Original Article

TEXTO & CONTEXTO ENFERMAGEM
TEXT & CONTEXT NURSING TEXTO & CONTEXTO ENFERMERÍA

DESIGN OF AN INSTRUMENT TO MEASURE MIDWIVES' WORKLOADS BASED ON NURSING INTERVENTIONS CLASSIFICATION

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ABSTRACT

Objective: to design a qualitative and quantitative scale for measuring specific workloads for obstetric-gynecological nurses (midwives) within the delivery unit and based on the Nursing Interventions Classification (NIC).
Method: this is a mixed qualitative study through focus groups and quantitative with real measurements of NIC times, descriptive and cross-sectional. From September 2020 to May 2021, an extensive bibliographic search, mapping, ad hoc scale development and configuration of three focus groups were carried out to agree on scale design. Moreover, a comparison was carried out on the subjective perception of the time spent providing care (NIC) during the delivery process by focus groups with respect to times actually measured between March and April 2021 in a delivery unit.
Results: the qualitative data obtained in focus groups were analyzed and related, agreeing on the ad hoc measuring instrument's final structure and the importance of having this measuring instrument representative of their work, with standardized language adapted to real health demands. Furthermore, when comparing the subjective and real execution times of each of the NIC, we found a significant correlation when presenting different mean execution times with a variation of 13 minutes.
Conclusion: the midwives in this study determined the measurement instrument construct validity for their workloads.

DESCRIPTORS: Midwife. Maternity Ward. Labor. Standard nursing terminology. Administration of health services. Health personnel management.

HOW CITED: Garcia LG, Gil MFH, Valcarcel MDR, Llor AMS, Guerrero FJN, Merino GR, Cano E de la I. Design of an instrument to measure midwives' workloads based on nursing interventions classification. Texto Contexto Enferm [Internet]. 2024 [cited YEAR MONTH DAY]]; 33:e20230120. Available from https://doi.org/10.1590/1980-265X-TCE-2023-0120en

DISEÑO DE UN INSTRUMENTO PARA MEDIR CARGAS DE TRABAJO DE MATRONAS BASADO EN INTERVENCIONES *NURSING INTERVENTIONS CLASSIFICATION*

RESUMEN

Objetivo: diseñar cualitativa y cuantitativa, una escala de medición de cargas de trabajo, específica para las enfermeras obstétrico-ginecológicas (matronas), dentro de la unidad de partos y basada en la Clasificación de Intervenciones de Enfermería (NIC).
Método: estudio mixto cualitativo mediante grupos focales y cuantitativo con mediciones reales de tiempos NIC, descriptivo y transversal. Durante los meses de septiembre de 2020 a mayo de 2021, se realizó una extensa búsqueda bibliográfica, mapeo, elaboración ad hoc de la escala, y la configuración de tres grupos focales, para consensuar el diseño de la escala. Además, se ejecutó una comparativa sobre la percepción subjetiva del tiempo empleado en la prestación de cuidados (intervenciones NIC) durante el proceso de parto por parte de los grupos focales, con respecto a los tiempos medidos realmente entre marzo y abril del 2021 en una unidad de partos.
Resultados: se analizaron y relacionaron los datos cualitativos obtenidos de los grupos focales, coincidiendo en la estructura final del instrumento ad hoc de medida, y en la importancia de tener este instrumento de medida representativo de su trabajo, con un leguaje estandarizado y adaptado a la demanda sanitaria real. Además, al comparar los tiempos subjetivos y reales de ejecución de cada una de las intervenciones NIC, encontramos una correlación significativa, al presentar distintos promedios de tiempos de ejecución con una variación de 13 minutos.
Conclusión: las matronas de este estudio determinaron la validez del constructo del instrumento de medición para sus cargas de trabajo.

DESCRITORES: Matrona. Sala de partos. Trabajo de parto. Terminología normalizada de enfermería. Administración de los servicios de Salud. Gestión de personal en salud.

