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CASE REPORT

Nursing care of a patient with cluster headache based on the Nola Pender health promotion model: Case report☆

Indiana Luz Rojas Torres[a,*], **Luis Enrique Perea Vásquez**[b], **Diana Marcela Perea Rojas**[a]

[a] *Facultad Ciencias de la Salud, Universidad Simón Bolívar, Barranquilla, Colombia*
[b] *Hospital Materno Infantil de Soledad, Atlántico, Colombia*

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KEYWORDS
Cluster headache;
Health promotion;
Nursing;
Patient care planning

Abstract
Introduction: Cluster headache was described by B.T. Horton as a strong unilateral pain in the orbital region of cyclical predominance, which affects mainly men. The structural and functional abnormalities of its aetiology are not exactly known, although it is related to an autosomal gene. The diagnosis is based on the patient's symptoms and the treatment on pain management and suppression of the precipitating factors of the episode.
Objective: To develop a nursing care plan for patients with cluster headaches and establish health-promoting behaviour.
Methodology: A review of the literature on cluster headache was conducted. Based on the Nanda International domain assessment taxonomy, Nursing Outcomes Classification (NOC) and Nursing Interventions Classification (NIC), an individualized care plan was developed. Next, the Nola Pender Health Promotion Model was applied to the patient to promote health-promoting behaviours.
Results: The nursing process is described starting from the diagnoses of pain, fatigue, knowledge, and health behaviour with their respective objectives, interventions, and nursing actions. Improvement was evidenced when the patient was administered 50% venturi oxygen at 15 L per min, for 30 min; topiramate every 12 h and generation of healthy behaviours based on the Health Promotion Model proposed by Pender.

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* Corresponding author.
E-mail address: indianaluzrojastorres@gmail.com (I.L. Rojas Torres).

Conclusions: The importance of not only addressing the severity of the clinical picture is highlighted, but also the promotion of appropriate lifestyles on risk factors that trigger the disease.

PALABRAS CLAVE
Cefalea en racimos;
Promoción de la salud;
Enfermería;
Planificación de los cuidados del paciente

Cuidados de enfermería a paciente con cefalea en racimos basado en el modelo de promoción de la salud de Nola Pender: informe de caso

Resumen
Introducción: La cefalea en racimos fue descrita por B.T. Horton como un fuerte dolor unilateral en la región orbitaria de predominio cíclico, que afecta principalmente a hombres. No se conoce exactamente las anormalidades estructurales y funcionales de su etiología, aunque se relaciona con un gen autosómico. El diagnóstico se basa en la clínica del paciente y el tratamiento en el manejo del dolor y supresión de los factores precipitantes del episodio.
Objetivo: Desarrollar plan de cuidados de enfermería paciente con cefalea en racimos y establecer una conducta promotora de salud.
Metodología: Se realizó revisión de la literatura sobre la cefalea en racimos. Basados en la taxonomía de valoración por dominios de Nanda Internacional, clasificación de Resultados de Enfermería (NOC) y clasificación de Intervenciones de Enfermería (NIC), se desarrolló un plan de cuidados individualizado. Seguidamente se aplicó en el paciente el Modelo de Promoción de la salud de Nola Pender con el fin de promover conductas promotoras de salud.
Resultados: Se describe proceso de enfermería partiendo de los diagnósticos dolor, fatiga y conocimiento y conducta de salud con sus respectivos objetivos, intervenciones y acciones de enfermería. Se evidenció mejoría al administrar al paciente oxígeno venturi al 50% a 15 litros por minuto, por 30 minutos; topiramato cada 12 horas y generación de conductas saludades orientadas desde el Modelo de Promoción de la Salud propuesto por Pender.
Conclusiones: Se resalta la importancia no solo del abordaje en la severidad del cuadro clínico, sino de la promoción de los estilos de vida adecuados sobre factores de riesgos desencadenantes de la enfermedad.

