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Article

Elaboration of an International Classification for Nursing Practice (ICNP)® subset in a neurosurgery unit: an observational study

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Abstract. *Background*: A review of the literature performed before the execution of the study showed that there are only 11 studies on this topic to date.
The purpose of this study is to create a neurosurgery subset of skilled nursing language based on the International Classification for Nursing Practice (ICNP)® using observational data collected in the Neurosurgery Department of the San Camillo-Forlanini Hospital in Rome.
Methods: Our observational dataset included patients with skull/brain area diagnoses. The existing nursing records of this patient group were converted into standardized ICNP® terminology.
Results: Notably, we observed that initial diagnoses constantly evolve throughout the period of hospitalization, differing markedly from diagnoses at the time of discharge. This study identified 148 nursing diagnoses in the observational dataset of which 79 were excluded as duplicates. In total, we found 69 formulated diagnoses for an INCP® subset in neurosurgery.
Conclusion: The ICNP® is a proven tool that facilitates promotion, organization and quality of care and contributes to professional autonomy and self-confidence in the nurse. It provides visibility to nursing practice and encourages professionalism in outpatient, hospital, and primary care contexts.

Keywords: subset, international classification of nursing practice, nurse.

Introduction

A review of the literature revealed that few studies handle this topic. Specifically, an extensive search of the principal database, such as PubMed and CINAHL, brought up 11 scientific works suitable for our review. Our review aimed to identify a subset produced to date within the suitable that detailed a specialized nursing language based on an International Classification for Nursing Practice (INCP)® for neurosurgery.

Existing literature supported the INCP® terminology as a model for optimal nursing care[1] and a useful identifier of suitable nursing diagnosing models that detail objectives and intervention to promote both accurate documentation [2,3] and complete nursing care[4].

The integration of ICNP® subset presents a potentially useful tool for specific fields that require unique skills and accurate nursing to maximize the patient's quality of life[5] in both outpatient and hospital settings [6]. A descriptive qualitative study published in 2013, defined a specific ICNP® catalogue for cancer pain with the intention of providing a systematic and secure pathway for nurses to improve the quality of patient care. The study observed positive results in terms of planned and appropriated nursing interventions[7].

Following this example, a team of specialized nurses developed and obtained validation for a subset specifically designed for patients with Acute Myocardial Infarction (AMI), because the ubiquity of the specified terminology in daily nursing practice. This example demonstrates the value of condition-specific terminology to ensure quality nursing care[3]. The Acute Myocardial Infarction subset was verified by professionals with experience in the field[8] · In this case, the standardized language of diagnoses formed the foundation of subset development[9]. Based on standardized diagnosis definitions, the team of specialized nurses expanded the definitions to include objectives and interventions[2]. The standardized procedures were integrated into documentation systems to facilitate the accuracy of electronic medical records [5].

Aim

Our aim, in this observational study, was to create a subset based on the International classification for nursing practices in the Neurosurgery Department of the San Camillo-Forlanini Hospital in Rome.

Study design, settings, materials and methods

The observational study was limited to patients admitted to U.O.C. of Neurosurgery in the San Camillo- Forlanini Hospital of Rome. Additionally, diagnoses related to the anatomic skull/brain area were considered inclusion criteria. The study excluded patients displaying bone marrow damage.

Patients included in the observational study were considered to be the most representative of commonly observed neurosurgical pathologies.

The data were extrapolated following the examination of n=3 patients' nursing records with different diagnoses including brain injury, head injury and bilateral subdural hematoma. The patient's care needs were identified and the nursing diagnoses were formulated, according to ICNP®.

Data extraction

The diagnoses were compiled by 5 researchers who worked in groups of 2 in different periods (one researcher worked on 2 cases). Each group was assigned the medical record of a neurochirurgical patient that was already or soon-to-be discharged from the neurosurgery ward. Researchers formulated the nursing diagnoses after reading and understanding the nursing records; the diagnoses made were enclosed in 5 macro areas: FEAR, ALTERATION OF MOVEMENTS and ADL; PAIN and ALTERATION OF PHYSIOLOGICAL FUNCTION; ALTERATION OF NUTRITIONAL STATE; ALTERATION OF NEUROLOGICAL STATE AND ALTERED SKIN INTEGRITY two cases (head injury and bilateral subdural hematoma) showed an additional macro area: RISK OF INFECTION.

