = “6-10 days,” 3 = “11-15 days,” 4 = “16-20 days.”

Question	2021 n (%)	2024 n (%)	2021 \bar{x}	2024 \bar{x}	Wilcoxon significance	Chi-square significance
Q1 “Have you been threatened by members of your community or others because of your job as a ranger?”	55 (100)	25 (100)	0.15	0.12	0.722	0.662
Q2 “Have you faced a life-threatening situation?”	54 (98.2)	24 (96)	0.37	0.5	0.603	0.280
Q4 “How many days per month do you get to see your family?”	54 (98.2)	25 (100)	2.12	2.68	0.0207*	0.003**
Q5a “Have working conditions become better or worse since becoming a ranger?”	53 (96.4)	23 (92)	0.81	0.77	0.704	0.243
Q5b “Have working conditions become better or worse over the past three years?”	51 (92.3)	21 (84)	0.79	0.58	0.100	0.160
Q6 “Do you feel you are provided with proper equipment and amenities to ensure your safety?”	55 (100)	25 (100)	0.55	0.54	0.970	1
Q7 “Do you feel you are adequately trained to do your job?”	55 (100)	25 (100)	0.76	0.52	0.035*	0.064
Q10 “Do you want your children to become rangers?”	55 (100)	25 (100)	0.92	0.8	0.113	0.182

Comparing Rangers who Did or Did Not Receive Benefits and Training from the Welfare Intervention

Within the 2024 SRT survey, 10 rangers had not yet received the welfare intervention and 15 had. Out of rangers who had not received the welfare intervention, 40% (n=4) were female and 60% (n=6) were men. The average time as a ranger was less than five years, and average age was between 31 and 40 years old. Out of rangers who had received the welfare intervention, 100% (n=15) were men, the average time as a ranger was between six and 15 years, and average age was between 41 and 50 years old.

Within the post-welfare intervention survey, there was little difference in how rangers who had received training and benefits from the welfare intervention and those who had not responded. For the majority of questions, responses did not greatly differ based on whether rangers had received the welfare intervention or not.

More rangers who had received the welfare intervention had received training on the use of supplies in the medical kits (Figure 9a). Additionally, more rangers who had received the benefits of the welfare intervention reported that they felt adequately trained to do their job (Figure 9b). Over 75% (n=12) of rangers who had received training and benefits of the intervention felt adequately trained, as opposed to only one (10%) ranger who had not received the intervention.

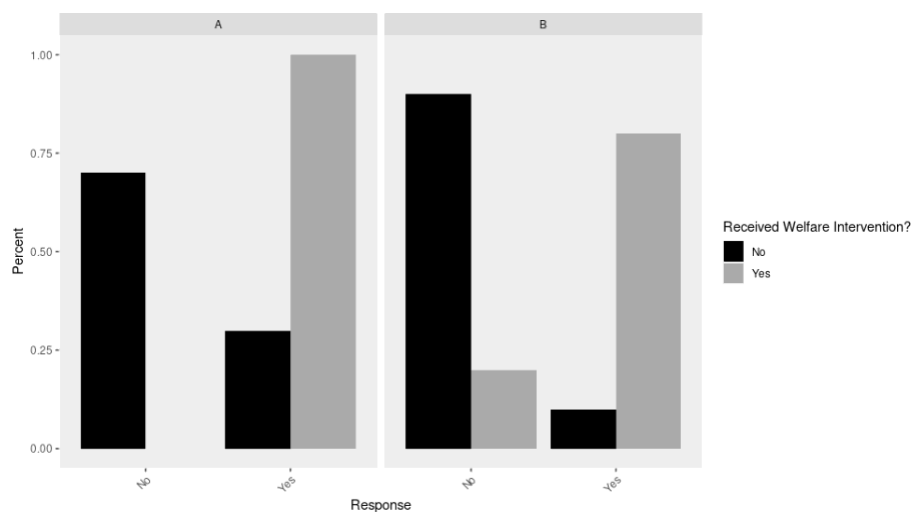


Figure 9: Distribution of responses from Namibian rangers who had and had not received the welfare intervention surveyed in 2024 to the statements (a) “I have received training on the use of supplies in the medical kits,” and (b) “Do you feel you are adequately trained to do your job?”

