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**IMPLICAÇÕES SOBRE O USO DE VENTILAÇÃO MECÂNICA NÃO INVASIVA NO DOMICÍLIO, NA PERSPETIVA DO INDIVÍDUO**

**IMPLICATIONS FOR THE USE OF NON-INVASIVE MECHANICAL VENTILATION AT HOME, FROM THE PERSPECTIVE OF THE INDIVIDUAL**

**IMPLICACIONES DEL USO DE VENTILACIÓN MECÁNICA NO INVASIVA EN EL DOMICILIO, DESDE LA PERSPECTIVA DEL INDIVIDUO**

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## RESUMO

**Introdução:** A ventilação mecânica não invasiva enquadra-se na modalidade de ventiloterapia maioritariamente utilizada no contexto domiciliário. Apesar de existirem muitos estudos relativos às experiências de ventiloterapia em contexto hospitalar, pouco ainda se tem investigado sobre a utilização desta terapia em contexto domiciliário.

**Objetivo:** Descrever as implicações sobre o uso de VMNI no domicílio, na perspetiva do indivíduo.

**Métodos:** Estudo exploratório e descritivo, de natureza qualitativa num total de 10 participantes. A colheita de dados realizou-se através de uma entrevista semiestruturada, sendo os mesmos posteriormente tratados com recurso à análise de conteúdo.

**Resultados:** Emergiram 6 categorias relacionadas com as implicações do uso de VMNI no domicílio: pessoas envolvidas, complicações, benefícios, dificuldades, estratégias adaptativas e hábitos implementados.

**Conclusão:** A utilização de VMNI em contexto domiciliário tem implicações para o indivíduo. Os resultados deste estudo poderão contribuir para um conhecimento mais aprofundado sobre o tema. O enfermeiro de família deverá integrar este conhecimento na conceção do processo de cuidados à pessoa utilizadora de VMNI no domicílio e família.

**Palavras-chave:** ventilação mecânica; cuidado domiciliário; cuidados de saúde primários; cuidados de enfermagem

## ABSTRACT

**Introduction:** Non-invasive mechanical ventilation is part of the ventilation therapy modality and is mostly used in the home context. Although there are many studies relating to ventilation therapy experiences in a hospital context, little has been investigated about the use of this therapy in a home context.

**Objective:** To describe the implications of the use of NIMV at home from the individual's perspective.

**Methods:** Exploratory and descriptive study of a qualitative nature with a total of 10 participants. Data collection was carried out through a semi-structured interview, which was subsequently treated using content analysis.

**Results:** 6 categories emerged related to the implications of using NIMV at home: people involved, complications, benefits, difficulties, adaptive strategies, and implemented habits.

**Conclusion:** The use of NIMV in a home context has implications for the individual. The results of this study may contribute to deeper knowledge of the topic. The family nurse must integrate this knowledge in the design of the care process for the person using NIMV in the home and family.

**Keywords:** mechanical ventilation; home care; primary health care; nursing care

## RESUMEN

**Introducción:** La ventilación mecánica no invasiva forma parte de la modalidad de terapia ventilatoria más utilizada en el contexto domiciliario. Aunque existen muchos estudios relacionados con experiencias de terapia ventilatoria en el contexto hospitalario, poco se ha investigado sobre el uso de esta terapia en el contexto domiciliario.

**Objetivo:** Describir las implicaciones del uso de VMNI en el hogar, desde la perspectiva del individuo.

**Métodos:** Estudio exploratorio y descriptivo, de carácter cualitativo con un total de 10 participantes. La recolección de datos se realizó a través de una entrevista semiestructurada, que posteriormente fue tratada mediante análisis de contenido.

**Resultados:** Surgieron 6 categorías relacionadas con las implicaciones del uso de la VMNI en el hogar: personas involucradas, complicaciones, beneficios, dificultades, estrategias adaptativas y hábitos implementados.