Introduction

Cluster headache is a primary headache disorder, also known as Horton's disease or suicide headache. This headache disorder falls within the trigeminal autonomic group,[1] characterised by severe cyclical, strictly unilateral pain in the supra-orbitary region. It may be accompanied by lacrimation, nasal congestion, facial sweating, miosis and eyelid oedema.[2] The term ''clusters'' is due to the fact that symptoms may last weeks or months, with an approximate duration of between 15 min and 3 h.

This disorder mostly affects men, with prevalence being one person in every 500. Regarding its cause, the literature refers to a high genetic probability[3] and it has been estimated that there is an increased risk of cluster headaches between 19 and 49 times among first and second degree relatives who suffer from this pathology.[4] Diagnosis of this disorder is currently based on clinical presentation.

The aim of this clinical case study was to provide home nursing care to a patient with cluster headache by applying the NANDA-NIC-NOC[5] nursing process and to encourage health-promoting behaviours and commitment to an action plan based on the health promotion model, authored by nurse Nola Pender,[6] which aims to provide an answer to how people adopt appropriate behaviours related to their own health.

Presentation of the case study

A 30-year-old male patient referred to a high complexity hospital for neurological assessment for presenting with symptoms of 21-days onset consistent with right temporal headache. Onset was insidious with increased 10/10 pulsating pain intensity. It was associated with conjuntival injection, epiphora, ipsilateral hyaline rhinorrhoea, with a feeling of uneasiness, lasting approximately 120 min, in a number of 8 episodes per day and partial improvement with triptans.

The patient reported a history of similar headaches 4 years ago, associated with inappropriate lifestyles, insufficient rest, excessive alcohol consumption, stress, unhealthy diet, among other factors associated with lifestyle, as well

Table 1 Nursing care process.

Altered domains	Objective data	Subjective data	Suggested nursing diagnosis	NOC	NIC
Domain: 12 Comfort	Fascia disengaged Sweating Frowning Facial muscle contracture Complaints Gritted teeth Irritability	*''I cannot bear this strong pain, I feel I am going mad''*	**Label:** 00132 Acute pain **Class:** 1 physical comfort **Definition:** Unpleasant sensorial and emotional experience associated with real or potential tissue damage, or described in terms of said damage; Initially sudden or slow of any intensity from mild to severe with an anticipated or predictable end and with duration of less than 3 months.	**Domain:** 4 Health awareness and behaviour **Class:** Health behaviour **Outcome label:** 1605 Pain control **Definition:** personal actions to eliminate or reduce pain **Indicators:** [160501] Recognises the primary causal factors (initial score: 3, target score: 5) [160503] Use preventative measures to control pain (initial score: 2, target score: 5) [160526] Use strategies of effective confrontation (initial score: 2, target score: 5) Likert scale: (1-5); with (1) Never demonstrate (2) Rarely demonstrated, (3) Sometimes demonstrated, (4) Frequently demonstrated (5) Always demonstrated	**Intervention label 1:** Oxygen therapy **Definition**: Administration of oxygen and control over its efficacy **Activities:** 1. Administer supplementary oxygen according to medical orders 2. Monitor oxygen litre flow 3. Instruct the patient and family in the use of oxygen in the home **Intervention label 2:** Medication management **Definition:** Facilitate safe and effective use of prescribed and freely dispensed medication Activities: 1. Observe the therapeutic effects of the medication on the patient 2. Determine the impact of the use of the medication on the patient's lifestyle 3. Develop strategies with the patient to enhance compliance of the prescribed medication regime

Table 1 (*Continued*)