DESIGN DE UM INSTRUMENTO PARA MEDIR A CARGA DE TRABALHO DAS PARTEIRAS COM BASE NAS INTERVENÇÕES DE CLASSIFICAÇÃO DAS INTERVENÇÕES DE ENFERMAGEM

RESUMO

Objetivo: elaborar uma escala qualitativa e quantitativa para mensuração de cargas de trabalho específicas para enfermeiras obstétrico-ginecológicas (parteiras) na unidade de parto e baseada na Classificação das Intervenções de Enfermagem (NIC).
Método: trata-se de um estudo qualitativo misto por meio de grupos focais e quantitativo com medidas reais de tempos NIC, descritivo e transversal. De setembro de 2020 a maio de 2021, foi realizada uma extensa pesquisa bibliográfica, mapeamento, desenvolvimento de escala ad hoc e configuração de três grupos focais para chegar a um acordo sobre o desenho da escala. Além disso, foi realizada uma comparação da percepção subjetiva do tempo gasto na prestação de cuidados (NIC) durante o processo de parto pelos grupos focais com os tempos efetivamente medidos entre março e abril de 2021 em uma unidade de parto.
Resultados: os dados qualitativos obtidos nos grupos focais foram analisados e relacionados, concordando com a estrutura final do instrumento de medição ad hoc e a importância de ter este instrumento de medição representativo do seu trabalho, com linguagem padronizada e adaptada às reais demandas de saúde. Além disso, ao comparar os tempos de execução subjetivos e reais de cada uma das NIC, encontramos correlação significativa ao apresentar tempos médios de execução diferentes com variação de 13 minutos.
Conclusão: as parteiras deste estudo determinaram a validade de construto do instrumento de medida para suas cargas de trabalho.

DESCRITORES: Parteira. Maternidade. Trabalho. Terminologia padrão de enfermagem. Administração de serviços de saúde. Gestão de pessoal de saúde.

INTRODUCTION

The adequate estimation of workloads requires an instrument or tool that establishes the correct ratio between patient and nursing according to the type of care and users' needs[1–2]. However, according to existing literature, we are faced with the lack of a validated tool that measures midwives' workloads[3–4]. Fortunately, the same does not happen with nursing, since currently there are various scales that measure the activities carried out within nephrology, hemodialysis or Intensive Care Units; these scales quantify the work performed depending on the type of patient, need for care and severity[5]: Therapeutic Intervention Scoring System (TISS-28)[6–9]; Nine Equivalents of Nursing Manpower Use Score (NEMS)[7]; Nursing Activities Score (NAS)[6]; *Valoración de las Cargas de trabajo y Tiempos de Enfermería* (VACTE)[6,9]; and MIDENF®[10].

The midwifery profession is internationally recognized in all health systems in which it is considered an essential figure that affects a health and social area as important as motherhood and attention to women's sexual and reproductive health and the family at different moments in a woman's life cycle[11]. In Spain, midwifery training is articulated exclusively as a nursing specialty within the scope of specialized training. It is essential to have training in nursing. It is necessary to pass an entrance exam through a public tender for this specialty, called internal resident nurse, with a two-year training course[12–14]. At an international level, access to midwifery training is very heterogeneous, having in common the fact that it is framed within the context of university studies[12–14].

This professional profile is defined by 1349/2009 SAS order in point 3 as: "professionals who, with a responsible scientific attitude and using at all times the clinical and technological means appropriate to the development of science, provide comprehensive sexual healthcare, reproductive and maternal of women in its preventive, promotion and healthcare and recovery aspects, also including care for mothers in the diagnosis, control and care during pregnancy, normal birth and puerperium and care for healthy newborns up to the 28th day of life. The scope of action of midwives covers both primary care (which includes health centers, the community, the family and the home) and specialized care (which includes the hospital or other devices dependent on it). Likewise, midwives can practice their profession in the public and private sectors as employees and as self-employed workers".

The International Conference of Midwives, Royal Decree 1837/2008 of November 8 and 1349/2009 SAS order establish the different competencies of midwives, which define their daily work in caring for women and newborns[15–17].

By focusing attention on the birth process, midwives carry out a host of activities and tasks that allow them to be recognized as a responsible professional who works in partnership with women to provide the necessary support, care and counseling during pregnancy, childbirth and the postpartum period. Directing births is the midwives' own responsibility and providing care to neonates and infants[16,18]. Childbirth is a profound and unique experience and, at the same time, a complex physiological process, as a transcendental event in women's lives, and the type of attention given to them has important effects on them and their sons and daughters, both physically and emotionally, in the short and long term[19–20].

Midwives perform their role within the health institution in the delivery service classified according to the hospital organization chart as the emergency service. The delivery service, like any emergency unit, has different peculiarities to take into account, since staff actions are dynamic and constant due to the great pressure of care and haste in the execution of the different interventions[5], always linked to the organization and coordination with various healthcare and professional services, both healthcare and non-healthcare.