Table 6: Summary statistics and significance levels (*<0.05, **<0.01, ***<0.001) of chi-square and Wilcoxon test comparing the responses to questions in the health section of rangers who have received the welfare intervention (Yes) and rangers who have not (No). Responses to Q2, Q3, Q4, Q5, Q6, Q7, Q8 and Q9 were averaged as 0 = “Never,” 1 = “Rarely,” 2 = “Sometimes,” 3 = “Often,” 4 = “Always.” Responses Q10, Q13, and Q14 were averaged as 0 = “No,” 1 = “Yes.” Responses to Q11, Q12, and Q15 were averaged as 0 = “Strongly Disagree,” 1 = “Disagree,” 3 = “Agree,” 4 = “Strongly Agree.”

Question	Yes n (%)	No n (%)	Yes \bar{x}	No \bar{x}	Wilcoxon significance	Chi-square Significance
Q2 “I feel physically exhausted”	14 (93.3)	9 (90)	1.83	1.5	0.507	1
Q3 “I feel emotionally exhausted”	14 (93.3)	10 (100)	1.92	1.56	0.505	0.941
Q4 “On patrol I have access to clean drinking water”	14 (93.3)	9 (90)	2.5	2.67	0.754	0.787
Q5 “In my opinion, the basic necessities I am provided are enough”	14 (93.3)	8 (80)	1.93	1.71	0.728	0.195
Q6 “During patrol at our fly camp, I have access to toilets”	15 (100)	10 (100)	0.43	0.6	0.7521	1
Q7 “During patrol at our fly camp, I have access to clean drinking water”	15 (100)	10 (100)	2.2	2.2	0.950	0.682
Q8 “During patrol at our fly camp, I have access to running water”	14 (93.3)	10 (100)	1.07	1.8	0.212	0.620
Q9 “During patrol at our fly camp, I have access to medical kits”	14 (93.3)	10 (100)	3.43	3.6	0.668	1
Q10 “I have received training on the use of supplies in the medical kits”	15 (100)	10 (100)	1	0.3	<0.001***	<0.001***
Q11 “I think that being a ranger is a dangerous job due to the chance of encountering poachers”	15 (100)	9 (90)	3.53	3.75	0.340	0.390
Q12 “I think that being a ranger is a dangerous job due to the chance of encountering dangerous animals”	15 (100)	10 (100)	3.47	3.4	0.409	0.148
Q13 “My employee insurance scheme provides compensation in cases of a serious injury on the job “	15 (100)	10 (100)	0.15	0.22	0.370	0.148
Q14 “My employee insurance scheme provides compensation in case I am killed on the job”	13 (86.7)	10 (100)	0	0	N/A	0.794
Q15 “When needed, the medical treatment that I am provided is enough”	15 (100)	9 (90)	1.2	2.11	0.030*	1

Table 7: Summary statistics and significance levels (*<0.05, **<0.01, ***<0.001) of chi-square and Wilcoxon test comparing the responses to questions in the general section of rangers who have received the welfare intervention (Yes) and rangers who have not (No). Responses to Q1, Q2, Q5a, Q5b, Q6, Q7, and Q10 were averaged as 0 = “No,” 1 = “Yes.” Q4 was averaged as 1 = “0-5 days,” 2 = “6-10 days,” 3 = “11-15 days,” 4 = “16-20 days.”

Question	Yes n (%)	No n (%)	Yes \bar{x}	No \bar{x}	Wilcoxon significance	Chi-square significance
Q1 “Have you been threatened by members of your community or others because of your job as a ranger?”	15 (100%)	10 (100%)	0.2	0	0.153	0.250
Q2 “Have you faced a life-threatening situation?”	15 (100%)	9 (90%)	0.64	0.11	0.0156**	0.249
Q4 “How many days per month do you get to see your family?”	15 (100%)	10 (100%)	2.47	3	0.371	0.193
Q5a “Have working conditions become better or worse since becoming a ranger?”	13 (86.7%)	10 (100%)	0.75	0.8	0.821	1
Q5b “Have working conditions become better or worse over the past three years?”	11 (73.3%)	10 (100%)	0.56	0.6	0.886	0.564
Q6 “Do you feel you are provided with proper equipment and amenities to ensure your safety?”	15 (100%)	10 (100%)	0.5	0.6	0.660	0.819
Q7 “Do you feel you are adequately trained to do your job?”	15 (100%)	10 (100%)	0.8	0.1	<0.001***	0.001**
Q10 “Do you want your children to become rangers?”	15 (100%)	10 (100%)	0.67	1	0.05*	0.120

Qualitative Results

When asked about the welfare intervention, rangers overall told me that they believed the program was both helpful and necessary. However, they also noted that these programs need to be expanded to improve ranger health and address welfare issues that arise in the field.