Altered domains	Objective data	Subjective data	Suggested nursing diagnosis	NOC	NIC
Domain: 4 Activity/Rest	Occupational requirements Insufficient energy Tiredness Increased physical exercise Sleep deprivation	*''I have shifts one after the other''* *''I don't sleep enough''* *''When I'm free I'm going clubbing''* *''I drink energy drinks''* *''After my shift I'm going to the gym or to play football''*	**Label:** 00093 Fatigue **Class:** 3 Energy balance **Definition:** Sustained and overwhelming sensation of exhaustion and reduction in capacity for a normal level of mental and physical work l	**Domain:** 5 perceived health **Class:** Health and quality of life **Outcome label** : 2013 Balance in lifestyle **Definition:** Personal actions to live a healthy, balanced life consistent with one's own values, strengths and interests, with conscious adherence to daily healthy habits and efforts to reduce and minimize stress **Indicators:** [201301] Recognises the need for balanced life activities (initial score: 2, target score: 4) [201303] Considers personal needs and values when choosing life activities (initial score:32, target score: 5) Likert scale: (1-5); with (1) Never demonstrate (2) Rarely demonstrated, (3) Sometimes demonstrated, (4) Frequently demonstrated (5) Always demonstrated	**Intervention label:** Facilitate self-reliance **Definition:** Encourage the patient to accept greater responsibility for their own behaviour **Activities:** 1. Encourage the establishment of goals 2. Discuss the consequences of not accepting individual responsibilities 3. Facilitate family support
Altered domains	Objective data	Subjective data	Suggested nursing diagnosis	NOC	NIC
Domain: 1 Health promotion	Expressions and desires to improve the management of risk factors Attentive and receptive to instructions and education on preventative behaviour regarding their disorder	*''I'm aware of the need to improve the triggers of my disorder, I am totally willing to improve them, I don't want to have another episode like that one'' ''this has been really tough and painful, I don't want to repeat an episode like this one''*	**Label:** 00162 Availability to improve health management **Class:** 2 Health management **Definition:** Integration regulation pattern in daily life of a therapeutic regime for treatment of the disorder and its sequelae which may be reinforced	**Domain:** 4 Awareness and health behaviour **Class:** Health behaviour **Outcome label:** 1602 Behaviour and health promotion **Definition:** Personal actions to maintain or increase well-being **Indicators:** [160222] Maintain adequate sleep (initial score: 3, target score: 5) [160214] Stick to a healthy diet [160216] Use an effective exercise programme (initial score: 2, target score: 4) (initial score: 21 target score: 3) P Likert scale: (1-5); with (1) Never demonstrate (2) Rarely demonstrated, (3) Sometimes demonstrated, (4) Frequently demonstrated (5) Always demonstrated	**Intervention label:** Modification of behaviour **Definition:** Promotion of a change in behaviour **Activities:** 1. Promote the replacement in undesirable habits for desirable ones 2. Identify the patient's problem in terms of behaviour 3. Develop a programme for changes in behaviour

Source: NNNConsult[5].

Table 2 Health Promotion Model (Nola Pender).

Factors according to the Nola Pender health promotion model	Results of assessment in the family /individual
Related prior behaviour: (Refers to previous behaviours related to the possibility of a health behavioural compromise)	*''Four years ago I had a crisis like this one and it was the same as now, I remember I was all over the place, with late nights, parties and going out with friends, not sleeping and then working and then playing football''*
Personal factors: biological, psychological and social (These factors are predictive in determining health behaviour, and are characteristic of each individual)	**Personal biological factors:** personal and family history of migraine type headaches **Personal psychological factors:** high stress level, sleep deprivation. **Sociocultural factors:** good interpersonal relationships works in the health area
Perception of perceived benefits of action (They are the positive effects which the patient anticipates will be achieved due to their health behavioural change)	*''I am aware that my inappropriate lifestyle and excesses are a trigger for the appearance of the symptoms of my disorder, which has been dormant for years. I know I should again adopt habits that prevent these episodes''*
Perception of barriers to action (Corresponds to the negative appreciations that may become an obstacle with a health behavioural change)	*«''I've always liked going out and nightlife, my circles of friends are the same as me, there is always a reason for not adopting a proper lifestyle. Also, I work a lot and when I rest the only thing I want to do is go out with my friends''*
Perception of self-sufficiency (Refers to the individual's perception regarding their ability to commit to a health behaviour)	*''This crisis was really painful and it destroyed loads of plans, both personal and occupational. It was highly debilitating, I need a change and I know I can get one. I do not want another episode like this one in my life''*
Activity-related effects (They are emotions which impact positively or negatively in health promoting behaviour)	*''People say I am affectionate but I think I am weak, and I am easily led by my friends. My family is very important in this process''*
Personal influences (Corresponds to the support the individual receives from people they consider important and the repercussion of this on health behaviour)	*''My family is my great support and stimulus, my circle of friends are definitely my greatest distracters in this process''*
Situational influences (These are aspect of the environment which positively or negatively affect change in behaviour)	*''Stressful work, music, messages and exciting stimuli''*
Demands (Low control) (Circumstances which people have little control of)	*''I don't know when this disorder will appear again, much needs to be researched »*
Preferences (high control) (Circumstances which people have high control of)	Lifestyle: sleep, exercise, nutrition, possibility of reducing night shifts
Commitment to a plan of action (it is the individual's responsibility for health behaviour change)	Exercise plan, improve sleep pattern, removal of energy drinks, medical check-up control
Health- promoting behaviour (the results of the behaviour change)	Modification of lifestyle and intervention into factors which may induce triggers of Horton's syndrome signs and symptoms.