In recent years, the care burden of midwives within the birth unit has increased due to various factors, such as sociocultural aspects, increase in maternal-fetal pathologies, current professional demands at a legal and research level, and the development of new technologies within the field of obstetrics, which imply the performance of new procedures, which has generated an overload of care for the staff that makes up these units[5]. Added to this is the health pandemic situation, which has led to a structural and staffing reorganization of the delivery room itself[21–24]. This situation highlights the priority of determining, as precisely as possible, midwife management, examining their workloads in mother-child care during childbirth. It is limiting how it is reflected in the cost-effective studies that have assessed the work carried out by this union that have been based on the quantification of the number of births and cesarean sections, without valuing humanized care that midwives provide in a moment as transcendental as childbirth in a woman's life[5].

Therefore, instruments are needed to measure and quantify workload adapted to pregnant women's real needs and care demands, expressed in standardized terminology, such as that provided by Nursing Interventions Classification (NIC) so that the language used is internationally recognized and commonly applied by all healthcare professionals. NIC describes specific behaviors in the act of caring and enables comparisons between care practiced in different settings. It is updated periodically[25–28], and this allows systematic organization of care provided by midwives, and its characteristics include an estimate of the time necessary to carry out the intervention[21]. Furthermore, NIC defines the role of midwives, as recommended by the Spanish Ministry of Health[29].

A measuring instrument design must faithfully collect all the activities to be carried out by pregnant women during labor within the four functions of midwives, and, consequently, the more reliable measurement will be and midwives will be able to adapt to mother-newborn's real care demands.

Therefore, we proposed as an objective to qualitatively and quantitatively design a workload measurement scale specific for obstetric-gynecological nurses (midwives) within the delivery unit and based on the NIC that constitute it.

METHODS

This is a methodological study, developed in two phases: literature review and instrument construction and validity. To do this, we proceeded to analyze and search the current scientific literature, both national and international, from the last 5 years of databases such as PubMed, Dialnet, Scopus, Embase, SciELO, using the Parturition, Workload, Nurse Midwives, Delivery Rooms, Measuring Instrument descriptors, NIC and Boolean operators AND OR.

In order to list the activities carried out by this professional group, within the delivery room, we focused on the documents published by prestigious organizations such as: at the international level the International Confederation of Midwives (ICM); and at the national level, the normal birth strategy proposed by the Ministry of Health, Social Policy and Environment in 2010 and of a legislative nature, Royal Decree 1837/2008 of November 8, 1349/2009 SAS order (Annex I). Once each of the activities was listed (Annex II) that are part of midwives' daily work in the delivery area, the research team proceeded to identify and classify each activity with its NIC taxonomy. To this end, an exhaustive mapping was carried out consulting the NIC classification (7th Edition, 2018) and on the NNN Consult platform in order to increase construct validity. After selecting each activity corresponding to each NIC, the research team prepared a draft scale for measuring midwives' workloads applicable to the birth unit. This was characterized, according to the focus groups, by being quick, simple and easy to use, in addition to being reproducible and reliable. The scale was structured with correlation to the four functions of nursing (care, manager, teacher and researcher) and nursing care plans based on

Marjory Gordon's functional patterns, as they are used in midwives' care process assessment in the study region (Murcia, Spain).

After the research team consensus, the measurement scale was organized into four dimensions to be assessed: first dimension: care (where Marjory Gordon's 11 functional patterns are integrated). The second dimension is divided into two: on the one hand, we have patient management (referring to all midwives' specific care) and, on the other hand, unit management (more administrative actions). Third dimension: teaching. Fourth dimension: research. And finally, a section on substitutes (made up of those interventions that are carried out in an extraordinary way). Once the bibliographic search, mapping and ad hoc preparation of the draft scale from September 2020 to March 2021 were carried out, the three focus groups were configured. Each of them has certain peculiarities, such as the geographical place of work and the time dedicated to the profession, to agree on the design of the scale proposed by the research team.

The three focus groups were based on different professional profiles. Group 1 was made up of midwives who provide care during childbirth, in national hospitals (Spain), such as *Hospital Universitario Virgen de la Candelaria, Hospital Público Verge de los Lliris, Hospital de Jaca, Hospital Universitario 12 de Octubre*, *Hospital Universitario Virgen de la Arrixaca* (HUVA), *Hospital Insular Nuestra Señora de los Reyes* and *Hospital Universitario de Canarias* in Tenerife. Group 2 is made up of midwives from regional hospitals, Region of Murcia, performing their duties at HUVA, *Hospital Comarcal del Noroeste, Hospital General Universitario Santa Lucia, Hospital Rafael Méndez*. Finally, group 3 was formed, also at a regional level (Region of Murcia), made up of managing midwives (delivery unit supervisors and maternal and child area directors) who practice at HUVA, *Hospital Comarcal del Noroeste* and *Hospital General Universitario Santa Lucia*.