When asked about the first aid training, respondents believed that the training was helpful and useful in the field. One ranger responded, “When you have pain or you get injured somewhere [you] know what [you] are going to do because you got training.” This suggests the training is applicable to real dangers rangers face in the field. Another ranger said “The first aid training helps ... a lot of people.” Many of the rangers I interviewed thought what needed to change about the training was the frequency with which rangers receive first aid training and content that is taught. Respondents believed that the training needed to be offered perhaps multiple times a year because rangers felt they forget the training over time. Several rangers expressed interest in opportunities to learn additional, more in-depth first aid skills.

When asked about the first aid kits, rangers expressed that they were helpful, mainly for ailments like headaches and diarrhea. One ranger said, “The welfare program is good, [it] works well in the field.” When asked about what could be changed about the first aid kits, rangers expressed a need for additional painkillers, especially for joint and back pain experienced as a result of long days spent walking while on patrol. Another need was eye drops, due to lots of time on patrol spent in the sun. Respondents also suggested that the training be changed and tailored to the first aid kits rangers are provided, citing instances of not knowing what the uses for certain medicines or products in the first aid kit did.

Many rangers found that one of the positive impacts of the first aid training and first aid kits is that when rangers are injured they do not need to leave the field and go to a clinic. Prior to the welfare intervention, rangers would need to call for a car to take them out of the field if they were injured. Now, rangers save fuel and have increased time in the field actually tracking rhinos. Additionally, even if rangers are injured and need to come out of the field for the clinic, they can at least somewhat be treated in the field and remain comfortable until a car can come.

When asked about the doctor check-ups, all respondents thought this was helpful, but only about half of respondents had actually seen a doctor. Respondents wanted to see the doctor several times a year, especially right after time spent in the field due to physically intense working conditions.

When asked what they would change about the program, most expressed the need for more of the first aid training, kits, and doctor visits. A few respondents suggested crime scene training as an additional aspect of the project to improve ranger welfare.

DISCUSSION

Comparing Namibian Rangers to Rangers Elsewhere in Africa

My results suggest that, on average, Namibian rangers are doing well in terms of welfare compared to other African rangers. They experience less exhaustion, more frequent water access, and more adequate access to basic necessities.

Namibian rangers also reported experiencing less physical and emotional exhaustion, which is important due to the intensity of their work. Rangers patrol large areas and are exposed to the elements, which contributes to physical exhaustion (Parker et al., 2022; Singh et al., 2020). SRT rangers typically patrol for about three weeks at a time, before taking a few weeks off and then patrolling again. I do not know the structure of the ranger schedule in other African countries, but it is possible that this could contribute to differing levels of reported physical exhaustion. One source of emotional exhaustion rangers experience is frequent separation from their families (Singh et al., 2020; Spira et al., 2019). One explanation for the lower reported rates of emotional exhaustion in Namibia could be because rangers, whether employed by the conservancies or by SRT, originate from local communities. As a result, when their patrols are over, it is relatively easy for most to return to their families. Another source of emotional exhaustion and stress for rangers is encounters with poachers and the poached animals. However, this is often cited as a source of stress for rangers in highly militarized conservation areas where there is tension between rangers, communities, and poachers (Annecke & Masubelele, 2016). Community-based conservation models, on the other hand, seek to involve communities in conservation, relieving some of these tensions. Many Namibian rangers surveyed were “Unsure” about the level of emotional exhaustion they feel. This suggests that Namibian rangers may not understand what emotional exhaustion is, and perhaps there is a need for increased conversation about mental and emotional health.

Rangers across the globe are commonly expected to patrol large areas and engage in physically intensive work, which makes clean drinking water a necessity (Parker et al., 2022).

