RIASE
REVISTA IBERO-AMERICANA DE SAÚDE E ENVELHECIMENTO
REVISTA IBERO-AMERICANA DE SALUD Y ENVEJECIMIENTO

NURSING INTERVENTIONS FOR PEOPLE WITH SUBDURAL HEMATOMA RESULTING FROM TRAUMATIC BRAIN INJURY: INTEGRATIVE LITERATURE REVIEW

INTERVENÇÕES DE ENFERMAGEM À PESSOA COM HEMATOMA SUBDURAL RESULTANTE DE TRAUMATISMO CRÂNIO-ENCEFÁLICO: REVISÃO INTEGRATIVA DA LITERATURA

INTERVENCIONES DE ENFERMERÍA PARA PERSONAS CON HEMATOMA SUBDURAL RESULTANTE DE UNA LESIÓN CEREBRAL TRAUMÁTICA: REVISIÓN BIBLIOGRÁFICA INTEGRADORA

Sandra Couto – Curry Cabral Hospital, Lisboa, Portugal.
ORCID: https://orcid.org/0000-0001-8009-4198

Paula Sapeta – Dr. Lopes Dias Higher School of Health, Polytechnic Institute of Castelo Branco, Castelo Branco, Portugal.
ORCID: https://orcid.org/0000-0001-6667-2326

Corresponding Author/Autor Correspondente:
Sandra Couto – Hospital Curry Cabral, Lisboa, Portugal. sandra23937@hotmail.com

Recebido/Received: 2022-04-22 Aceite/Accepted: 2022-08-02 Publicado/Published: 2022-08-29

DOI: http://dx.doi.org/10.24902/r.riase.2022.8(1).543.56-72

VOL. 8 NO. 1 APRIL 2022

ABSTRACT

Objective: To map the scientific evidence about nursing interventions for the person with subdural hematoma resulting from cranioencephalic trauma.

Method: Integrative literature review, based on the research question: what are the nursing interventions for the person with subdural hematoma resulting from cranioencephalic trauma? The research was carried out on the EBSCO Host platform, through the conjugation of the DeCS/MESH descriptors "nursing", "craniocerebral trauma", "subdural hematoma", "older adult", conjugated with the Boolean descriptors AND, OR and AND, in the period of 2011 to 2021.

Results: The sample consisted of 4 studies that identified as main nursing interventions the neurological assessment, vital parameters' monitoring, pain control, safety/protection, nutritional status and pressure, as well as patient/family education about health status, non-verbal communication skills, infection risk prevention and positioning.

Conclusion: Nurses' interventions to patients with craniocerebral injury are especially important in monitoring the patient/family from the occurrence of the episode to post-discharge preparation.

Descriptors: Craniocerebral Trauma; Nursing; Older Adult; Subdural Hematoma.

RESUMO

Objetivo: Mapear a evidência científica acerca das intervenções de enfermagem à pessoa com hematoma subdural resultante de traumatismo crânio-encefálico.

Método: Revisão integrativa da literatura, com base na questão de pesquisa: quais são as intervenções de enfermagem à pessoa com hematoma subdural resultante de traumatismo crânio-encefálico? A pesquisa foi realizada na plataforma EBSCO Host, através da conjugação dos descritores DeCS/MESH "nursing", "craniocerebral trauma", "subdural hematoma", "older adult", conjugados com os descritores booleanos AND, OR e AND, no período temporal de 2011 a 2021.

Resultados: A amostra foi formada por 4 estudos que identificaram como principais intervenções de enfermagem a avaliação neurológica, monitorização de parâmetros vitais, do controlo da dor, da segurança/proteção, do estado nutricional e da pressão, ainda, educação do doente/família sobre o estado de saúde, habilidades na comunicação não-verbal, prevenção do risco de infeção e realização do posicionamento.

Conclusão: As intervenções do enfermeiro ao doente com lesão craniocerebral têm especial importância, no acompanhamento do doente/família desde a ocorrência do episódio, até à preparação pós-alta.

Descritores: Enfermagem; Hematoma Subdural; Idoso; Trauma Crânio-cerebral.

RESUMEN

Objetivo: Mapear las evidencias científicas sobre las intervenciones de enfermería para personas con hematoma subdural resultante de trauma craneoencefálico.

