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## Feature Article

# Facilitators and Barriers Influencing Resilience Amongst Critical Care Transport Professionals in a Fixed-Wing Air Ambulance Environment

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## A B S T R A C T

**Objective:** This study describes the facilitators and barriers influencing resilience in a fixed-wing air ambulance environment.

**Methods:** Self-reported interview guides were used to explore and describe the facilitators and barriers influencing resilience among critical care transport professionals in a fixed-wing air ambulance environment.

**Results:** The findings revealed 12 facilitators and 8 barriers influencing resilience among critical care transport professionals in a fixed-wing air ambulance environment in South Africa.

**Conclusion:** The findings revealed 12 facilitators and eight barriers influencing resilience among CCTPs in the fixed-wing air ambulance environment in South Africa.

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Resilience is defined as the capacity of individuals or groups to endure, adapt to, and recover from challenges, setbacks, and stressful situations.<sup>1</sup> Resilience does not entail the avoidance of difficult circumstances but rather involves cultivating the skills and mindset necessary to manage and prosper in the face of adversity.<sup>2,3</sup> Critical care transport (CCT) in the air ambulance environment poses distinct challenges that are not encountered in conventional hospital settings.<sup>3-6</sup> In the rigorous field of CCT, professionals tasked with managing critically ill or injured patients are required to possess resilience to ensure their effectiveness and success.<sup>6,7</sup> Resilient CCT professionals (CCTPs) are better equipped to manage stress, which leads to improved patient outcomes.<sup>6-9</sup> Resilience fosters cognitive flexibility and critical thinking skills, facilitating rapid and effective decision-making.<sup>10,11</sup> This results in higher job satisfaction, reducing turnover and retaining experienced professionals.<sup>12</sup> CCTPs lacking resilience may experience adverse effects, such as increased stress levels, potentially leading to substance abuse and burnout.<sup>3,10,13</sup> Promoting resilience through training, support, and well-being initiatives can mitigate these effects

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Ethical clearance was obtained from the University of Pretoria (reference: 90/2024).

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and ensure the delivery of high-quality patient care.<sup>11-13</sup> This approach could better equip CCTPs and promote career longevity.<sup>11-16</sup> The objectives of this study were to explore the facilitators and barriers influencing resilience in a fixed-wing air ambulance environment and to describe these facilitators and barriers to assist CCTPs and managers in implementing measures to enhance their resilience.

## Methods

### Study Design and Data Collection

The researchers used an exploratory, descriptive design to explore and describe the facilitators and barriers affecting resilience within the fixed-wing air ambulance context.<sup>17</sup> The self-reported interview guide introduced the study purpose and objectives to the participants. It provided a definition of resilience and prompted participants to respond to 3 open-ended questions concerning resilience in the fixed-wing air ambulance environment in which they operated.

1. "What do you think are facilitators of resilience in your work environment?"
2. "What do you think are barriers to resilience in your work environment?"
3. "What do you think managers can do to assist with enhancing resilience in your work environment?"

The researchers formulated questions to use participant input to comprehend, explore, and delineate the facilitators and barriers.

Furthermore, they aimed to ascertain how managers can leverage this information to enhance resilience among CCTPs.

**Study Setting, Population, and Sampling**

Ethical approval was obtained (reference: 90/2024) from the University of Pretoria, Pretoria, South Africa. The researchers engaged with the 5 largest fixed-wing air ambulance services in South Africa to maximize the number of participants who met the inclusion criteria. These services operate in South Africa for both domestic and international air ambulance flights. Owing to the geographical distribution of these services, CCTPs were introduced to the study during hybrid (online and in-person) monthly flight meetings and through electronic communication groups. Informed consent was obtained from all the participants. Upon providing consent, the participants received the self-reported interview guide electronically. After completion, the interview guides were returned to the study leader electronically to ensure confidentiality.<sup>17</sup> The responses were received electronically and populated into a spreadsheet, with each participant receiving a number, to ensure anonymity. Participants completed the interview guides at their convenience, allowing them to respond honestly and openly, without external influence.

The criteria for inclusion were defined as follows: individuals must be employed by a privately owned, fixed-wing air ambulance service in South Africa, serving in the capacity of a full- or part-time physician, nurse, or paramedic. The researchers used purposive total population sampling.<sup>17</sup>

**Data Analysis**

Thematic data analysis was used in this study<sup>17,18</sup> (Fig. 1).