Clean drinking water access was one parameter particularly cited by the World Wildlife Fund (WWF) report as a major concern for rangers (Belecky et al., 2019). Rangers in Namibia who are patrolling the vast Kunene region bring their own water to the field because there are almost no sources of natural water in the desert for much of the year, particularly during drought conditions. This likely differs from other countries where rangers may patrol in landscapes where water is more abundant.

WWF surveyed only public sector rangers, or rangers employed by the government (Belecky et al., 2019). Rhino rangers in the Kunene region are either employed directly by SRT or employed by communal conservancies but supported by SRT. This employment structure could be one reason that Namibia rangers reported greater access to basic necessities compared to other African rangers. The resources provided to rangers by organizations and governments likely differ among countries, especially considering varying political and economic climates in the other African countries surveyed by WWF.

For some metrics, such as toilet access, poacher and animal danger, insurance, and medical treatment, Namibian ranger responses suggest that wellness is lacking compared to other African rangers. Namibian rangers report much less toilet access than other African rangers, which makes sense because they are patrolling in a remote region with no running water. When it comes to the danger posed by animals, the Kunene area is home to numerous dangerous animals, including poisonous snakes, scorpions, and lions. Rangers can also be injured in encounters with rhinos. When interviewed, many rangers mentioned the danger that animals pose in the field. I specifically heard about scorpion bites and rangers that had sustained injuries while running away from charging rhinos.

Additionally, Namibian rangers reported having less insurance than rangers in other African countries. The WWF only surveyed public sector rangers, such as rangers employed by federal agencies. The rangers that SRT supports are employed directly by SRT or come from communal conservancies. Thus, insurance coverage varies between nonprofit and community organizations and governments, which likely have greater structural access to insurance. It would be interesting to compare rates of insurance between SRT rangers and rangers in Namibia employed by the Namibian government working in Etosha National Park or other national parks in Namibia.

Finally, Namibia rangers reported lower levels of satisfaction when asked if medical treatment provided was adequate. Prior to the welfare interventions, there was little medical training or resources provided by SRT to the rangers.

It is beyond the scope of this study to investigate the specific ranger jobs and conservation activities in each African country surveyed by the WWF. However, it is likely that varying demographic, political, biological, and economic factors across the seven study countries all could play a role in the different results from the WWF and SRT surveys. Namibia is unique in part due to its community-based approach to rhino conservation, arid landscape, and that rangers surveyed are employed by the community or a nonprofit organization rather than the government. These and other factors could have contributed to the differences observed between Namibian rangers and other African rangers. This study puts Namibia within a regional context and adds to the growing literature on job satisfaction and ranger welfare.

Comparing Namibian Rangers Before and After the Welfare Intervention

The reported impact of the welfare interventions on ranger wellness were mixed. Some dimensions of welfare, such as perceptions of dangerous wildlife and access to first aid, improved. Ranger perceptions of dangerous wildlife came up both in the survey data and qualitative interviews. Rangers described how the new medical kits and first aid training have been used to address scorpion bites and being chased by rhinos and other dangerous animals. After the welfare intervention, rangers are, understandably, still concerned about dangerous animals, but the extent to which they are concerned has decreased. Perhaps this is because through welfare intervention rangers are now trained and equipped to address dangerous encounters with wildlife. It makes sense that access to first aid and medical kits improved following the welfare intervention because this is what the intervention was designed to do.

Based on the results of the survey and interviews, the welfare intervention seems to get training and first aid kits into the hands of rangers as intended. However, it is possible that these results are merely a function of the small sample size and inclusion of new rangers in the post-welfare intervention survey.

On the other hand, levels of exhaustion appeared to increase after the welfare intervention. This could be due to the small sample size and inclusion of new rangers who have not yet had much experience in the field. Potentially, the implementation of the welfare

intervention made rangers more aware of their own physical and emotional health, which changed the way rangers responded before and after the welfare intervention. It is still promising that few rangers “Often” or “Always” feel emotionally or physically exhausted as compared to the results from rangers in other African countries in the WWF survey. Surprisingly, reported access to sufficient water decreased after the welfare intervention. Water access was not addressed by the welfare intervention so it is unclear why this changed. Again, it is possible this result is due to the small sample size and the inclusion of new rangers who are not familiar with SRT programs. It is also possible that there was another change in SRT’s structure or resources unrelated to the welfare intervention that impacted water access.