Método: Revisión integrativa de la literatura, a partir de la pregunta de investigación: ¿cuáles son las intervenciones de enfermería para personas con hematoma subdural resultante de trauma craneoencefálico? La investigación se realizó en la plataforma EBSCO Host, mediante la conjugación de los descriptores DeCS/MESH "nursing", "craniocerebral trauma", "subdural hematoma", "older adult", conjugados con los descriptores booleanos AND, OR y AND, en el período de tiempo de 2011 a 2021.

Resultados: La muestra estuvo compuesta por 4 estudios que identificaron como principales intervenciones de enfermería la evaluación neurológica, seguimiento de parámetros vitales, control del dolor, seguridad/protección, estado nutricional y presión, así como educación del paciente/familia sobre el estado de salud, comunicación no verbal habilidades, prevención de riesgos de infección y posicionamiento.

Conclusión: Las intervenciones de los enfermeros a los pacientes con lesión craneoencefálica son especialmente importantes en el acompañamiento del paciente/familia desde la ocurrencia del episodio hasta la preparación post-alta.

Descriptores: Adulto mayor; Enfermera; Hematoma Subdural; Traumatismo Craneoencefalico.

INTRODUCTION

Traumatic brain injuries (TBI) are a public health problem, whose incidence has increased worldwide, constituting one of the main causes of death, especially in younger populations. The most common etiological factors for TBI are falls from standing height, traffic accidents, violent physical aggression and injuries associated with sports or recreational activities. In addition to the direct injury caused by trauma to the epicranial soft tissues and the skull, TBI can be complicated by causing intracranial injuries with encephalic repercussions, such as: cerebral contusion, epidural hematoma, subdural hematoma and intraparenchymal hematoma[1].

Traumatic subdural hematoma occurs in about 1 to 5% of all traumatic injuries to the skull and in 22% of severe traumatic brain injuries. It is more frequent among elderly individuals, with an increasing incidence with age, almost doubling in the 65-75 age group and reaching 286/100,000 in people over 80 years-old[2].

The subdural hematoma results from a mechanism of acceleration and deceleration of the brain more or less violently according to the energy of the trauma. This movement of the brain in the cranial vault conditions the laceration of bridging veins, between the brain and the cranial venous sinuses, or of cortical veins, more frequently in the lateral zones of the cerebral hemispheres[3]. According to the same authors, it can be classified as: acute, composed of fresh clot and blood (48 hours); subacute, consisting of blood and fluid (days 2-14); chronic, composed of fluid (after 14 days).

Symptomatic acute subdural hematomas that cause a deviation of the median structures greater than 5 mm, that present a volume greater than 30 cm^3 (when supratentorial) or 16 cm^3 (when infratentorial), with a thickness greater than 2 cm, justify, as a rule, a surgical approach[4]. In these cases, postponing the surgical drainage of the hematoma conditions the accumulation of blood in the subdural space, and the increase in the mass effect on the brain and intracranial pressure, which compromises cerebral venous return and reduces cerebral perfusion pressure. These alterations are responsible for disruption and direct structural damage to the brain, as well as secondary ischemic lesions due to vascularization deficit[3].

The patient with TBI requires nursing interventions to obtain predictive values and patient safety scores, as well as predictive value for the survival rate. The role of nursing in the context of this disease is developed, in a first phase, in the prevention of head trauma, primarily in the elderly population, by acting in education for the prevention of falls, in the identification of patients at risk and in the clarification of victims of head trauma

and their caregivers, alerting them to the possibility of late signs and symptoms, which may appear in the following weeks after the initial trauma[5].

Patients with subdural hematoma require nursing interventions appropriate to the severity of the situation. In this way, nurses must be up-to-date and have the technical capacity and professional experience in order to manage stress and make immediate decisions, defining priorities for action with these patients. Correct and timely action can significantly improve the person's neurological status, failure to intervene in these measures can lead to secondary brain injuries with consequences in the recovery of neurological functions. In the context of the treatment of hematoma in the acute or symptomatic phase, nursing assumes a fundamental role in monitoring the neurological status and installation of neurological deficits or de novo hemodynamic instability[6].