Step 1: Data preparation: The researchers and study leader read through the responses and familiarized themselves with the data.<sup>17,18</sup>

Step 2: Coding: The researchers and study leader extracted categories from the data.<sup>17,18</sup>

Step 3: Data organization: Data were organized into corresponding categories.<sup>17,18</sup>

Step 4: Interpretation: The process was conducted manually and independently to identify categories until no further ideas emerged. Subsequently, the researchers and the study leader crossverified each other's work to ensure the appropriateness of the extracted categories; any discrepancies were discussed and resolved. Consensus was reached on the categories within the 2

themes. Thematic saturation was achieved by interpreting the responses corresponding to the identified categories. For instance, participants would respond with phrases such as “no communication” or “lack of communication” under the theme “barriers to resilience.” This was recognized as a category when mentioned by multiple participants. The 2 main themes were described using 20 categories, as found in Table 1.

Measures were implemented to mitigate reflexivity in the study. The researchers and study leader engaged in self-awareness and critical self-reflection to address potential biases, preconceptions, and their relationship to the research.<sup>17</sup> Given the researchers' involvement in the air ambulance environment, precautions were taken to minimize the influence of personal experiences on the study outcomes.

**Results**

Data collection was conducted in a 4-month period, from June 2024 to September 2024. Responses were obtained from 48 CCTPs of a possible 63 at the time of the study (Table 2).

The survey elicited positive reactions from the participants, who provided extensive responses, with some elaborating on the questions in detail. Participants appreciated the opportunity to express their opinions, as evidenced by 1 participant's comment: “This is a great topic, thank you for the opportunity to voice my thoughts” (P4) Responses identified 20 categories across 2 themes: 12 facilitators and 8 barriers.

**Facilitators**

The most prominent category identified as a facilitator of resilience was optimal family support. The results revealed that having a support system, such as family, helps participants become more resilient. “I have an amazing support system in my best friend and my son ...” (P14) “The support system of the fixed-wing service I work for is excellent. We are like one big happy family.” (P3) The identified categories also included the satisfaction of basic human needs. “Access to ‘quality of life’ things in flight like food/water/snacks/warmth make me more resilient.” (P8) “Coffee and food make me happy and then I can be more resilient ...” (P43)

The identified categories encompassed not only physical aspects but also psychological dimensions, such as a positive attitude. “Having a positive attitude helps me through tough times, we see hard things in our environment, and this inevitably affects us, keeping a

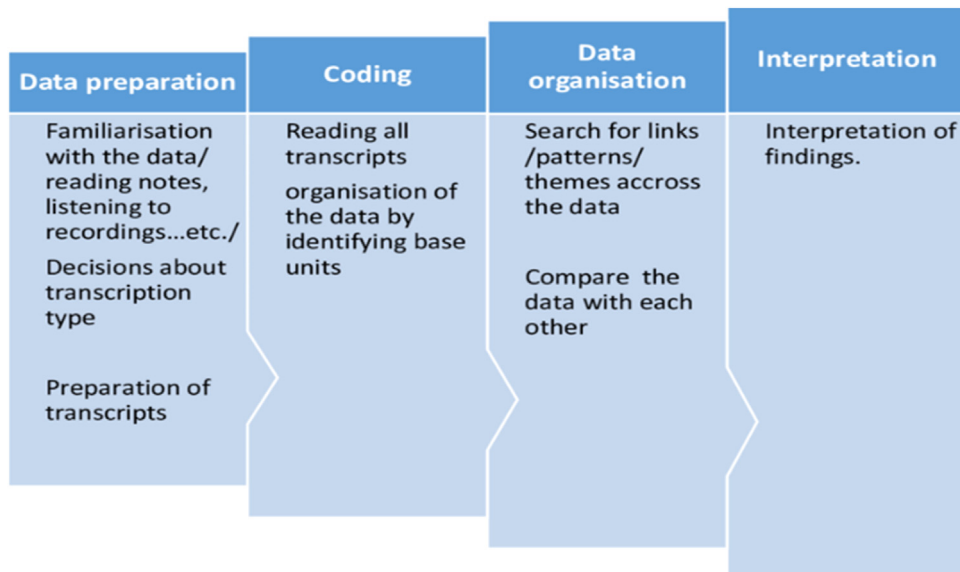


Figure 1. Content analysis.<sup>17,18</sup>

**Table 1**  
Summary of Facilitators and Barriers Influencing Resilience

Theme 1: Facilitators	Theme 2: Barriers
Category	Category
1. Optimal family support	1. Fatigue due to lack of sleep
2. Sustaining basic human needs	2. Unmet human needs
3. Positive attitude	3. Lack of education and training
4. Strong personal values	4. Ineffective communication
5. Strong spirituality	5. Non-existence of teamwork
6. Optimal psychological and mental health support	6. Punitive system in work environment
7. Optimum education and training	7. Lack of managerial support
8. Support from management	8. High demands of the work environment
9. Excellent teamwork	
10. Transparent communication	
11. Continued work experience	
12. Positive workplace culture and environment	

positive attitude helps ...” (P18) This correlates with the fourth category, namely, strong personal values. “I have the self-motivation to improve.” (P36) “... and I have found that living according to my values, not fears, helps me to be more resilient ...” (P2) Being strong in spirituality supported a positive attitude and personal values. “God also said that life on earth will not be easy, but He promised to be right by your side through it all ...” (P43) Christianity was the only religion mentioned in the results.