Source: own created based on the Pender 1996 health promotion model. In: Aristizábal et al.[6]

as a maternal family history of migraine-type headaches. He stated that he did not pay attention to the symptoms initially presented, but they had gradually worsened until he presented daily with 6–8 crises at a specific time between 6 am and 6 pm. On physical examination he was conscious and oriented in the three spheres, fundus without papilledema, no alteration of cranial nerves, overall muscle strength 5/5, sensitivity preserved, motor coordination tests preserved, no change in gait. Paraclinical report: glycaemia 121 mg/dL, creatinine 1,1 mg/dL, sodium138 mEq/L, chlorine 100 mEq/L, PCR 0.46 mg/L, haemogram leukocyte 14.7 mm^3, neutrophils 86%, haemoglobin 15 g/dL, haematocrit 46%. A simple cranial tomography was performed, showing good differentiation of white and grey matter, cistern and permeable ventricular system.

He was managed on admission with IV dipyrone 2 g, IV dexamethasone 8 mg, without express improvement. He felt slight improvement with treatment initially prescribed at the referring institution: neosaldine, topiramate, propranolol and verapamil. Subsequently, he was assessed by the neurology department who diagnosed the patient with characteristic trigeminal-autonomic headache. He was then discharged with a home care plan: administration of oxygen with a 50% Ventury mask at 15 L per min for 30 min, topiramate 25 mg every night for 15 days, subsequently increasing the dose to 50 mg every night, avoiding night work and improving his lifestyle.

After treatment lasting over 3 weeks with high flow oxygen, topiramate every 12 h and changes to his lifestyle, the headaches gradually disappeared (Tables 1 and 2).

Discussion

The treatment of the cluster headache was directed at both the management of symptoms, specifically the management of pain during the cluster, and prophylaxis to prevent future disorder-associated episodes.[7] According to the Acute Pain nursing diagnosis (ND), pain management was achieved through nursing care aimed at the administration of prescribed drugs and home oxygen therapy, focused on the administration according to medical orders, monitoring of oxygen litre flow, efficacy control and patient and family member education.

It has been proven that one of the main fast action and relief treatments is the administration of high flow inhaled oxygen. In most patients (50%–80%) pain relief was achieved.[8] In one previous study, it was shown that 75% of the patients treated with oxygen flow with a rate of 7 L/min had appropriate complete relief in at least 7 out of 10 attacks. [9]

For ND Fatigue, interventions were established which aimed at encouraging self-reliant behaviour in the patient focused on appropriate lifestyles, due to the manifestations of exhaustion derived from conditions such as sleep deprivation, excessive alcohol consumption, increased physical exercise, and professional occupation. Although the cluster headache had a sporadic and multi-factorial onset there were other precipitating factors of the clinical presentation such as excessive alcohol consumption, vasodilators and insufficient rest which were the main triggers of pain.[10]