Many aspects of ranger welfare reportedly did not change with the welfare intervention. First, insurance coverage did not change, which makes sense because the welfare intervention did not address insurance. There was no change in responses to the statement, “When needed, the medical treatment that I am provided is enough.” We may expect more Namibian rangers to agree with this statement after the welfare intervention considering this provides additional medical training and supplies to rangers. However, many rangers in qualitative interviews expressed that they had received only one doctor’s visit, if any. How this question is answered depends on how “medical treatment” is interpreted, whether as doctor’s visits, the first aid training, and/or first aid kits.

While perceptions of animal danger changed, perceptions of rangers to the danger of encountering poachers did not change. This may be because the impacts of encountering a poacher in the field may be quite psychological, as opposed to what is available in the medical kits and first aid training (Annecke & Masubelele, 2016).

The results of the surveys and my qualitative interviews suggest that perhaps the welfare intervention is helpful for addressing more acute ailments or problems in the field but more ongoing programming to improve overall welfare. When interviewed, all rangers were using the first aid training and kits and found them useful in the field and mentioned using the kits for medical needs like stings, headaches, and diarrhea. However, many rangers mentioned chronic conditions not addressed by the welfare intervention, such as back or joint pain. Many rangers also indicated a need for additional doctor’s visits. Although one goal of the welfare intervention was to bring a doctor regularly to the area to conduct evaluations of their rangers, this has seemed to rarely happen in reality. There is a clear need for additional welfare programming,

perhaps more ongoing and addressing chronic pain, which would perhaps do more to shift responses in the survey and increase ranger welfare.

Comparing Namibian Rangers who Did and Did Not Receive the Welfare Intervention

Very few questions differed greatly between rangers who had and had not received the welfare intervention. This could suggest that the welfare intervention has not had a widespread impact on ranger welfare, it also could very well be because the rangers who had not yet received the welfare intervention are new rangers who have not spent much time, if at all, on patrol, and who may be unfamiliar with the benefits and work of SRT rangers.

It makes sense that more rangers who had received the welfare intervention had received training on the use of medical supplies as this is the goal of the welfare intervention. Rangers that had the welfare intervention responded that they were more adequately trained to do their job. While this result could suggest that the welfare intervention helps rangers feel trained to do their job, new rangers who have not received the welfare intervention may not feel adequately trained because they have yet to receive other trainings, not only those related to welfare.

However, we expected that in comparing these two groups of rangers, responses would significantly differ. Many measures of health and welfare remained the same, including exhaustion levels, perceptions of danger, and belief that resources including basic necessities and medical treatment are sufficient. This again could be due to the small sample size and the fact that new rangers may be unfamiliar with SRT. It is also possible that these results further suggest the limitations of the welfare intervention and the need for additional and ongoing programming.

Chi-Square vs. Wilcoxon Test

In data analysis, I used both a chi-square and Wilcoxon test to compare survey data. The chi-square test measures the difference between observed and expected counts for each of the Likert scale responses. The Wilcoxon, or Mann-Whitney, test measures for difference in median response from the Likert scale. While both tests measure the difference in distribution of response, the Wilcoxon test allows us to say in what direction this difference is as it uses median responses.

Limitations

An important limitation of this study was the differences in Likert scales used in the WWF and SRT surveys. The SRT survey included “Sometimes” options for some questions (e.g., the scales that ranged from “Never” to “Always”) while the WWF survey did not. This meant that I could not compare these “Sometimes” responses from Namibian rangers to any equivalent on the WWF survey. Additionally in the process of preparing data for analysis, a strongly disagree to strongly agree scale from the WWF was converted to a never to always scale for purposes of comparing to the SRT survey (e.g., for the statement, “The basic necessities I am provided are enough”). Both scales move from very little access to basic necessities to lots of access to basic necessities, but certainly there could be different interpretations of these scales.

Furthermore, in order to compare WWF and SRT results using a chi-square test, percent response data from the WWF report had to be converted into count data. To do this, I assumed that the 2,061 rangers from Africa that were surveyed answered every survey question. It is possible that rangers did not answer every question, meaning some of the count data may be inaccurate. However, the WWF sample size of over 2,000 rangers is quite large, so assuming that most rangers answered each question, this still should be an effective comparison.