The population incidence of subdural hematoma resulting from traumatic brain injury, resulting from falls, polypathologies and drug treatment regimen, namely anticoagulants, has given rise to reflection on the research question, which supports this study, subsequent to professional practice in a hospital context. The main objective is to map the scientific evidence about nursing interventions for people with subdural hematoma resulting from traumatic brain injury, carrying out an integrative review of the literature.

METHOD

This integrative review started with the following question: what are the nursing interventions for the person with subdural hematoma resulting from traumatic brain injury? In structuring this question, the PICO methodology was used, thus obtaining:

P – Participants: person with subdural hematoma resulting from TBI;

I – Interventions: nursing interventions;

C – Comparisons: not applicable;

O – Outcomes: nursing interventions for people with subdural hematoma resulting from TBI.

The research was carried out from January 2011 to December 2021, on the EBSCO Host platform, in the electronic databases CINAHL Complete, MEDLINE Complete, MedicLatina, in the b-on Online Knowledge Library. The Descriptors in Health Sciences (DeCS) from the Virtual Health Library and in MESH in English were used "nursing", "craniocerebral

trauma", subdural hematoma", "older adult", articulated with the Boolean operators AND, OR and AND, respectively. The inclusion criteria were: full-text articles published in the last 10 years, written in Portuguese and English, indexed in the aforementioned databases, which addressed the topic under study.

RESULTS

From the search results, a total of 74 articles were obtained, which after removing the duplicates (12) and after analyzing the titles and abstracts (56) resulted in 6 articles for full reading. After evaluating the relevance of the content and its methodological quality through the Critical Appraisal Skills Program (CASP), the final sample consisted of 4 articles.

The methodology of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)[7] was chosen to systematize the process of including them (Figure 1↗).

In this review, 4 scientific articles were included, which were available in: CINAHL Complete (3), MEDLINE, MedicLatina (1). In order to clarify the results obtained, we used the systematization of the analysis of the articles according to an instrument adapted from the methodological manual for Scoping Reviews of the Joanna Briggs Institute[8], highlighting the main characteristics of the analyzed articles and their respective results (Chart 1↗). The period of publication of the articles is between the years 2011 and 2021.

To assess the quality of the selected studies, an instrument adapted from the Critical Apppraisal Skills Program (CASP) was used[13]. The checklists were thus prepared according to the methodology of each of the studies, with Study 1 presenting a score of 9/11 (88%), Study 2 a score of 8/10 (80%), and Study 3 and 4 a score of 9/10 (90%), according to tables 1↗, 2↗ and 3↗.

DISCUSSION OF RESULTS

The theme of nursing interventions for people with subdural hematoma resulting from TBI is the subject of recent studies, as observed by the years of publication of articles, published in China, Brazil, Poland and Indonesia.

The results obtained indicate that the role of the nurse is very important in the process of care, treatment, rehabilitation and education of the sick person with craniocerebral injury.

The importance of the nurse's intervention in the follow-up of the patient/family from the occurrence of the episode to the post-discharge preparation[9], can be inferred from the monitoring, implementation and evaluation from the treatment of both intracranial pressure and the wound[12]. It emerges that the person's advanced neurological deficit after craniocerebral injury requires a holistic approach to the patient[11].

Conducting regular assessments of vital signs and assessment of neurological status can have an impact on the rapid detection and prevention of complications[11]. In this perspective, the following problems emerge in the literature: risk of deterioration of the patient's condition after surgery; aggression; deficit in self-care and self-education; difficulty in maintaining body hygiene; risk of pathological changes (beds/abrasions/wounds); risk of urinary tract infection and postoperative wound infection; difficulty in preparing the patient to return home[11]; pain problems[10,11]; movement difficulty[9,10,11]; lower mood[11]; anxiety; unstable emotional control; impaired memory; situational low self-esteem; sleep pattern disorder[10]; depression and disillusionment[9]; changes in breathing pattern; impaired gas exchange translated into poor tissue perfusion; deficient liquid volume; verbal communication and impaired skin integrity[10] which leads to a decline in quality of life[9,10].

From the study carried out, emerges the importance of a holistic approach to the patient and the involvement of the entire therapeutic team. In addition, 50% of the studies identify the use of the Glasgow Coma Scale to assess the state of consciousness in victims of trauma and brain injuries.