Table 1, **Table 2** and **Table 3** show nursing diagnoses as they were recorded when the patient entered the neurosurgery ward and updates throughout hospitalization.

Data analysis

It has been noted that the initial diagnoses at the time of hospitalization, constantly evolve, throughout the period of hospitalization. They also typically differ from those identified at the time of discharge. It was therefore possible to divide the experience of patients into two parts: initial diagnoses at the point of hospitalization and subsequent diagnoses during hospitalization. The study identified 148 nursing diagnoses with 79 excluded as duplicates. In total, researches defined 69 diagnoses for an INCP® neurosurgery subset.

Figure n.1 Flow chart of nursing diagnoses.

Initial diagnoses for brain injury patient	13
Subsequent diagnoses for brain injury patient	30
TOTAL DIAGNOSES	43
Initial diagnoses for cranial trauma patient	22
Subsequent diagnoses for cranial trauma patient	31
TOTAL DIAGNOSES	53
Initial diagnoses for bilateral subdural hematoma patient	19
Initial diagnoses for bilateral subdural hematoma patient	33
TOTAL DIAGNOSES	52
Total initial diagnoses	54
Total subsequent diagnoses	94
TOTAL DIAGNOSES	148

Nursing diagnoses initially identified at point of hospitalization

There were 13 initial nursing diagnoses at the time of hospitalization for the patient with brain injury. The most predominant diagnoses were related to assessing pain (10026119) caused by the presence of the tumor which led to hospitalization, natural fear (10027889) caused by uncertainty of the prognosis and pain after surgery, agitation (10025705), impaired alertness (10027165) caused by an epileptic crisis.

Table n.1 shows no cases involving alteration of movement, ADLs, nutritional status and physiological activities.

Table n. 1: Initial nursing diagnoses for brain injury patients at point of hospitalization.

	Diagnosis / Outcomes NCH	*CODES*
	FEAR	
1	Reduced Fear	10027889
	ALTERATION OF MOVEMENTS AND ADL	
	PAIN	
2	Assessing Pain	10026119
3	Managing Pain	10011660
4	Identifying Attitude Toward Pain	10009654
5	Pain	10023130
6	Acute Pain	10000454
	ALTERATION OF PHISYOLOGICAL ACTIVITY	
	ALTERATION OF NUTRITIONAL STATUS	
	ALTERATION OF THE NEUROLOGICAL STATE	
7	Impaired Nervous System Function	10037322
8	Impaired Alertness	10027165
9	Increased Intracranial Pressure	10025395
10	Sensory Deficit	10022730
11	Agitation	10025705
	ALTERATION OF SKIN INTEGRITY	
12	Pressure Ulcer Prevention	10040224
13	Skin Assessment	10041126

For head injury patient, researchers identified 22 initial diagnoses. The observed predominant diagnoses was alteration of the neurological state because head injuries often cause a cerebral hemorrhaging, which leads to the loss of sensory functions, movement and language. This impairment of sensory function corresponds to the following diagnoses: impaired ability to participate in care planning (10035134), impaired mobility (10001219), confined to bed (10050456),

impaired nervous system function (10037322), communicative barrier (10022332), sensory deeficit (10022730), impaired communication (10023370), impaired verbal communication (10025104).
Table n.2 highlights all initial diagnoses observed.

Table n. 2 Initial nursing diagnoses for head injury patients with at point of hospitalization

	Diagnoses / Outcomes NCH	**CODES**
	INFECTION HAZARD	
1	Risk For Infection	10015133
2	Urinary Tract Infection	10029915
	FEAR	
	ALTERATION OF MOVEMENTS AND ADL	
3	Confined To Bed	10050456
4	Impaired Ability To Participate In Care Planning	10035134
5	Impaired Mobility	10001219
6	Risk For Loneliness	10015179
7	Lack Of Family Support	10022473
	PAIN	
8	Assessing Pain	10026119
9	Identifying Attitude Toward Pain	10009654
	ALTERATION OF PHYSIOLOGICAL ACTIVITIES	
10	Impaired Swallowing	10001033
	ALTERATION OF THE NUTRITIONAL STATE	
11	Risk for Impaired Nutritional Status	10037224
12	Risk for Impaired Nutritional Intake	10023013
13	Risk for Impaired Gastrointestinal System Function	10046431
	ALTERATION OF THE NEUROLOGICAL STATE	
14	Impaired Nervous System Function	10037322
15	Skin Assessment	10041126
16	Communicative Barrier	10022332
17	Sensory Deficit	10022730
18	Impaired Communication	10023370
19	Impaired Verbal Communication	10025104
	ALTERATION OF SKIN INTEGRITY	
20	Pressure Ulcer Prevention	10040224
21	Skin Assessment	10041126
22	Risk For Impaired Skin Integrity	10015237