For this reason, the ND Disposition to improve health management was proposed, which was related and jointly, effectively, approached Nola Pender's health promotion model, given that this model allows people to be encouraged to take control of their lifestyle, particularly people whose health is at risk.[10] The nursing approaches contained in the health promotion model allows people to be guided to achieve appropriate health and wellbeing, and to identify risk factors that prevent this, thereby allowing them to act on them and change them if necessary. Hence the importance of the nursing professionals in fostering empowerment towards health-promoting and self-care behaviours.[11]

Conclusion

Among the symptoms of cluster headaches, severe pain, commonly retro-orbital, requires immediate treatment both because of the severity expressed by the patient and also because of the duration of the crises episodes, together with the fact they are highly incapacitating. Although high efficacy in pain relief has been demonstrated with the administration of high-flow oxygen and pharmacological treatment such as sumatriptan, zolmitriptan, verapamil, propranolol and topiramate, nursing care becomes a fundamental pillar in the promotion of health and therapeutic guidelines necessary for the management of the disorder and possible relapses. These measures include respecting sleep schedules, avoiding certain foods and good stress management to promote healthy lifestyles.

The health promotion model explores the risk factors associated with the disorder and also promotes a better understanding of the health-disorder process, and consequently can be used by the nursing professional to support behavioural change in the patient's health.

Conflict of interests

The authors of this article declare that no conflicts of interests exist nor were there any sources of financing.

References

1. Leira R. Cefalea en racimos y cefaleas secundarias. Medicine. 2019;12:4163–74.
2. Ramos-Rúa L, Álvarez-Fernández L, Nogueira-Fernández V, da Silva-Franca CF, Brañas-Fernández FM, Pego-Reigosa R, et al. Fibrilación auricular paroxística en el contexto de cefalea en racimos. Rev Neurol. 2015;16:477–8.
3. Russell MB. Epidemiology and genetics of cluster headache. Lancet Neurol. 2004;3:279–83.
4. Goadsby PJ. Pathophysiology of cluster headache: a trigeminal autonomic cephalgia. Lancet Neurol. 2002;1:251–7.
5. Herramienta online para la consulta y diseño de Planes de Cuidados de Enfermería. NNNConsult. Elsevier; 2015. Available from: https://www.nnnconsult.com/. [Accessed 6 January 2021].
6. Aristizabal G, Blanco D, Sánchez A, Ostiguín R. El modelo de promoción de la salud de Nola Pender. Una reflexión en torno a su comprensión. Enferm Univ. 2011;8:16–23.
7. Abarca A. Cefalea en Racimos. Med Leg Costa Rica. 2016;33.

8. Higes Pascual F, Cubilla Salinas MA, Yusta Izquierdo A. Cefalea (III): cefalea en racimos, secundarias, farmacológicas y respondedoras a indometacina. Medicine. 2015;11:4167–83.
9. Dirkx THT, Haane DYP, Koehler PJ. Oxygen treatment for cluster headache attacks at different flow rates: a double-blind, randomized, crossover study. J Headache Pain. 2018;19:94, http://dx.doi.org/10.1186/s10194-018-0917-4.
10. Salamanca-Ramos E. Estilos de vida promotores de salud en mujeres de los programas sociales de Villavicencio-Colombia. Orinoquia. 2015;19:213–9.
11. Cazares Miranda V, Solís Flores L, Granados Rangel MG, Méndoza Hernández F, López Alvarenga JC. Beneficios de la consejería personalizada de enfermería en pacientes neurológicos. Rev Cient Soc Esp Enferm Neurol. 2017;46:18–25.

JBI CRITICAL APPRAISAL CHECKLIST FOR CASE REPORTS

Reviewer Jason Anthony I. Alberto, RN **Date** May 05, 2024

Author Indiana Luz Rojas Torres, Luis Enrique Perea Vásquez, & Diana Marcela Perea Rojas