Of the nursing interventions in patients with craniocerebral injury, the neurological assessment using the Glasgow Coma Scale[10-12], monitoring of vital parameters[9-12], pain control[10], administration of therapy[11], management of pain intensity and selection of suitable instruments – VAS – Visual Analogue[11], administration of analgesics[11], monitoring of intracranial pressure, adequate administration of oxygen, assessment of hyperventilation, diuresis and hyperosmolarity, monitoring of hypothermia, hypertension, body temperature and capillary blood glucose[12], positioning[9,12], head elevation[12], sur-

veillance of the correct positioning of invasive monitoring[12], prevention of the risk of infection[11], promotion of safety/protection[10,11], food surveillance[11], non-verbal communication skills[11], patient hygiene[9,11], assessment of the patient's nutritional status[11], assessment of needs psychological and social data[9,11], patient/family education about health status and discharge[9,11].

The research results emphasize that specialized nursing intervention should always pay attention to the patient's mental state. For continuity, nurses/caregivers/family must persuade and encourage patients to have positive thoughts and actively cooperate in the process[9].

The nursing process is one of the most used methods to (re)organize and direct nursing care, divided into five interconnected stages, namely data collection, elaboration of nursing diagnoses, intervention planning, implementation and evaluation. The relevance in the practice of the nursing process as a methodological instrument of work in health services, guides the actions carried out by nursing professionals, standardizes the dialogue between those involved in care, values the category by appropriating something that is private in the performance of care. their work, applying the technical scientific knowledge of nursing. The nursing diagnosis is one of the stages of the nursing process, which consists of the grouping of information gathered at the time of carrying out the anamnesis. The elaboration of diagnoses will guide the definition of the care plan and the establishment of priorities[10].

Nursing depends on professional performance in different contexts, giving visibility to the development of diagnoses in the area of the TBI victim population promotes qualified nursing care[10].

CONCLUSION

In recent years, the quality of nursing care has registered very significant advances, largely due to the growing concern of nurses with their practice, in the search for the best and most recent scientific evidence. Through research, nurses can reflect and question problems arising from their practice, which can raise and generate innovative ideas.

The nursing process as a methodological work instrument is a fundamental practice in health services, as it guides the actions to be carried out by nursing professionals, standardizes the dialogue between those involved in care, values the category and the performance of their work, allowing to apply the scientific technical knowledge of nursing.

It should be noted that the nurses' interventions in the patient with craniocerebral injury are especially highlighted, from the follow-up of the patient/family at the beginning of the episode, to the post-discharge preparation. Furthermore, adequate nursing interventions reduce the length of stay and the mortality rate. The results obtained indicate that the role of the nurse fulfills an important task in the process of care, treatment, rehabilitation and education for the person with craniocerebral injury.

The literature reveals gaps in research aimed at nursing diagnoses and interventions for patients with subdural hematoma resulting from TBI. A significant part of the research reports clinical manifestations during nursing care, but does not describe diagnoses and interventions. Thus, as a limitation, there is a scarcity on the subject of nursing interventions for people with subdural hematoma resulting from TBI, in contrast, an opportunity for excellence for future studies emerges.

It is suggested that further research be carried out in the context of nursing interventions for the person with subdural hematoma resulting from TBI, to expand the effective knowledge of the systematization of nursing intervention, with the implementation of diagnoses and interventions for the person with subdural hematoma, in order to , to contribute to the improvement of clinical practice and development of reflective practice.

Authors' contributions

SC: Design and coordination of the study, data collection, storage and analysis, review and discussion of results.
PS: Design and coordination of the study, collection, storage and analysis of data, review and discussion of results.
All authors read and agreed with the published version of the manuscript.

Ethical Disclosures

Conflicts of Interest: The authors have no conflicts of interest to declare.
Financial Support: This work has not received any contribution, grant or scholarship.
Provenance and Peer Review: Not commissioned; externally peer reviewed.

Responsabilidades Éticas

Conflitos de Interesse: Os autores declararam não possuir conflitos de interesse.
Suporte Financeiro: O presente trabalho não foi suportado por nenhum subsídio ou bolsa.
Proveniência e Revisão por Pares: Não comissionado; revisão externa por pares.