In total, 19 nursing diagnoses were found for patient with bilateral subdural hematoma. The predominant diagnoses were those relating to alteration of the state of consciousness (10050186), impaired alertness (10027165) and sensory deficit (10022730) due to the subdural hematoma, and the alteration of the integrity' skin due to drainage. Furthermore, because the patient was diabetic the

evaluation of the nutritional status (10030660), dietary needs (10005946) and referring to the nutritionist (10046788) were taken into consideration. Table n.3 shows all initial diagnoses found.

Table n. 3 Initial nursing diagnoses for bilateral subdural hematoma patient at point of hospitalization.

	Diagnoses / Outcomes NCH	***CODES***
	INFECTION HAZARD	
	FEAR	
1	Reduced Fear	*10027889*
	ALTERATION OF MOVEMENTS AND ADL	
2	Enticed	*10050456*
	PAIN	
3	Assessing Pain	*10026119*
4	Identify the Attitude Towards Pain	*10009654*
5	Pain	*10023130*
	ALTERATION OF PHYSIOLOGICAL ACTIVITIES	
6	Impaired Urinary System Function	*10001359*
	ALTERATION OF NUTRITIONAL STATUS	
7	Risk Of Alteration Of The Nutritional Status	*10030660*
8	Dietary Need	*10005946*
9	Referring To Nutritionist	*10046788*
	ALTERATION OF THE NEUROLOGICAL STATE	
10	Impaired Nervous System Function	*10037322*
11	Impaired Alertness	*10027165*
12	Sensory Deficit	*10022730*
13	Assessing Consciousness	*10050186*
14	Assessing Anxiety	*10041745*
	ALTERATION OF INTEGRITY 'SKIN	
15	Drainage	*10006207*
16	Keep The Wound Drainage	*10036596*
17	Assessing skin	*10041126*
18	Maintaining skin integrity	*10035293*
19	Surgical wound	*10023148*

Subsequent nursing diagnoses during hospitalization

The clinical path of the patient with brain injuries changes significantly during the period of hospitalization. Researchers identified 30 nursing diagnoses, some of which were present at the initial point of hospitalization such as fear (10027889) and pain (10023130).

Other diagnoses were identified only after surgery as in the case of all diagnoses classified under Alteration of Movements and ADLs: impaired ability to perform movements (10001219), prevent falls (10040211), impaired mobility in the bed (10001067). Other diagnoses related to nutrition were also identified: lack of nutritional intake (1002551917), impaired intake fluids (10029873), due to impaired

swallowing (10001033) caused by the intervention. **Table n. 4** summarizes the nursing diagnoses found.

Table n.4 Subsequent nursing diagnoses for brain injury patient during hospitalization.

	Diagnoses / Outcomes NCH	***CODES***
	FEAR	
1	Reduced Fear	*10027889*
	ALTERATION OF MOVEMENTS AND ADL	
2	Impaired Mobility	*10001219*
3	Assessing Risk For Falls	*10023520*
4	Impaired Mobility With Wheelchair	*10001363*
5	Self Care Deficit	*10023410*
6	Washing The Patient	*10044803*
7	Assessing Pain	*10026119*
8	Managing Pain	*10011660*
9	Pain	*10023130*
10	Acute Pain	*10000454*
	ALTERATION OF PHYSIOLOGICAL ACTIVITIES	
11	Impaired Swallowing	*10001033*
12	Impaired Urinary System Function	*10001359*
13	Impaired Urination	*10021790*
14	Promoting Effective Bowel Elimination	*10036717*
	ALTERATION OF NUTRITIONAL STATUS	
15	Impaired Nutritional Status	*10025746*
16	Impaired Fluid Intake	*10029873*
17	Impaired Low Nutritional Intake	*10025519*
18	Dietary Need	*10005946*
19	Referring To Nutritionist	*10046788*
20	Assessing Food Intake	*10050091*
	ALTERATION OF THE NEUROLOGICAL STATE	
21	Impaired Nervous System Function	*10037322*
22	Impaired Alertness	*10027165*
23	Impaired Verbal Communication	*10025104*
24	Actual High Intracranial Pressure	*10025395*
25	Actual Negative Sedation Status	*10040160*
26	Aphasia	*10002438*
27	Agitation	*10025705*
	ALTERATION OF INTEGRITY 'SKIN	
28	Assessing Skin	*10041126*
29	Maintaining Skin Integrity	*10035293*
30	Surgical Wound	*10023148*