Participants also felt that psychological and mental support was particularly important for facilitating resilience. “Access to counseling and mental health resources helps individuals manage stress and trauma associated with our stressful environment.” (P18) “Having access to mental health resources: Provide access to psychological support services ...” (P19) Support in terms of training was not limited to psychological support, but continuous education and training. “The ongoing training is brilliant, as it capacitates you ...” (P5) “Ongoing training sessions ensure that medical aviation professionals are constantly updated ...” “If a person is adequately trained in their field ... it is easier to be resilient ...” (P17) Managers should actively endorse training and continuous education initiatives. The participants identified supportive management as a significant facilitator. Managers should be supportive and practical “... the biggest focus for managers must be to help clinicians through all the challenges and assist them in realizing what they are capable of.” (P19) “Organizations need supportive managers that know how to create positive working environments ... they should also be part of the team and not just sit behind a desk and delegate tasks ...” (P24) Managers who actively participate as integral members of their teams are linked to the category of excellent teamwork. “Strong/good teamwork. Treating patients in the fixed-wing environment is a team

effort and good teamwork is important ...” (P32) “Working with a strong team member and having strong relationships with team members helps you to be more resilient.” (P32)

Effective teamwork requires proficient communication. Transparent communication is a significant facilitator. “Encouraging open lines of communication where staff can voice concerns and suggestions without fear of retribution ...” (P18) “... message of encouragement, is amazing. The ability to talk to the managers openly is great, this allows your voice to be heard.” (P5)

Participants recognized that continued work experience contributed to their resilience, thereby enhancing their capacity to effectively address challenges. “Years experience on the road and air help me to be more resilient.” (P28) “... having more experience on fixed-wing and dealing with challenges regularly, equips you to deal with challenges better and to be more resilient.” (P30)

Finally, participants identified positive workplace culture and environment as facilitators. “A non-punitive system with the reporting of near misses and incidents to the employer.” (P10) “Working in a team with positive people ...” (P42) “Having a positive workplace culture where everyone is supportive and acknowledged and the manager is fair with allowing everyone equal opportunity ...” (P34)

**Barriers**

Fatigue resulting from insufficient sleep has been identified as the most significant impediment to resilience. “When I am extremely tired, I feel less resilient ...” (P4) “Lack of sleep and fatigue affects resilience greatly.” (P14) “Lack of sleep during long flights ...” (P43) This was closely followed by unmet human needs. “Coffee and food are essential during a long flight ... it is difficult to be resilient if you are hungry.” (P9)

The findings revealed that barriers were not limited to physical needs but also emphasize on need for continued education and training. “Poor training on equipment/not using that equipment often enough to be confident impact negatively.” (P36) “Lack of frequent training and refreshing impact negatively on your confidence ...” (P36) and ineffective communication. The lack of communication or ineffective communication negatively affects resilience. “A lack of understanding among team members may cause frustration and loss of resilience.” (P33) “Lack of communication can be a barrier, in feedback- harsh critique instead of constructive criticism leads to barriers ...” (P48) “Lack of communication and transparency from top to bottom in company.” (P27)

Inadequate communication can result in the absence of teamwork, which adversely affects resilience. “... a big thing is the culture amongst staff. Having good relationships with the medical crew and pilots can make or break the team.” (P25) “Poor teamwork. (Not knowing your team well/working with a team member you don’t particularly like/don’t like/don’t work well with their style/personality).” (P36)

**Table 2**  
Demographics

Demographics	Categories	N	%
Profession	Doctor	7	14.6
	Nurse	12	25
	Paramedic	29	60.4
Total		48	100
Worked in this environment	<5 y	19	39.6
	5-10 y	11	22.9
	>10 y	7	14.6
	>20 y	11	22.9
Total		48	100
Highest qualification	Bachelor’s degree	21	43.8
	Diploma/certificate	16	33.3
	Master’s degree	10	20.8
	Other	1	2.1
Total		48	100