REFERENCES

1. Ahmed S, Venigalla H, Mekala H, Dar S, Hassan M & Ayub S. Traumatic Brain Injury and Neuropsychiatric Complications. Indian journal of psychological medicine. 2017. [cited 2022 Feb]; 39(2): 114–121. Available from: https://doi.org/10.4103/0253-7176.203129.

2. Mulligan P, Raore B, Liu S, & Olson J. Neurological and functional outcomes of subdural hematoma evacuation in patients over 70 years of age. Journal of neurosciences in rural practice. 2013. [cited 2022 Jan]; 4(3): 250–256. Available from: https://doi.org/10.4103/0976-3147.118760.

3. Oliveira E, Lavrador J, Santos M, & Antunes J. Traumatismo Crânio-Encefálico: Abordagem Integrada. Acta Med Port. 2012. [cited 2022 Jan]; 25(3): 179-192. Available from: https://actamedicaportuguesa.com/revista/index.php/amp/article/download/43/45.

4. Badke M, Perdonssini L, Dalmolin I, & Sassi M. Hematoma subdural agudo traumático: Um Estudo de Caso. Revista Contexto & Saúde. 2011. [cited 2022 Mar]; 20(10): 999-1004. Available from: https://doi.org/10.21527/2176-7114.2011.20.999-1004

5. Sillero-Sillero A & Zabalegui A. Safety and satisfaction of patients with nurse's care in the perioperative. Revista Latino-Americana de Enfermagem. 2019. [cited 2022 Feb]; 27, e3142. Available from: https://doi.org/10.1590/1518-8345.2646.3142.

6. Pereira N, Vale A, Fernandes M, Moura M, Brito J & Mesquita G. O cuidado do enfermeiro à vítima de traumatismo cranioencefálico: uma revisão da literatura. Revista Interdisciplinar NOVAFAPI. 2011. [cited 2022 Jan]; 4 (3): 60-65. Available from: https://www.abnc.org.br/revisao_literatura.pdf.

7. Joanna Briggs Institute. Reviewers`manual: 2015 (edition). Australia (AU): JBI; 2015. [cited 2022 Feb]. Available from: https://nursing.lsuhsc.edu/JBI/docs/ReviewersManuals/Scoping-pdf

8. Aromataris E & Munn, Z. (Editors). JBI Manual For Evidence Synthesis. JBI; 2020. Available from: https://synthesismanual.jbi.global. https://doi.org/10.46658/JBIMES-20-01.

9. Xiaodan L, Fengxia L, Guimei Y, Ju Y, Yi L & Ying T. Curative Effect of Early Full Nursing Combined with Postdischarge Continuation Nursing on Patients after Craniocerebral Trauma. Evidence-Based Complementary and Alternative Medicine, 2021. [cited 2022 Mar]; vol. 2021, Article ID 7424855: 1-8. Available from: https://www.hindawi.com/journals/ecam/2021/7424855/#introduction

10. Silva M, Silva R, Nogueira S, Lopes S, Alencar R, & Pinheiro W. Nursing diagnoses for patients with traumatic brain injury: integrative review. Enfermería Global. 2021. [cited Mar]; 20 (4): 614-627. Available from: https://revistas.um.es/eglobal/article/view/435321

11. Raszka, A., Antczak-Komoterska, A., & Filipska, K.Nursing Problems of the Patient after Craniocerebral Trauma – Case Report Journal of Neurological & Neurosurgical Nursing. 2018. [cited 2022 Feb]; 7(2): 80-85. Available from: https://www.jnnn.pl/index.php/neurological-and-neurosurgical/article/view/197/193

12. Saputro S, Siswanto & Utami Y. The correlation between nurse time response and the hemodinamic status to the head injury patient in igd room of rsud dr. MoewardI International Journal of Nursing Education. 2021. [cited 2022 Mar]; 12(4): 143-147. Available from: https://ejournal.lucp.net/index.php/mjn/issue/view/95

13. Critical Appraisal Skills Programme. CASP checklists for randomized controlled trials, qualitative studies and cohort studies. [on line] 2018. Available from: https://casp-uk.net/casp-tools-checklists/