**Conclusión:** El uso de VMNI en el contexto domiciliario tiene implicaciones para el individuo. Los resultados de este estudio pueden contribuir a un conocimiento más profundo sobre el tema. La enfermera de familia debe integrar estos conocimientos en el diseño del proceso de atención a la persona que utiliza VMNI en el hogar y la familia.

**Palabras clave:** ventilación mecánica; cuidados en el hogar; primeros auxilios; cuidado de enfermera

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## INTRODUCTION

Sociodemographic transformations and technological development have enabled the use of advanced medical technology at home for the treatment of chronic diseases, allowing it to become an increasingly visible reality in the present and in the future. Non-invasive mechanical ventilation (NIMV) falls within the modality of respiratory care and is widely used in the home context. It is defined as the application of positive pressure ventilatory support through a non-invasive interface aimed at reducing respiratory effort, facilitating the rest of the respiratory muscles, and improving gas exchange (Cabrini et al., 2019).

Despite many studies regarding the experiences of ventilator therapy in a hospital setting, little has been published about the experiences of individuals undergoing NIMV at home, particularly concerning care needs and long-term complications (Stieglitz et al., 2013). Without this knowledge, it is difficult to tailor healthcare to this population. Therefore, the aim of this study is to describe the implications of NIMV use at home from the individual's perspective.

## 1. THEORETICAL FRAMEWORK

Non-invasive mechanical ventilation (NIMV) has gained increasing importance in the treatment of individuals with Respiratory Insufficiency in both hospital and home settings (Stieglitz et al., 2013). This technique has been gaining prominence in recent years, especially positive pressure ventilation. NIMV is used to provide ventilation through a non-invasive interface (Cabrini et al., 2019) using accessories that do not invade the respiratory tract, such as nasal, facial, or oral masks or a helmet system (Rodriguez, 2012). The objective of this type of ventilation is to improve gas exchange and relieve symptoms of ventilatory discomfort, increase spontaneous inspiratory efforts, improve alveolar ventilation, decrease dyspnoea, reduce respiratory rate (RR), and improve arterial oxygenation (Nicolini et al., 2014; Pertab, 2009).

Despite initially being applied between the 1930s and 1950s in the context of the poliomyelitis epidemic, it has been since the 1980s that NIMV began to be more widely used in intensive care units and emergency services (Comellini, Pacilli & Nava, 2019). Nowadays, it is known that the use of NIMV can be useful in the treatment of exacerbated Chronic Obstructive Pulmonary Disease (COPD), cardiogenic acute pulmonary edema (Comellini et al., 2019), facilitating extubation, and can also be used in palliative care to improve survival and relieve symptoms of ventilatory discomfort associated with oncological disease, advanced respiratory disease, or heart failure (Comellini et al., 2019).

The literature has demonstrated a positive impact of using this type of ventilation on improving health-related quality of life, as well as reducing hospitalization episodes and the number of days hospitalized (MacIntyre et al., 2016).

Regarding the success of using NIMV at home, Fex et al. (2012), as well as Rodriguez (2011), argue that fundamental requirements include a positive attitude towards dealing with problems, self-confidence in abilities, flexibility, and hope for the future, extending these attributes to caregivers and other family members. On the other hand, complications related to the interface, pressure, flow, and ventilator malfunction are also associated with ventilator therapy (Correia et al., 2013; Rodriguez, 2011). Complications related to inadequate gas exchange may also arise due to a lack of synchrony between the ventilator and the user, as well as potentially severe hemodynamic effects caused by increased pressure in the thoracic cavity (Rodriguez, 2011).

According to Low et al. (2014), one of the key components for an effective home ventilator therapy program tailored to the individual's needs is the presence of a healthcare team, with the nurse playing an essential role in coordinating between the ventilator provider, the referring hospital, and the user. Other authors suggest that individuals undergoing NIMV, accompanied by the nursing team, better address treatment-related complications, resulting in reduced hospitalizations, greater clinical stabilization, and improved quality of life at home (Correia et al., 2013).