Researchers noted that patient with head injuries saw significant changes to diagnose during hospitalization , particularly in terms of neurological status: he was found to be more collaborative and more alert; despite presenting a nasogastric tube, he began semi-liquid feeding . It was also observed that pain could be evaluated, through response to verbal stimuli. Additionally, the possibility of wheelchair mobilization was observed, decreasing the risk of pressure injuries. The 31 identified diagnoses are summarized in **Table n. 5**.

Table n.5 Subsequent nursing diagnoses for cerebral hemorrhage patient during hospitalization.

	Diagnoses / Outcomes NCH	**CODES**
	FEAR	
1	Reduced Fear	10027889
	ALTERATION OF MOVEMENTS AND ADL	
2	Impaired Mobility	10001219
3	Assessing Risk For Falls	10023520
4	Risk For Fall	10015122
5	Self Care Deficit	10023410
6	Oral Care	10032184
7	Bathing The Patient	10045986
8	Washing The Patient	10044803
9	Reinforcing Muscle or Joint Exercise Technique	10036512
10	Fall Prevention	10040211
11	Assessing Body Movement	10050223
	PAIN	
12	Assessing Pain	10026119
13	Managing Pain	10011660
14	Identifying Attitude Toward Pain	10009654
	ALTERATION OF PHYSIOLOGICAL ACTIVITIES	
15	Assessing Swallowing	10050155
16	Promoting Effective Bowel Elimination	10036717
17	Preventing Constipation	10046454
18	Assessing Bowel Status	10036475
	ALTERATION OF NUTRITIONAL STATUS	
19	Assessing Nutritional Status	10030660
20	Dietary Need	10005946
21	Referring To Nutritionist	10046788
22	Risk For Impaired Nutritional Status	10037224
23	Assessing Food Intake	10050091
	ALTERATION OF NEUROLOGICAL STATUS	
24	Impaired Nervous System Function	10037322
25	Assessing Ability To Communicate By Talking	10030515
26	Aphasia	10002438
27	Sensory Deficit	10022730
	ALTERATION OF INTEGRITY 'SKIN	
28	Assessing Skin	10041126
29	Maintaining Skin Integrity	10035293
30	Mobilising	10012120
31	Pressure Ulcer Prevention	10040224

Finally, 33 nursing diagnoses were found for bilateral subdural hematoma patients, during the period of hospitalization. Some diagnoses such as fear (10027889), pain (10023130) and alteration of movements and ADLs, were already present when entering the patient's ward. Other diagnoses were identified during hospitalization, such as surgical wound care (10032863) due to the removal of drainage, fall prevention (10040211), oral care (10032184), bathing the patient (10045986) and maintaining skin integrity (10035293) due to the patient's immobility. All the diagnoses found are indicated in **Table n.6**.

Table n.6 Subsequent nursing diagnoses of the patient with bilateral subdural hematoma found during hospitalization.