An important limitation of the pre- and post-survey is the small number of rangers interviewed in 2024 after the welfare intervention. Additionally, some of these rangers had not yet received the training and benefits of the welfare intervention. This small sample size and inclusion of new rangers was mainly due to time limitations and the need for data to be collected with enough time for me to run the analysis. Additionally, rangers were surveyed at the SRT field base when they were either returning from or going out into the field on patrol. At these times, rangers either want to get home to their families or get out on patrol, which made it difficult to get them to sit and take the time to fill out this survey. The times that rangers are moving through the field base are also very busy times, which made it difficult to get a lot of rangers to take the survey at once. Once rangers are in the field, they do not return for about three weeks. Thus if rangers did not fill out the survey whilst at the field base, SRT needed to wait for three weeks to try and survey them again. This is a further restraint that again makes it difficult to quickly survey more than a small sample of rangers.

In addition, the survey instrument the rangers completed was designed and initiated by SRT management. This could have resulted in rangers feeling pressure to respond in a positive manner about their own working conditions and resources.

While the anonymity of the rangers was maintained, rangers may have felt uncomfortable sharing their opinions. During my qualitative interviews, rangers may have felt pressure to respond positively about the welfare program to appear appreciative of management (Yin, 1990). While all rangers were appreciative of the welfare intervention, they did all mention aspects of the welfare intervention that needed to be expanded upon or improved.

Policy and Management Implications

It appears that the welfare intervention has been impactful for rangers, especially in the area of more acute ailments and the dangers posed by animals in the field. A clear need that came out of the Namibian ranger surveys and interviews was a need for regular doctor visits and overall more ongoing welfare programs. Rangers specifically suggested that they would like to visit a doctor more than once per year, as well as additional first aid training so that rangers do not forget what they learned. Some rangers also requested that subsequent first aid trainings cover additional topics, suggesting that rangers are interested in learning more about welfare and health. These findings illustrate that in many ways, SRT rangers are well provided for and experience improved welfare outcomes compared to their peers in other countries. However, there is a clear need for additional programming to further address the many dangers rangers face in their work. Such additional programming will require further funding for doctors, medical services, or other benefits for rangers.

In addition to programs, further research and data collection to track the impact of the welfare intervention and account for the low sample size in the post-welfare intervention is needed. This would allow Save the Rhino Trust (SRT) and their community partners to gauge the impact of the program and adjust or increase interventions and training accordingly. Even without additional surveys, there is much more analysis that could be drawn from existing survey data both from the WWF and SRT. Further study should delve into responses to these surveys to extract additional valuable information on ranger welfare.

Future Recommendations

Ranger welfare is important for effective conservation, particularly the protection of threatened endangered species such as black rhinos (Farhadinia et al., 2023; Spira et al., 2019). There is growing global recognition that additional studies are needed to understand what factors influence ranger welfare and how ranger welfare can be improved (Belecky et al., 2019; Singh et al., 2020). The results of this study show that rhino rangers in the Kunene region of Namibia report welfare in many ways as compared to rangers in other countries in Africa. Future studies could help us understand why the rhino rangers in this area of Namibia have improved welfare, and what other countries can do to improve the welfare of their rangers. Additionally, this study has shown that the SRT welfare intervention, including first aid training, first aid kits, and regular doctor's visits, has had limited success in helping rangers with health ailments in the field. Though it has not widely shifted ranger welfare overall, it is helpful for rangers in the field. This means that such an intervention could be implemented in another country where rangers face similar threats from animals. One of the biggest takeaways from both the surveys and interviews with Namibian rangers is that welfare programming must be ongoing in order to promote ranger welfare and wildlife conservation more broadly. Finally, from talking to rangers, there is a clear excitement about welfare programming for rangers, a promising sign that rangers are interested in health and welfare projects. Rangers are experts in their own welfare and so any future welfare interventions from SRT or other government agencies or organizations must involve their direction and input.

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Appendix A: SRT Ranger Welfare Survey

Ranger Welfare Survey

INTRODUCTION

Rangers, like yourself, play a vital role in protecting wildlife. It is critical for managers to establish an understanding on ranger beliefs, attitudes and perspectives to various aspects of their work.

This is a pilot project to show the importance of medical assistance for Rangers like you. We hope to use the information you provide to publish a report and scholarly article on this important issue. At no point will your name or identity be linked to your responses.