There is a general consensus among authors that the use of NIMV generates specific needs for physical, technical, emotional, and family care, such as parameter monitoring, support in ventilator handling, empathy from professionals, and the integration of family members in the therapeutic process (Correia et al., 2013; Rodriguez, 2012; Stieglitz et al., 2013;). To address care needs, nurses need not only inherent technical knowledge but also an understanding of the most significant aspects of the experience of NIMV use at home from the individual's perspective.

Therefore, the research question arises: What are the implications of NIMV use at home from the individual's perspective?

## 2. METHODS

An exploratory, descriptive study of qualitative nature was developed. The study underwent prior evaluation and received approval from the Ethics Committee (Opinion No. 74/2018), as well as authorization from the Clinical Council of the ACeS [Group of Health Centres] where it was conducted.

### 2.1 Sample

The participants in this study consist of 10 individuals undergoing NIMV at home, registered with a Group of Health Centres (ACeS) in the northern region of the country.

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## 2.2 Data Collection Instruments

Data collection was conducted through a semi-structured interview composed of 12 sociodemographic characterization questions, such as age, gender, education level, occupation, type of ventilator therapy, and duration of use, as well as open-ended questions where individuals were asked to describe their experience with NIMV since the beginning, including difficulties and positive aspects.

## 2.3 Data Analysis

All collected material was analyzed using the content analysis technique proposed by Bardin (2008), preceded by the full transcription of the interviews. Subsequently, floating readings of all transcribed documents were conducted, followed by more precise readings of the narratives, dividing them into context units and then into recording units. From these, categories were created by semantic approximation and later differentiated into subcategories.

## 3. RESULTS

The sociodemographic data, represented in Table 1, revealed that the participants are aged between 40 and 81 years old, with the majority being male (9). Their educational qualifications are mostly at the primary level (4). Half of the participants are retired, with most having worked primarily in the construction, mining, or quarrying sectors.

**Table 1** – Sociodemographic Characterization of NIMV Users at Home

Variable		Fr
Age (years)	Minimum: 40	
	Maximum: 81	
Gender	Male	9
	Female	1
Qualifica-tions	Primary education	4
	Lower secondary education	3
	Secondary education	2
	Bachelor's degree	1
	Retired (Bricklayer, Construction foreman, Miner)	5
Occupa-tion	Small business owner	1
	Unemployed	2
	Technical assistant	1
	Doctor	1

The duration of ventilator therapy ranges from 7 months to 16 years. The ventilatory modality used is Continuous Positive Airway Pressure (CPAP) (10), always during the night time and utilizing nasal (1) and facial (9) interfaces, all of them indicated the presence of Obstructive Sleep Apnoea Syndrome (OSAS).

From the analysis resulting from the successive data reduction operations, 6 categories emerged, namely: (i) individuals involved, (ii) complications, (iii) benefits, (iv) difficulties, (v) adaptive strategies, and (vi) implemented habits. The categories and subcategories are presented in Table 2:

**Table 2** – Categories and Subcategories

Category	Subcategory
Individuals involved	Doctor; Technician(s); Spouse; Child; Friend; Grandchild
Complications	Air leaks; Mucous membrane dryness; Respiratory desynchrony; Material wear and tear; Pressure ulcers; Eye irritation; Abdominal distension; Pressure dysregulation
Benefits	Psychological well-being; Sleep quality; Energy conservation; Concentration; Cardiovascular risk; Interpersonal relationship
Difficulties	Interface adaptation; Movement restriction; Noise; Sleep disturbance; Symbolic dependence; Device manipulation; Ventilator transportation
Adaptive strategies	Application of active ingredient ; Air humidification; Interface change; Interface adjustment; Mucous membrane hydration; Pressure adjustment; Motivation; Habituation; Dietary restriction; Reserve material
Implemented habits	Ventilator hygiene; Ventilator transportation; Number of sleep hours