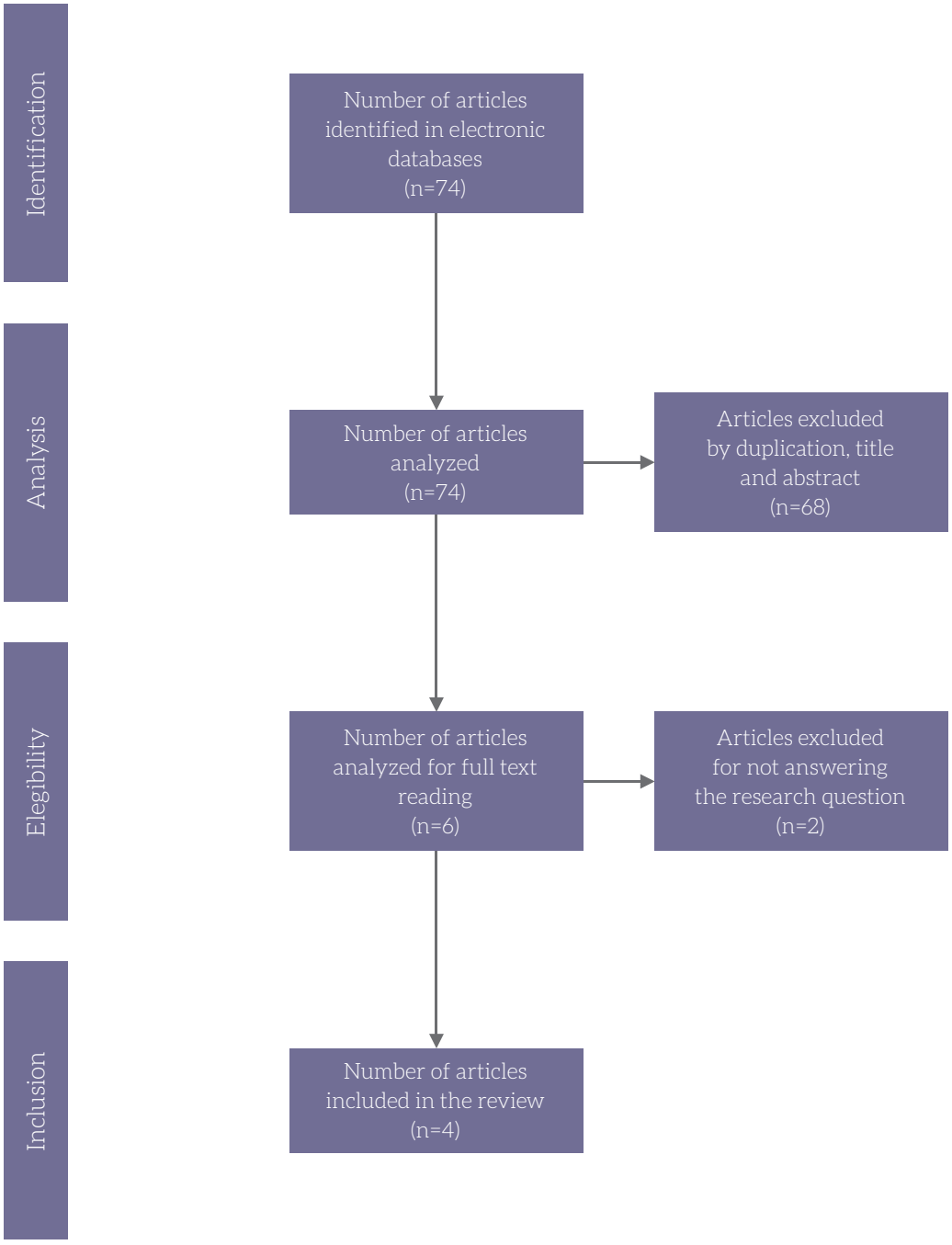

Figure 1 – PRISMA flow diagram (adapted) of the article selection process.↖

Chart 1 – Synthesis of studies included in the Integrative Review.