Lastly, will you please sign the space below indicating you provide full consent to participate in the study and were not forced into doing so.

NAME

Date

Demographics

1. What is your gender?

MALE	FEMALE
------	--------

2. In which age group are you?

Under 20 years	21-25 years	26-30 years	31-35 years	36-40 years
41-45 years	46-50 years	51-55 years	56-60 years	Above 61 years

3. Which position do you hold? Please specify.

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4. How long have you served as a ranger?

Less than 1 year	1-5 years	6-10 years
11-15 years	16-20 years	More than 20 years

5. Who is your employer?

From WWF Global Ranger Survey (comparison): Africa

1. Have you been threatened by members of your community or others because of your job as a ranger?

YES	NO	UNSURE
-----	----	--------

2. Have you faced a life-threatening situation?

YES	NO	UNSURE
-----	----	--------

3. If so, what was it? (TICK ALL THAT APPLY)

- Attacked by poachers
 - Threatened by poachers
 - Threatened by community members
 - Dangerous encounters with wildlife (including all animals as well as snakes, scorpions, spiders (?))
 - Serious injury or illness while on patrol
 - Other
-

4. How many days per month do you get to see your family? (5 day intervals)

0-5 Days	6-10 Days	11-15 Days	16-20 Days	Unsure
----------	-----------	------------	------------	--------

5. Have working conditions become better or worse?

a. Since becoming a ranger

YES	NO	UNSURE
-----	----	--------

b. Over the past 3 years

YES	NO	UNSURE
-----	----	--------

6. Do you feel you are provided with proper equipment and amenities to ensure your safety?

YES	NO	UNSURE
-----	----	--------

7. Do you feel you are adequately trained to do your job?

YES	NO	UNSURE
-----	----	--------

8. What is your main motivation for continuing as a Ranger? (TICK ONLY 1 BOX)

- I enjoy being close to nature
- I like to implement the law
- I am a respected member of the community
- I enjoy being a ranger
- I like the power and authority
- I believe it is an exciting job
- I am living my dream
- I have good promotion prospects
- I have no other job options
- Other _____

9. What is the worst aspect of being a Ranger? (TICK ONLY 1 BOX)

- Boring work
- Poor treatment by public and government
- Inadequate leave time
- Little or no recognition as a professional
- Poor facilities and infrastructure
- Rarely get to see my family
- Little or no reward for hard work
- Dangerous working conditions
- Low and/or irregular pay
- Other _____

10. Do you want your children to become Rangers?

YES	NO	UNSURE
-----	----	--------

11. If no, what is the main reason (TICK ONLY 1 BOX)

- The pay is irregular
- There is no job security
- There is no potential for promotion
- The facilities are poor
- There is no reward for hard work
- They would have to stay apart from family

- It is a dangerous job
- The pay is low
- Other _____

12. If yes, what is the main reason (TICK ONLY 1 BOX)

- It is easy to get a ranger job
- To have power and authority
- There is good job security
- I want my children to serve the country
- I am proud to be a ranger
- To protect wildlife
- I want my children to serve nature
- Other _____

Health Specific (from main survey)

1. Please list the diseases or injuries that you experienced over the last 12 months?

- Infections
 - Malaria
 - Broken bones
 - Existing health problems made worse by work
 - Severe Diarrhea (runny tummy)
 - Severe Headaches
 - Ankle sprains/strains
 - Blisters on feet
 - Sting by scorpion
 - Bitten by snake
 - Severe reaction to an insect/spider bite
 - Other
-

2. I feel physically exhausted

Never	Rarely	Sometimes	Often	Always	Unsure
-------	--------	-----------	-------	--------	--------

3. I feel emotionally exhausted

Never	Rarely	Sometimes	Often	Always	Unsure
-------	--------	-----------	-------	--------	--------

4. On patrol I have access to clean drinking water

Never	Rarely	Sometimes	Often	Always	Unsure
-------	--------	-----------	-------	--------	--------

5. In my opinion, the basic necessities that I am provided are enough

Never	Rarely	Sometimes	Often	Always	Unsure
-------	--------	-----------	-------	--------	--------

6. During patrol at our fly camp, I have access to toilets

Never	Rarely	Sometimes	Often	Always	Unsure
-------	--------	-----------	-------	--------	--------