	Diagnoses / Outcomes NCH	***CODES***
	RISK OF INFECTION	
1	Assessing Signs And Symptoms Of Infection	*10044182*
2	Preventing Infection	*10036916*
3	Risk For Infection	*10015133*
	FEAR	
4	Reduced Fear	*10027889*
	ALTERATION OF MOVEMENTS AND ADL	
5	Impaired Mobility	*10001219*
6	Assessing Risk For Falls	*10023520*
7	Risk For Fall	*10015122*
8	Oral Care	*10032184*
9	Self Care Deficit	*10023410*
10	Washing The Patient	*10044803*
11	Bathing The Patient	*10045986*
12	Wheelchair Mobility	*10021068*
13	Fall Prevention	*10040211*
14	Self Management	*10046837*
	PAIN	
15	Assessing Pain	*10026119*
16	Managing Pain	*10011660*
	ALTERATION OF PHYSIOLOGICAL ACTIVITIES	
17	Assessing Swallowing	*10001359*
18	Promoting Effective Bowel Elimination	*10036717*
19	Preventing Constipation	*10046454*
20	Assessing Bowel Status	*10036475*
	ALTERATION OF NUTRITIONAL STATUS	
21	Assessing Nutritional Status	*10030660*
22	Dietary Need	*10005946*
23	Referring To Nutritionist	*10046788*
	ALTERATION OF NEUROLOGICAL STATUS	
24	Impaired Nervous System Function	*10037322*
25	Assessing Anxiety	*10041745*
26	Assessing Consciousness	*10050186*
27	Sensory Deficit	*10022730*
28	Impaired Alertness	*10027165*
	ALTERATION OF INTEGRITY 'SKIN	
29	Assessing Skin	*10041126*
30	Maintaining Skin Integrity	*10035293*

31	Mobilising	*10012120*
32	Pressure Ulcer Prevention	*10040224*
33	Surgical Wound Care	*10032863*

Interventions

After identifying all the diagnoses inherent to the neurosurgical patient, three were extended into standardized nursing interventions , as they were the most relevant to the typical patient experience: 1] Assessing Pain (10026119); 2] Impaired Mobility (10001219); 3] Impaired Nervous System Function (10037322). According to these three diagnoses, researchers defined series of possible interventions in order to produce a suitable welfare result (outcome). In order to assess pain, three interventions were defined: collaborating with physician (10023565), managing pain (10011660), through the administering medication (10025444). For impaired mobility (10001219) researchers defined several interventions including: assessing mobility (10030527), assessing risk for falls (10023520), providing safety devices (10024527), teaching about exercise (10040125). Finally, researchers found interventions for impaired nervous system function (10037322): assessing ability to communicate by talking (10030515), assessing neurological status before operation (10002768), assessing neurological status after operations (10007097) and monitoring neurological status (10035326). **Table n. 8** lists the interventions found.

Table n. 8 Interventions.

Diagnoses / Outcomes NCH	INTERVENTIONS
PAIN	
Assessing Pain (10026119)	1. Implementing Pain Guideline 10009872 2. Consulting For Pain Management 10024331 3. Collaborating With Physician 10023565 4. Managing Pain 10011660 5. Administering Medication 10025444 6. Identifying Attitude Toward Pain 10009654 7. Assessing Control Of Pain 10002710 8. Assessing Pain 10026119 9. Assessing coping 10002723
ALTERATION OF MOVEMENTS AND ADL	
Impaired Mobility (10001219)	1. Providing Safety Devices 10024527 2. Teaching About Exercise 10040125 3. Fall Prevention 10040211 4. Promoting Limit Setting 10026334 5. Promoting self-care 10026347 6. Establishing Trust 10024396 7. Assessing Acceptance Of Health Status 10026249 8. Assessing Self Efficacy 10024280 9. Assessing Risk For Falls 10023520 10. Assessing Mobility 10030527 11. Assessing Ability To Perform Caretaking 10037966
ALTERATION OF THE NEUROLOGICAL STATE	
Impaired Nervous System Function (10037322)	1. Providing Emotional Support 10027051 2. Identifying Obstruction To Communication 10009683 3. Identifying Attitude Toward Care 10009649 4. Encouraging Rest 10041415 5. Monitoring Physiological Status 10012183 6. Monitoring Neurological Status 10035326 7. Reinforcing Self Efficacy 10022537 8. Supporting Psychological Status 10019161 9. Assessing Barriers To Adherence 10024214 10. Assessing Self Efficacy 10024280 11. Assessing Information Processing 10050117 12. Assessing Attitude Toward Disease 10024192 13. Evaluating Psychosocial Response To Plan Of Care 10007153 14. Assessing Ability To Communicate By Talking 10030515 15. Assessing Neurological Status Before Operation 10002768 16. Evaluating Neurological Status After Operation 10007097

Conclusions

Researches defined a total of 69 Nursing diagnoses used to compile a Catalogue according to the ICNP® classification. The most common diagnoses were related to the fear of the intervention, pre-operative pain due to head compression and post-operative pain. The alterations of the neurological status, specific to the neurosurgery patient, were identified to the time of hospitalization while others were identified during hospitalization; they were due to the presence of neoplastic pathology in some cases and vascular damage in others. The results of this research highlight how ICNP® standardized terminology can improve the standard of care within Neurosurgery Operating Units by ensuring standardized assistance and procedures, avoiding individual interpretation errors. This tool also proves useful for identifying suitable nursing diagnosis models to facilitate the accuracy and appropriateness of documentation for a full nursing care.