Study; Authors; Year	Sample; Type of study	Objectives	Results
E1[9] 2021	49 patients in the control group and 49 patients in the observation group underwent surgical treatment – Case Control.	To explore the effect of specialized nursing intervention combined with post-discharge continuity intervention on motor function, quality of life and complications of patients after traumatic brain injury.	Continuing nursing can help guide patients/families to learn personal self-care, keep the patient stable, improve and restore health; Specialized nursing combined with continuity intervention nursing has a superior effect on improving motor function and quality of life for patients after traumatic brain injury; Specialized nursing must always pay attention to the patient's mental state. Many patients may experience negative emotions, such as depression and disillusionment, due to a long-term inability to master physical ability; Nurses/caregivers/family should persuade and encourage patients to think positive thoughts and actively cooperate in the process; After craniocerebral trauma, limb motor function is impaired, which leads to a decline in quality of life, so it is necessary to restore motor function as soon as possible to improve self-care capacity and quality of life; Post-discharge continuity intervention nursing improves long-term self-care capacity and patients' quality of life; Early functional exercise can promote the restoration of physiological functions, reduce the likelihood of disability, and accelerate the recovery of limb function; Continuing Intervention Nursing is based on the patient's characteristics, dividing the recovery process into different phases; Specialized nursing develops a plan for the patient, helping him to start exercise early, reducing bedtime and the incidence of infections, bedsores and other complications; The results show that specialized nursing combined with continuity intervention nursing has the ability to improve patients' quality of life and reduce the likelihood of postoperative complications.

Chart 1 – Synthesis of studies included in the Integrative Review.↔↖

Study; Authors; Year	Sample; Type of study	Objectives	Results
E2[10] 2021	Integrative literature review.	To list the NANDA I Nursing Diagnoses that can be proposed for hospitalized patients with TBI.	Eighteen nursing diagnoses (ND) were listed; The ND found related to psychological changes were mainly anxiety, unstable emotional control, impaired memory, low situational self-esteem and sleep pattern disorder; A significant finding was observed in the number of people with TBI who presented anxiety after the trauma, which shows that despite being a feeling frequently reported nowadays by the general population, it is something that bothers and interferes with the quality of life of individuals, because , not everyone is prepared to deal with concerns; Regarding physical impairments, the ones that most caused instability were: changes in breathing pattern, impaired gas exchange translated into poor tissue perfusion, impaired verbal communication, impaired physical mobility, deficient fluid volume and impaired skin integrity, thus favoring the risk of infections; Acute pain was also a diagnosis frequently verified during care, evaluated in some patients during nursing procedures such as tracheal aspiration; Pain is something frequently observed in trauma victims and evidence shows that some factors such as the mobilization and execution of techniques influence its perception by the patient; Pain control measures are essential to provide the best possible comfort to patients, especially in trauma victims where the repercussion and acute pain are intense; Acute pain resulting from trauma can be influenced by different factors: biological, emotional, spiritual and sociocultural; Biological changes such as tachycardia, dyspnea, nervousness, confusion, despair and emotional changes such as the feeling of powerlessness; Other nursing diagnoses were found, such as hyperthermia and ineffective thermoregulation;

Chart 1 – Synthesis of studies included in the Integrative Review.↔↖

Study; Authors; Year	Sample; Type of study	Objectives	Results
E2[10] 2021	Integrative literature review.	To list the NANDA I Nursing Diagnoses that can be proposed for hospitalized patients with TBI.	The effects of hypothermia for the patient after suffering a TBI with hypothermia presented a lower value on the Glasgow scale, the hospital stay is prolonged and the mortality rate is higher; For patients who demonstrated changes in temperature, the ND were proposed: Hyperthermia, hypothermia and ineffective thermoregulation, all included in domain 11 of NANDA-I regarding safety/protection.
E3[11] 2018	Case report.	To present the patient's nursing problems after a craniocerebral injury as a result of a gunshot wound.	Conducting regular measurements of vital signs and assessment of neurological status can have an impact on the rapid detection and prevention of complications; Taking into account the severity of symptoms or parameters and reacting appropriately to any disturbing changes; • Problem 1: Risk of deterioration of the Patient's Condition after Surgery; • Problem 2: Aggression; • Problem 3: Pain problems; • Problem 4: Deficit in self-care and self-education; • Problem 5: Difficulty in maintaining body hygiene; • Problem 6: Risk of pathological changes (Beds/abrasions/Wounds); • Problem 7: The risk of urinary tract infection; • Problem 8: Lower mood as a result of injury; • Problem 9: Risk of post-operative head wound infection; • Problem 10: Difficulty in movement; • Problem 11: Difficulty in preparing the patient to return home. An advanced neurological deficit in a patient after craniocerebral injury requires a holistic approach to the patient and the involvement of the entire therapeutic team in the process of diagnosis, treatment, rehabilitation or psychotherapy.