7. During patrol at our fly camp, I have access to clean drinking water

Never	Rarely	Sometimes	Often	Always	Unsure
-------	--------	-----------	-------	--------	--------

8. During patrol at our fly camp, I have access to running water

Never	Rarely	Sometimes	Often	Always	Unsure
-------	--------	-----------	-------	--------	--------

9. During patrol at our fly camp, I have access to medical kits

Never	Rarely	Sometimes	Often	Always	Unsure
-------	--------	-----------	-------	--------	--------

10. I have received training on the use of supplies in the medical kits

YES	NO	UNSURE
-----	----	--------

11. I think that being a ranger is a dangerous job due to the chance of encountering poachers

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
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12. I think that being a ranger is a dangerous job due to the chance of encountering dangerous animals (including all animals, , scorpions, snakes, spiders (?) etc)

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
-------------------	----------	--------	-------	----------------

13. My employee insurance scheme provides compensation in cases of a serious injury on the job

YES	NO	UNSURE
-----	----	--------

14. My employee insurance scheme provides compensation in case I am killed on the job

YES	NO	UNSURE
-----	----	--------

15. When needed, the medical treatment that I am provided is enough

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
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Medical Background

1. In case of an emergency, on average during a typical patrol, how do you get to a medical facility? Circle those that apply:

Via Ambulance	Vehicles readily available	Self-provided transport
Via Air Evacuation	Transport by employer	Do not know / unsure
Other (Please specify):		

2. On average during a typical patrol, how long would it take to reach the nearest Clinic by 4x4 patrol vehicle?

Less than 1 hour	1-2 hours	3-4 hours	5-6 hours
7-8 hours	9-10 hours	More than 10 hours	Do not know/unsure

3. On average during a typical patrol, how long would it take to reach the nearest Hospital by 4x4 patrol vehicle?

Less than 1 hour	1-2 hours	3-4 hours	5-6 hours
7-8 hours	9-10 hours	More than 10 hours	Do not know/unsure

4. In the past 5 years, have you been ILL on duty / in the field? Illness is feeling or being sick. For example, 'I felt sick after drinking water from a natural spring'.

YES	NO	UNSURE
-----	----	--------

5. If YES, what types of illness did you have? Please write down information on the illness in blocks provided.

Type of illness	Cause of illness	Medical attention received?	Treatment received

6. Do you visit a Traditional Healer for any medical illnesses?

Never	Rarely	Sometimes	Often	Always	Unsure
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7. Please list the illnesses that you would seek a Traditional Healer to help treat

8. Please list the illnesses that you would seek a Hospital/Clinic doctors to help treat

9. In the past 5 years, have you been INJURED in the line of duty? Injury is actual damage to your body. For example, 'Injured my foot when I tripped on a rock'.

YES	NO
-----	----

10. If yes to the last question, where were you treated for these injuries?

Self-treated at Home	Treated at basecamp
Traditional Healer	Clinic / hospital

11. If YES, what types of injuries did you have? Please write down information on the injuries in blocks provided.

Type of injury	Cause of injury	Medical attention received?	Treatment received

12. Do you visit a Traditional Healer for any injuries?

Never	Rarely	Sometimes	Often	Always	Unsure
-------	--------	-----------	-------	--------	--------

13. If yes, please list the injuries that you would seek a Traditional Healer to help treat

14. Please list the injuries that you would seek a Hospital/Clinic doctors to help treat

15. Have you experienced any colleagues dying on duty?

YES	NO
-----	----

16. What was the cause of death?

Injury	Illness
Wildlife encounter	Poacher involvement
Other (Please specify):	

Anything Else YOU would like to add?

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THANK YOU!

Appendix B: Interview Guide

1. How has the first aid training changed your patrol conditions? When have you used the training while on patrol?
2. Is there anything you would change about the first aid kits?
3. How have the first aid kits changed your patrol conditions? When have you used the first aid kits while on patrol?
4. Is there anything you would change about the first aid training?
5. How have the doctor checkups changed your patrol conditions?
6. Is there anything you would change about the checkups?
7. How has your safety changed on patrol following the welfare intervention?
8. How has your mental exhaustion changed since the welfare project?
9. How has the respect you feel from senior leadership changed since the welfare project?
10. Are there any other programs SRT could implement to improve health and safety on patrol?