Table n.7 All nursing diagnoses found in NCH.

	Diagnoses / Outcomes NCH	**CODES**
	FEAR	
1	Reduced Fear	10027889
	ALTERATION OF MOVEMENTS AND ADL	
2	Impaired Mobility	10001219
3	Assessing Risk For Falls	10023520
4	Risk For Fall	10015122
5	Impaired Mobility In Bed	10001067
6	Impaired Mobility With Wheelchair	10001363
7	Oral Care	10032184
8	Bathing The Patient	10045986
9	Washing The Patient	10044803
10	Reinforcing Muscle or Joint Exercise Technique	10036512
11	Assessing Body Movement	10050223
12	Fall Prevention	10040211
13	Self Management	10046837
14	Wheelchair Mobility	10021068
15	Risk For Loneliness	10015179
16	Enticed	10050456
17	Impaired Ability To Participate In Care Planning	10035134
18	Lack Of Family Support	10022473
	PAIN	
19	Assessing Pain	10026119
20	Managing Pain	10011660
21	Identifying Attitude Toward Pain	10009654
22	Pain	10023130
23	Acute Pain	10000454
	ALTERATION OF PHYSIOLOGICAL ACTIVITIES	

24	Assessing Swallowing	10050155
25	Impaired Swallowing	10001033
26	Preventing Costipation	10046454
27	Assessing Bowel Status	10036475
28	Alterata integrità dei tessuti	10001080
29	Impaired Urinary System Function	10001359
30	Impaired Urination	10021790
31	Promoting Effecctive Bowel Elimination	10036717
	ALTERATION OF NUTRITIONAL STATUS	
32	Assessing Nutritional Satuts	10030660
33	Dietary Need	10005946
34	Referring To Nutritionist	10046788
35	Risk For Impaired Nutritional Status	10037224
36	Assessing Foof Intake	10050091
37	Impaired Nutritional Status	10025746
38	Impaired Fluid Intake	10029873
39	Impaired Low Nutritional Intake	10025519
40	Risk For Impaired Gastrointestinal System Function	10046431
41	Risk For Impaired Nutritional Intake	10023013
	ALTERATION OF NEUROLOGICAL STATUS	
42	Impaired Nervous System Function	10037322
43	Valutare la capacità di comunicare attraverso il linguaggio verbale	10030515
44	Aphasia	10002438
45	Sensory Deficit	10022730
46	Impaied Alertness	10027165
47	Impaired Verbal Communication	10025104
48	Actual High Intracranical Pressure	10025395
49	Actual Negative Sedation Status	10040160
50	Agitation	10025705
51	Assessing Anxiety	10041745
52	Assessing Consciousness	10050186
53	Communicative Barrier	10022332
54	Impaired Communication	10023370
	ALTERATION OF INTEGRITY 'SKIN	
55	Assessing Skin	10041126
56	Maintaining Skin Integrity	10035293
57	Surgical Wound	10023148
58	Pressure Ulcer Prevention	10040224
59	Surgical Wound Care	10032863
60	Drainage	10006207
61	Keep The Wound Drainage	10036596
62	Risk For Impaired Skin Integrity	10015237

	INFECTION HAZARD	
63	Assessing Signs And Symptoms Of Infection	10044182
64	Preventing Infection	10036916
65	Urinary Tract Infection	10029915
66	Risk For Infection	10015133

Ethical approval and informed consent

The study was approved by the Ethics Review Committee of the San Camillo-Forlanini Hospital in Rome. Informed consent was not obtained from patients as it is an observational study.

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Conflict of interest

The authors declare that they have no conflict of interest. The authors declare that they have not received any funding for the following study and that they have no financial interest in the topic discussed or in the results obtained.

Authors contributions

Each author participated equally in all phases of the study.

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