Another impediment identified is the presence of a punitive system within the workplace. Operating in an unsupportive environment is a barrier to resilience. “Managers can ensure they foster a working environment where practitioners feel safe to make decisions . . . know that their decisions will be trusted . . . harsh critique instead of constructive criticism . . .” (P46) This also supports the category of lack of managerial support. Managers who are not supportive can be a barrier. “If the work environment is toxic, nothing flourishes.” (P24) “Shortsightedness from management in not supporting personal career growth and education.” (P17)

Finally, high demands in the work environment negatively affect resilience. “Long working hours and difficult patients are part of the job . . .” (P34) “. . . during the pandemic, the PPE made things quite difficult, wearing full PPE suit, trying to treat a patient in a foreign language, all whilst its 42 degrees Celsius and humidity of 85%.” (P23)

## Discussion

Fixed-wing air ambulance transport presents significant challenges, including extended working hours, transportation of critically ill patients, and operation within demanding environments.<sup>5,9</sup> To effectively manage these demands, CCTPs must exhibit resilience to ensure the provision of high-quality patient care. The findings can inform policy development and support initiatives for CCTPs in clinical settings to bolster their resilience.

This study seeks to explore and delineate the factors that enhance and diminish CCTPs’ resilience in such settings. Family support emerges as a pivotal facilitator of resilience.<sup>19,20</sup> This underscores the necessity of integrating CCTPs into their broader familial context, which involves accommodating family involvement and endorsing activities that reinforce their familial roles. This includes offering flexibility in work hours and shifts, thereby enabling CCTPs to participate in significant family events. CCTPs also require familial support in their professional endeavors, which are characterized by long hours and time spent away from family.<sup>19,21</sup> The provision of basic needs aligns with the foundational tier of Maslow’s hierarchy of human needs.<sup>21</sup> This is highlighted by the emphasis on necessities such as food, water (coffee), and sufficient rest. Enhancing individuals’ well-being is imperative through the support of their basic needs.<sup>22,23</sup> Sleep is often undervalued, despite being an inexpensive yet vital resource.<sup>24</sup> Insufficient sleep can potentially undermine resilience, adversely affecting CCTPs’ capacity to manage stressful situations.<sup>19,24</sup> This highlights the importance of ensuring the availability of food and opportunities for sleep and rest between shifts and after flights. It is essential to ensure that schedules are meticulously planned to allow adequate time for recuperation.

Enhancing resilience should encompass not only physical support but also psychological and mental assistance.<sup>24</sup> Managers can facilitate the mental well-being of CCTPs by advocating for a healthy work-life balance, exemplifying healthy behaviors, and fostering a culture of open dialogue regarding mental health.<sup>7,23,25</sup> Spiritual fortitude and a positive outlook endow CCTPs with a sense of resolution and resilience amidst the demanding nature of their environment.<sup>25</sup> The air ambulance setting can exert considerable pressure and be emotionally taxing, particularly when attending to critically ill patients.<sup>19,25</sup> This is associated with feelings of being overwhelmed.<sup>26–28</sup> Spiritual strength can serve as a reminder that their work contributes to a cause greater than themselves, thereby sustaining motivation in their mission, whether it involves providing healing, comfort, or support.<sup>8,23,29,24</sup> Recognizing the impact on a patient’s health outcome, for instance, can be a source of motivation.<sup>24</sup> Continuous education and training are likely to enhance the knowledge and skills of CCTPs.<sup>7,30,31</sup> It offers opportunities to remain abreast of the latest medical advancements, treatments, equipment, and technologies.<sup>7,11</sup> Supporting professional development through training and career advancement opportunities can demonstrate

management’s commitment to growth.<sup>19</sup> Skill-based training can enhance competence and confidence, equipping CCTPs to manage stress effectively.<sup>32</sup> A lack of support for continuing education from managers may lead CCTPs to feel unsupported and undervalued.<sup>30,33</sup>

Teamwork unifies a group, providing direction and focus.<sup>24</sup> It facilitates task distribution, potentially preventing burnout by ensuring no individual is overwhelmed with responsibilities.<sup>24,25</sup> Sharing both challenging and rewarding experiences fosters a sense of belonging and mitigates feelings of isolation.<sup>24,25</sup> Team members can exchange knowledge, skills, and best practices, contributing to personal and professional development.<sup>23–25</sup> When CCTPs feel supported and valued within their teams, they may be better equipped to handle the stressors of the profession.<sup>5,27</sup> Ineffective collaboration is associated with in-team members being unable to rely on each other.<sup>19,26</sup> It could hinder learning and development, resulting in missed opportunities for knowledge sharing and mentorship.<sup>27</sup>