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### Individuals involved

Regarding the category of *individuals involved*, participants spontaneously mentioned some individuals when narrating their experiences related to the use of NIMV in a home setting. Therefore, a category associated with individuals involved was differentiated in the data corpus. The following individuals were mentioned: the doctor ("*hospital doctor*" E4, "*...the cardiologist*" E4, "*...family doctor*" E5); the technician from the company providing the ventilator service: "*...they [technicians from the company] come here*" E1, "*I explain to the technician*" E2; the spouse ("*...my partner*" E6, "*...my wife*" E7); the children ("*my daughter...*" E8, "*my children...*" E10); a friend ("*I started explaining the symptoms to my friends*" E6); and grandchildren ("*my grandchildren*" E5).

### Complications

Regarding complications, various subcategories emerged from the data analysis such as mucous membrane dryness, described as dryness in the mouth, nose, or throat ("*...my throat got very dry*" E7, "*...my nose gets blocked*" E9); air leaks were also reported, with participants mentioning air escaping from the mask, including towards the eyes ("*air was coming out towards my eyes*" E2, "*...that thing puffing towards my eyes...*" E9). Some participants highlighted respiratory desynchrony, describing a lack of coordination between themselves and the device regarding respiratory cycles ("*air entering through my nose while I'm breathing through my mouth...There was a conflict in ventilation*" E6). Material damage was another recurring issue associated with the ventilator ("*the piece keeps holding on and breaks*" E7). Additionally, participants mentioned developing pressure ulcers caused by the interface, with one participant referring to it as a "*little ulcer on my nose*" E3). Abdominal distension due to the accumulation of air from the ventilator in the digestive system was also noted. Other complications included eye irritation ("*my eyes were tearing up*" E8), and ventilator pressure dysregulation.

### Benefits

The category of benefits was divided into six subcategories: psychological well-being, sleep quality, energy conservation, concentration, cardiovascular risk, and interpersonal relationship. Participants mentioned feeling lighter, having better disposition, improved self-esteem, and more calmness ("*...emotionally, that improved significantly*" E3, "*...I'm calmer now*" E4, "*much calmer...*" E5, "*good disposition also improved significantly...*" E6).

The sleep quality subcategory was also widely mentioned by participants. This subcategory reflects the perception of better sleep, with fewer nightmares, greater regularity, and without snoring ("*...I don't snore as much as I used to*" E9, "*...better sleep quality and even number of hours*" E10).

Energy conservation, related to daily activity performance, was considerably mentioned through the association with decreased fatigue, increased mobility, and less daytime drowsiness ("*...not feeling as sleepy after lunch*" E9, "*...less drowsiness while driving*" E10).

Concentration is a subcategory representing benefits related to cognitive attention and reasoning ("*...I can read articles to the end without having to start over*" E10). Weight loss and decreased blood pressure were described as outcomes of NIMV use, associated with reduced cardiovascular risk, and considered a benefit. Finally, there was also a reference to interpersonal relationships as a benefit compared to the period before using the ventilator ("*...now I go out, talk to friends, and enjoy laughing...*" E3).

### Difficulties

Adapting to the interface was mentioned as a difficulty, as participants reported that it disturbs, hurts, or makes it more difficult to get used to the ventilator ("*...the mask bothers me*" E2, "*if I make a slight mistake in adjusting, it starts to tighten, hurt...*" E5). Restricted movement was also cited, with participants expressing feeling limited in their movements while using the device, making adaptation more difficult ("*I used to like, for example, sleeping on my stomach, but I can't with the ventilation*" E6). The noise produced by the ventilator was also mentioned as a constraint, with participants stating that it bothers them and suggesting the need for quieter devices ("*...if there were a quieter one [device], it would be better*" E7).

Besides being pointed out as a benefit, sleep quality is referred to as a difficulty from another perspective. Therefore, sleep disturbance was differentiated as a subcategory by narratives associated with the noise or air leaks from the ventilator ("*there are times when it starts breathing out...and so you don't sleep as well*" E1). The category of symbolic dependence also emerged, illustrating the idea that the ventilator and the person are inseparable ("*I felt dependent on a device*" 4 and "*like carrying a foreign body*" E10). Manipulating the device was also a difficulty that was associated with technical dexterity in handling the device. Transporting the ventilator was mentioned as a constraint for which the participant avoids "*spending nights away from home*" (E6).