Each focus group was formed with 8 professionals and was guided and coordinated by the main researcher. Within the group, free expression of opinions was sought by each of its participants, creating a relaxed atmosphere that allowed the exchange of ideas as well as the inclusion and exclusion and suitability of the elements that make up the scale. To select the focus group participants, an intentional non-probabilistic sample was carried out, taking into account their knowledge and professional experience within the delivery area of more than 5 years. The meeting with each of the focus groups was held during May 2021, lasting 1 hour each, in digital format, through the Zoom platform, which allowed it to be recorded, always with the advance consent of each of the group members. The group members had to determine the clarity, coherence and relevance of each of the NICs and the execution time of each of the interventions for quality care provision. Furthermore, at the end of each dimension, it was considered whether they were sufficient, whether they would be grouped or deleted and whether, on the contrary, some more should be considered.

Once the qualitative data had been collected, they were analyzed and coded using specific software for qualitative research (Atlas.ti). This allowed us to validate the scale from the point of view of content and construct qualitatively. Moreover, a new draft was generated taking into account focus groups' contributions (Annex III).

After the qualitative phase, the quantitative phase begins on measuring the time dedicated to the execution of NIC, comparing the consensus of times obtained by the three focus groups with the real execution time measured in the HUVA delivery unit (Murcia), for being the reference hospital in Murcia and presenting a great variability in midwifery interventions, between March and April 2021, by two observers previously trained to carry out observations homogeneously. The same NIC were measured with the same instrument, timing the actual execution time (Annex IV).

The determination of the times by the three focus groups was subject to the saturation principle, but in those interventions where it was difficult to reach a consensus between the groups, the mean time dictated was established. In those figures whose decimal is equal to or greater than 0.50, the next minute was taken. All the data obtained were processed with SPSS version 23.0 and a descriptive analysis was carried out, calculating frequencies and contingency tables between the different variables (NIC). The chi-square test has been applied for statistical inference and statistical significance has been accepted when $p < 0.05$, with a 95% confidence level. After the consensus of the three focus groups, the actual measurement of NIC times and contributions and recommendations by the research team gave rise to the final design of the scale.

The scale consists of 24 items and each item contains one or more NIC associated with the same time of application. The time assigned to each item was established by comparing the real time it takes to execute each intervention with the time agreed upon by the focus groups. To measure workload, the scale is applied to each labor patient during work shift, noting the number of times each NIC /items are performed. The total time spent on that patient is calculated by adding the validated time with the number of times each NIC is performed.

The commitment to ethical research standards and the essential legal requirements to carry out this study have been scrupulously complied with. A study that is part of a doctoral thesis, for which approval was obtained from the research ethics committee of participating entities, did not require measuring the times of each NIC. Special attention was paid to compliance with the following ethical aspects, such as voluntariness, anonymity and confidentiality when participating in the research. The midwives participating in the three focus groups formed signed the informed consent. Law 3/2018 of December 5 on the Protection of Personal Data and guarantee of digital rights was respected at all times.

RESULTS

The data obtained in the qualitative phase by the three groups, made up of a total of 24 professionals, are considered in a unified manner after analysis using the Atlas.ti program, obtaining the following map that includes the main topics discussed as well as the most representative textual citation obtained from each of them (Figure 1).

Furthermore, a comparison was made of the data extracted from each of the focus groups on the subjective perception of time spent providing care (NIC) during the birth process in relation to times actually measured between March and April 2021 in the HUVA birthing unit, obtaining the results presented in Table 1.

The results extracted from the focus group consensus indicate that the mean time that midwives need to carry out a NIC intervention is 33 minutes. When comparing this figure with the mean real time in the execution of a NIC, we found a discrepancy, since they spend 20 minutes carrying it out. By relating the mean times of both samples using SPSS version 23.0, we obtained a mean time of 13 minutes. This indicates the statistical significance of said correlation due to disparity between the mean time of both samples ($p=0.000$).