Managers who practice active listening create a positive environment ensuring they truly strive to understand CCTPs’ concerns and feedback.<sup>24,27</sup> Constructive feedback will help CCTPs grow and improve in their roles.<sup>19,24</sup> When managers are available and approachable, it could create a culture easier for them to seek help and guidance.<sup>13,26</sup> Without strong leadership, they may feel unsupported and undervalued, leading to increased stress and burnout.<sup>19,31,32</sup>

Transparent communication is instrumental in fostering trust and ensuring alignment among stakeholders.<sup>27</sup> This can be achieved through regular meetings aimed at discussing progress, addressing concerns, and sharing updates.<sup>13</sup> Such communication facilitates an environment in which critical information, including company goals, changes, and decisions, is openly shared.<sup>19,27</sup> This transparency enables ownership in decision-making and ensures that CCTPs feel acknowledged. Communication tools, such as messaging and video conferencing platforms, are essential for maintaining connectivity.<sup>8,19,26,27</sup> Conversely, ineffective communication often results in misunderstandings, potentially leading to confusion, frustration, and errors.<sup>8,19</sup>

Continuous work experience allows CCTPs to develop and refine their skills, thereby enhancing their competence and confidence in their roles.<sup>19,28</sup> Confronting and overcoming various work-related challenges can improve their problem-solving abilities, making them more resilient to future difficulties.<sup>27,28</sup> This environment fosters collaboration among colleagues, building support networks that provide both emotional and practical assistance.<sup>8,13,16,19,27,28</sup> Regularly managing work pressures and learning to cope with stress effectively contribute to building resilience.<sup>8,16,18,26</sup> Creating a positive work environment is crucial for productivity and overall organizational success.<sup>8,18</sup> Therefore, it is imperative that managers consistently acknowledge and reward the hard work and achievements of CCTPs.<sup>29–31</sup> A nurturing and safe environment encourages open communication.<sup>29,30</sup> CCTPs have indicated that such an environment is conducive to learning and enhance resilience.

A lack of support can also decrease psychological safety.<sup>24,25</sup> When CCTPs do not feel safe to express concerns or seek help, it could lead to increased stress and anxiety, creating the potential for decreased productivity, which could jeopardize patient safety.<sup>24,25</sup>

The air ambulance environment is highly demanding and stressful.<sup>7,9</sup> It is imperative to highlight the importance of resilience in maintaining high cognitive performance under stress and to detect stress-related factors to enhance performance and reduce the risk of failure in high-stress professions.<sup>32,33</sup> Thus, it is necessary to address the potential negative impact of stress on resilience, thereby leading to potentially better health for CCTPs and better patient care.<sup>7,32,33</sup>

## Limitations and Suggestions

The limitations of this study are predominantly linked to the use of a self-reported interview guide. The response rate was 76%, indicating the potential impact of selection bias on the study’s outcomes. The

proportion of air ambulance services based in Johannesburg (n = 4) was greater than that of services located outside Johannesburg (n = 1). Furthermore, this study assumed that the individual completing the interview guide accurately reported the characteristics of their experience, which may have introduced reporting and recall bias into the results.

Future research should evaluate CCTPs in various air ambulance settings beyond fixed-wing operations. In addition, this study did not specifically address gender differences; therefore, subsequent research should explore the distinctions and commonalities across genders in this context.

## Conclusion

This study highlights the importance of resilience by amplifying the voices of CCTPs and focusing on critical areas such as family support, mental health, teamwork, and communication. Identifying these facilitators and barriers is crucial for managers in the development of continuous professional development programs, the formulation of policies, and the advancement of mental health initiatives aimed at enhancing resilience among CCTPs. The findings indicate that facilitation of resilience can promote cognitive flexibility and critical thinking skills, thereby enabling CCTPs to effectively manage stress within the demanding environment of the fixed-wing air ambulance environment. The findings suggest that resilience training and support should be integral components of both initial and continuing professional development within the fixed-wing air ambulance environment.

## Declaration of competing interest

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## CRedit authorship contribution statement

**Karien Basson:** Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Isabel Coetzee-Prinsloo:** Writing – review & editing, Conceptualization. **Annatjie van der Wath:** Writing – review & editing, Conceptualization. **Letitia Greenberg:** Writing – review & editing.

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## Declaration of generative AI and AI-assisted technologies in the writing process

In the course of preparing this manuscript, the authors used Paperpal for language and editing assistance. Following the application of this tool, the authors conducted a thorough review and made the necessary editorial revisions to the content, thereby assuming full responsibility for the final publication.

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