### Adaptive strategies

One of the adaptive strategies found was the application of an active ingredient, in which participants described applying some product for different therapeutic purposes, from treating a wound (ointment), drops for eye irritation, or spray for dry mucous membranes ("*...I started applying Halibut [on the wound] and it healed.*" E3). Another strategy mentioned was air humidification

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by placing water in the device in a proper location (*"they put the humidifier along with water"* E5). Changing the interface refers to switching the type of interface and was a described strategy, as well as just its adjustment (e.g., *"from time to time I have to adjust it [the mask]"* E5).

Mucous membrane hydration is a subcategory that emerged in response to the complication of mucous membrane dryness, where participants mentioned some actions to minimize this problem (*"...I come to the bathroom, rinse with water, and that's it"* E7). Adjusting pressure, motivation, habituation, pre-sleep dietary restriction, and having reserve supplies were subcategories that emerged from participants' narratives as adaptive strategies in minimizing difficulties or complications (*"I really had to gain that willpower I never had before..."* E3, *"...a while before I know I'm going to bed, I immediately abstain from eating."* E5).

### Implemented habits

Cleaning the ventilator was an action several participants described they had started to do daily (*"I wash the device in the morning"* E4). Transporting the ventilator also became a habit, with participants mentioning they take it with them when sleeping away from home, some in all situations and others only when staying away for more than two nights (*"...I don't go anywhere without it"* E4). Lastly, the number of sleep hours was also described as a habit, as the participant mentioned they started sleeping a certain number of hours (*"they're those are 8 hours [of sleep], more or less"* E6).

## 4. DISCUSSION

From the perspective of participants' demographic and social profiles, their ages range from 40 to 81 years and are mostly men. Scientific evidence suggests that advanced age and male sex are risk factors for the development of Obstructive Sleep Apnoea Syndrome (OSAS) (Tomlinson & Gibson, 2006; López-López et al., 2018).

Regarding the duration of NIMV, this varies between 7 months and 16 years. All participants undergo ventilation in the Continuous Positive Airway Pressure (CPAP) mode during the night, mostly using a facial interface. The use of NIMV is aimed at treating a sleep disorder with respiratory implications called OSAS.

The prevalence of OSAS is not exactly known in Portugal, but it is estimated that, in 2018, the proportion of people undergoing CPAP treatment was 89.6%, indicating a high prevalence of this condition (Observatório Nacional Doenças Respiratórias, 2016). In this study, the facial mask is the most commonly used type of interface, which aligns with Nicolini (2014), who mentions this type of mask as the most common.

In general, it is possible to observe that categories related to negative connotations, perceived difficulties, or constraints are associated by participants with a temporal dimension contextually linked to the past through the use of the past simple and continuous tenses (*"I was starting to feel a lot of pressure"* E1 or *"It was hard for me to adapt to the machine itself..."* E7). On the other hand, the benefits concerning the individual and the family are linked to a recent past or even reported in the present (*"I feel calmer"* E4 or *"I feel better because I used to struggle to breathe, but now I don't anymore"* E8). It was understood in this study that during the phase of adapting to ventilatory therapy, difficulties, discomforts, and constraints may be more evident than the well-being benefits, thus being a crucial phase in the therapy adherence process. According to studies by Fex et al. (2012) and Rodriguez (2011), attributes of self-confidence, positive attitude, flexibility, and hope for the future present in the individual and the family will aid in this adaptation process. Hu et al. (2017) also add that a nursing education program aimed at CPAP users in the first month from the beginning of treatment is key to improving the quality of life of people with OSAS undergoing this treatment.