Chart 1 – Synthesis of studies included in the Integrative Review.

Study; Authors; Year	Sample; Type of study	Objectives	Results
E4[12] 2020	Systematic review of the literature	To know the role of nurses in the treatment of intracranial pressure to improve hemodynamic status in patients with head trauma.	Head injury management starts with monitoring, intervention, implementation and evaluation from the management of both intracranial pressure and injury; The patient's intracranial and hemorrhagic status which includes blood pressure, respiratory rate, pulse, temperature, oxygen saturation and level of consciousness; The role in increasing intracranial pressure (ICP) involves adequate oxygen administration, control, hyperventilation, drainage treatment, diuretic and hyperosmolar treatment, hypothermia management, decompressive craniectomy control, positioning; Management aimed at controlling cerebral perfusion; Inadequate ventilation can cause hypoxemia and hypercapnia that worsen ICP; The administration of adequate oxygen can decrease intracranial pressure in order to prevent it from increasing; In the management of hyperventilation control, intracranial pressure can be performed with the head elevation; The nurse must make sure that the invasive monitoring systems are correctly positioned; In electrolyte control, use 10% hypertonic saline solution better than 20% mannitol in preventing cerebral ischemia; The patient must have adequate intravascular volume to prevent hypertension and secondary brain injury; Management of intracranial pressure can be performed, such as fluid management, osmotherapy, temperature management and glycemic control.

Table 1 – CASP Checklist Case Control Studies.↖

Items/Study	E1
Did the study address a clearly focused issue?	1
Did the authors use an appropriate method to answer their question?	1
Were the cases recruited in an acceptable way?	1
Were the controls selected in an acceptable way?	1
Was the exposure accurately measured to minimise bias?	1
(a) Aside from the experimental intervention, were the groups treated equally?	1
(b) Have the authors taken account of the potential confounding factors in the design and/or in their analysis?	0
How large was the treatment effect?	1
How precise was the estimate of the treatment effect?	0
Do you believe the results?	1
Can the results be applied to the local population?	1
Total	9

Quotation: Yes – 1; Can't tell – 0; No – 0.
Source: own elaboration based on data from Critical Appraisal Skills Program Checklists, 2019.

Table 2 – CASP Checklist Study Qualitative Review.↖

Items/Study	E2	E3
Was there a clear statement of the aims of the research?	1	1
Is a qualitative methodology appropriate?	1	1
Was the research design appropriate to address the aims of the research?	1	1
Was the recruitment strategy appropriate to the aims of the research?	1	1
Was the data collected in a way that addressed the research issue?	1	1
Has the relationship between researcher and participants been adequately considered?	0	1
Have ethical issues been taken into consideration?	0	0
Was the data analysis sufficiently rigorous?	1	1
Is there a clear statement of findings?	1	1
How valuable is the research?	1	1
Total	8	9

Quotation: Yes – 1; Can't tell – 0; No – 0.
Source: own elaboration based on data from Critical Appraisal Skills Program Checklists, 2019.

Table 3 – CASP Study Checklist Systematic Review.↖

Items/Study	E4
Did the review address a clearly focused question?	1
Did the authors look for the right type of papers?	1
Do you think all the important, relevant studies were included?	1
Did the review's authors do enough to assess quality of the included studies?	1
If the results of the review have been combined, was it reasonable to do so?	1
What are the overall results of the review?	1
How precise are the results?	1
Can the results be applied to the local population?	1
Were all important outcomes considered?	1
Are the benefits worth the harms and costs?	0
Total	9

Quotation: Yes – 1; Can't tell – 0; No – 0.
Source: own elaboration based on data from Critical Appraisal Skills Program Checklists, 2019.