Year 2023

	Yes	No	Unclear	Not applicable
1. Were patient's demographic characteristics clearly described?	■	☐	☐	☐
2. Was the patient's history clearly described and presented as a timeline?	■	☐	☐	☐
3. Was the current clinical condition of the patient on presentation clearly described?	■	☐	☐	☐
4. Were diagnostic tests or assessment methods and the results clearly described?	☐	☐	■	☐
5. Was the intervention(s) or treatment procedure(s) clearly described?	■	☐	☐	☐
6. Was the post-intervention clinical condition clearly described?	■	☐	☐	☐
7. Were adverse events (harms) or unanticipated events identified and described?	☐	■	☐	☐
8. Does the case report provide takeaway lessons?	■	☐	☐	☐

Overall appraisal: Include ■ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

The case report has presented a comprehensive assessment with clear explanation of how Nola Pender's Health Promotion Model was integrated to the case. Diagnostic tests was presented but interpretation was not clearly made. The use of NOCs and NICs provided evidence-based interventions and has helped in the evaluation process. Self-reliant behaviour was encouraged in the discussion alongside compliance to medical treatment. Health promotion model was emphasized accordingly in making the care plan.

EXPLANATION OF CASE REPORTS CRITICAL APPRAISAL

How to cite: Moola S, Munn Z, Tufanaru C, Aromataris E, Sears K, Sfetcu R, Currie M, Qureshi R, Mattis P, Lisy K, Mu P-F. Chapter 7: Systematic reviews of etiology and risk. In: Aromataris E, Munn Z (Editors). JBI Manual for Evidence Synthesis. JBI, 2020. Available from https://synthesismanual.jbi.global

Case Reports Critical Appraisal Tool

Answers: Yes, No, Unclear or Not/Applicable

1. **Were patient's demographic characteristics clearly described?**

   Does the case report clearly describe patient's age, sex, race, medical history, diagnosis, prognosis, previous treatments, past and current diagnostic test results, and medications? The setting and context may also be described.

2. **Was the patient's history clearly described and presented as a timeline?**

   A good case report will clearly describe the history of the patient, their medical, family and psychosocial history including relevant genetic information, as well as relevant past interventions and their outcomes. (CARE Checklist 2013)

3. **Was the current clinical condition of the patient on presentation clearly described?**

   The current clinical condition of the patient should be described in detail including the uniqueness of the condition/disease, symptoms, frequency and severity. The case report should also be able to present whether differential diagnoses was considered.

4. **Were diagnostic tests or methods and the results clearly described?**

   A reader of the case report should be provided sufficient information to understand how the patient was assessed. It is important that all appropriate tests are ordered to confirm a diagnosis and therefore the case report should provide a clear description of various diagnostic tests used (whether a gold standard or alternative diagnostic tests). Photographs or illustrations of diagnostic procedures, radiographs, or treatment procedures are usually presented when appropriate to convey a clear message to readers.

5. **Was the intervention(s) or treatment procedure(s) clearly described?**

   It is important to clearly describe treatment or intervention procedures as other clinicians will be reading the paper and therefore may enable clear understanding of the treatment protocol. The report should describe the treatment/intervention protocol in detail; for e.g. in pharmacological management of dental anxiety - the type of drug, route of administration, drug dosage and frequency, and any side effects.

6. **Was the post-intervention clinical condition clearly described?**

   A good case report should clearly describe the clinical condition post-intervention in terms of the presence or lack thereof symptoms. The outcomes of management/treatment when presented as images or figures would help in conveying the information to the reader/clinician.

7. **Were adverse events (harms) or unanticipated events identified and described?**

   With any treatment/intervention/drug, there are bound to be some adverse events and in some cases, they may be severe. It is important that adverse events are clearly documented and described, particularly when a new or unique condition is being treated or when a new drug or treatment is used. In addition, unanticipated events, if any that may yield new or useful information should be identified and clearly described.

8. **Does the case report provide takeaway lessons?**

   Case reports should summarize key lessons learned from a case in terms of the background of the condition/disease and clinical practice guidance for clinicians when presented with similar cases.

REFERENCES:

Gagnier JJ, Kienle G, Altman DG, Moher D, Sox H, Riley D, CARE Group. The CARE Guidelines: Consensus-Based Clinical Case Reporting Guideline Development. Headache: The Journal of Head and Face Pain, 2013;53(10):1541-1547.

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