Users of NIMV at home reported the involvement of several individuals in this therapeutic process. From the moment of diagnosis of the underlying disease to the prescription of NIMV for its treatment in specialized centres and the subsequent referral of individuals to Primary Health Care to be monitored and have the ventilator prescriptions renewed (Direção Geral da Saúde, 2016), there is the intervention and contact of various healthcare professionals mentioned by the participants (such as the hospital doctor and family doctor). The equipment supplier plays an active role during the use of NIMV, as they are expected not only to install the equipment but also to conduct home visits with one of the following professionals: the cardiopneumologist, the physiotherapist, and/or the nurse (DGS, 2015). The spouse is also a significant figure, which is understandable given that all participants in this study are married or in a common-law marriage. Participants also mentioned children, grandchildren, and friends. Several authors refer to family support as essential in adapting to NIMV and in the individual's satisfaction with it (Fex, et al., 2012; Rodriguez, 2011; Dystrad et al., 2012), which reinforces our results regarding the mention of significant individuals. The study by Morais and Queirós (2013) reinforces the results, mentioning participants in adherence to NIMV at home from the perspective of the individual and family: the family doctor, the pulmonologist, and the nurse from the inpatient service, the specialist in respiratory care, the operational assistant, and also the community nurse.

Regarding the complications of using NIMV, the results are consistent with Correia et al. (2013) and Rodriguez (2011), who stated that air leaks and dryness of the mucous membranes, as well as lack of synchrony between the ventilator and the user, abdominal distension, conjunctivitis, and pressure ulcers, are the main complications associated with individuals using NIMV.

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Regarding the benefits of NIMV utilization, psychological well-being, sleep quality, energy conservation, concentration, cardiovascular risk, and interpersonal relationships were mentioned. It is worth noting that psychological well-being is a subjective state, and this benefit may have been influenced by others (sleep quality, energy, concentration, among others), resulting in the user's perception of improved quality of life with NIMV (Hu et al., 2017; Markussen, 2017). Sleep improvement is also referenced as a benefit by Morais and Queirós (2013) and Hu et al. (2017). Furthermore, energy conservation was also mentioned as a benefit of NIMV utilization. Better energy conservation naturally results from the improvement of the underlying respiratory insufficiency associated with SAOS. Participants reported less fatigue, feeling lighter, and being more alert while driving. This benefit can be understood due to improved gas exchange with NIMV use (Hazenberg et al., 2016), as well as improved sleep quality. Morais and Queirós (2013) mentioned reductions in fatigue and increased strength as benefits of adhering to a NIMV program. Increased concentration capacity was also reported by participants, which is consistent with Hu et al. (2017), who demonstrated in their study that 60% of participants showed increased alertness and better performance at work 30 days after using CPAP.

In terms of cardiovascular risk, it is known that OPSAS constitutes an independent risk factor for cardiovascular diseases. The use of CPAP is associated with lower levels of complications and mortality from cardiovascular causes (López-López et al., 2018), which is consistent with our results. Participants described improvements in factors contributing to the reduction of cardiovascular risk, such as blood pressure and weight.

The interpersonal relationship aspect was also reported concerning social interaction, resulting in more social programs and enjoyment, which is supported by Hu et al. (2017), who found that CPAP users show improvement in their relationships with others after one month. Markussen et al. (2017) also demonstrated that after 6 years of therapy, NIMV users improved their level of social functioning and leisure activities, which translated into the ability to go out at night and participate in social events, related to an increase in forced vital capacity. Regarding the benefits for the NIMV user, our results are consistent with those of Castillejo et al. (2015) and MacIntyre et al. (2016), who showed that NIMV has a positive impact on quality of life, reduction in episodes of hospitalization, and increased survival, which is due to improvements in gas exchange (Hazenberg et al., 2016) and consequent improvement in the ability to perform self-care (Hu et al., 2017).

The perceived difficulties of using NIMV differ from complications, as they are associated with more personal and subjective constraints, discomfort, or inconvenience, which are not necessarily easily resolved. These include interface adaptation, movement restriction, noise, sleep disturbances, symbolic dependence, device manipulation, and transportation. These findings align with Nicolini et al. (2014), who stated that interface intolerance has been the main cause of non-adherence to ventilation. According to these authors, one way to address intolerance is through the rotation strategy, as interfaces are uncomfortable and can be challenging, a sentiment also shared by Morais and Queirós (2013). Movement restriction is something that troubles NIMV users and will always be present during the therapeutic process, constituting an inevitability and a common problem for NIMV users (Hu et al., 2017). It is noted that improved sleep quality is a benefit of NIMV for some participants, while simultaneously, sleep disturbances are a difficulty felt, associated with the experience of waking up more frequently at night. However, this difficulty is related to the initial phase of ventilator use and/or may also be related to the noise the device produces. As Morais and Queirós (2013) note, ventilator noise is a difficulty that influences adherence to ventilation by its users. In turn, Hu et al. (2017) also described sleep disturbance as discomfort of CPAP use, including waking up during the night, in addition to the discomfort caused by the device and its economic costs. This latter reference was not observed in our study.

In addition to the difficulties experienced in the home-based NIMV process, participants also mentioned adaptive strategies represented by behaviors and/or attitudes aimed at solving complications or minimizing difficulties. In the case of preventing and treating pressure ulcers on the nose, the literature advises only the application of a hydrocolloid dressing (Correia et al., 2013). On the other hand, air humidification was one of the most common strategies, probably due to one of the most frequent complications, mucosal dryness. This strategy is also proposed by Correia et al. (2013) and Rodriguez (2011) in the prevention and resolution of the described complication. Participants described motivation as an adaptive strategy. In this sense, Gale et al. (2005) are of the opinion that individuals undergoing NIMV develop strategies to accept the need for ventilation and adapt, despite the discomfort and anxiety that the use of the ventilator may cause. These strategies may also include the implementation of habits, in light of the last category of this study.

## CONCLUSION

NIMV at home has implications for the life of its users.

The benefits of this therapy described by the participants were improved sleep quality, psychological well-being, and energy levels. Some individuals involved in the therapeutic process were mentioned, such as the doctor, the technician from the supplier of the ventilator, and family members. On the other hand, difficulties are also common, particularly adapting to the interface and restricted movement. Adaptive strategies have been established in response to ventilator use, such as applying an active principle, humidifying the air, and changing the interface. Complications are also described as an implication of home NIMV use, including air leaks, dry mucous membranes, and ventilatory desynchronization. Finally, the adoption of habits is also identified, particularly equipment hygiene and ventilator transportation.

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This study may contribute to a better understanding of NIMV from the individual's perspective. The knowledge and interest shown by the nurse regarding the experience of NIMV use will facilitate the therapeutic relationship, allowing the individual to speak more openly about their difficulties in this process. The nurse can thus incorporate the information gathered into their care plans to achieve positive outcomes, particularly in effective adherence to this therapy.

In the future, it will be important to continue researching the use of NIMV at home, ideally with a larger number of participants. Other types of studies could be developed, such as quantitative studies, to establish relationships between variables, so that the results can have a higher level of evidence for the scientific community. It will also be important in practice contexts to identify individuals using NIMV at home and assess their health needs in order to formulate care plans accordingly and to observe gains resulting from the family nurse's intervention.

## AUTHOR CONTRIBUTIONS

Conceptualization, V.G. and R.N.; data curation, V.G. and M.H.F.; formal analysis, V.G., R.N. and M.H.F.; investigation, V.G., R.N. and M.H.F.; methodology, V.G., R.N. and M.H.F.; project administration, V.G., R.N. and M.H.F.; resources, V.G.; supervision, R.N. and M.H.F.; validation, V.G., R.N. and M.H.F.; visualization, V.G., R.N., T.M. and M.H.F.; writing-original draft, V.G., R.N., T.M. and M.H.F.; writing-review and editing, V.G., R.N., T.M. and M.H.F.

## CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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