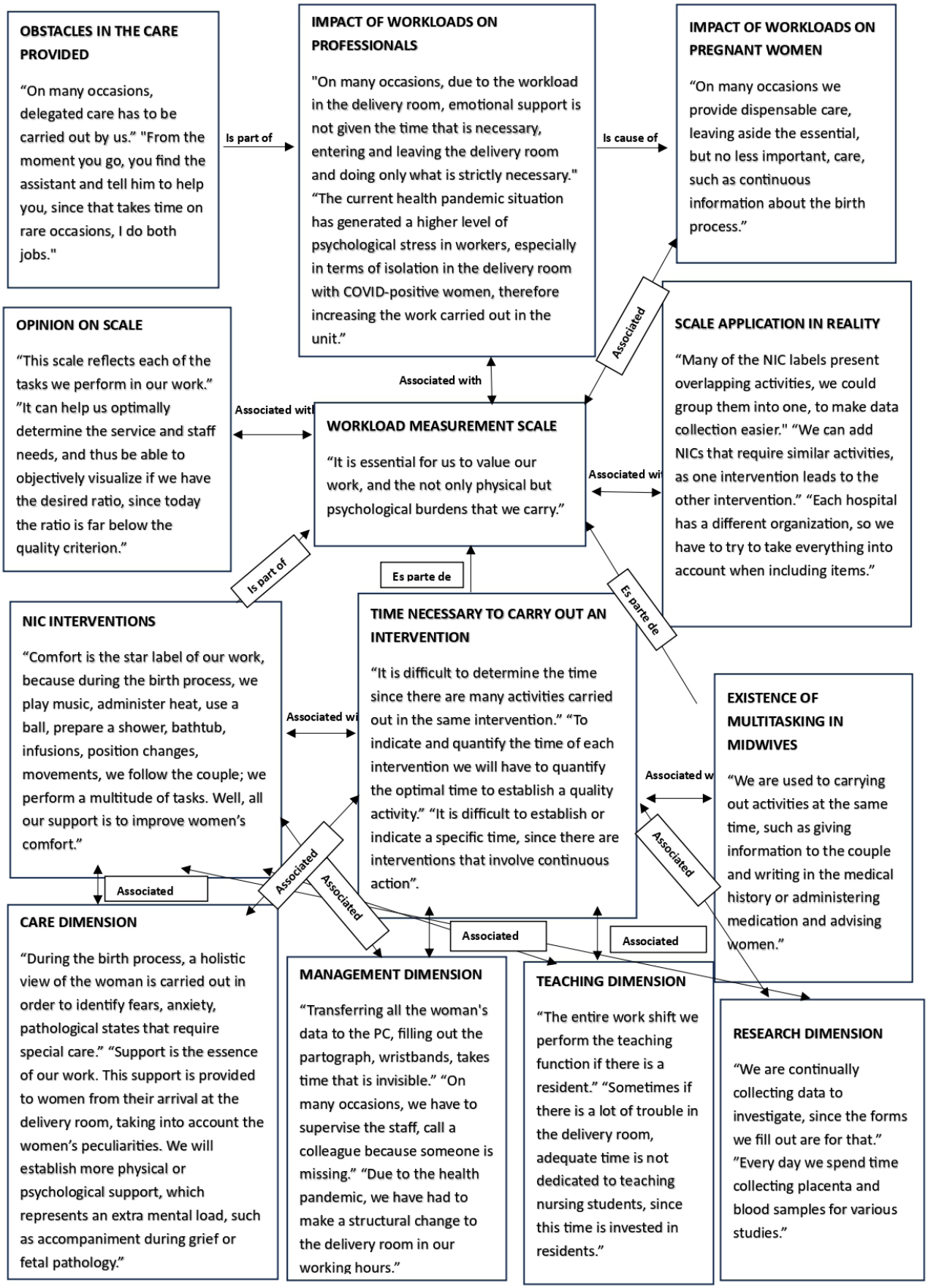

Figure 1 – Unified consensus of the three focus groups on the scale importance and design to measure their workloads in digital format, Zoom platform (2021).

Table 1 – Time to carry out the interventions agreed upon by three focus groups together with the real time measured in the delivery unit of *Hospital Universitario Virgen de la Arrixaca* (2021).

Nursing Interventions Classification	Real time (Minutes)	Consensus time
1801. Self-care assistance: bathing/hygiene	3	11
6540. Infection control	38	21
2300. Medication administration	4	16
2380. Medication management	4	16
2314. Medication administration: intravenous (IV)	4	16
4200. Intravenous (IV) therapy	4	16
2313. Medication administration: intramuscular (IM)	15	15
2304. Medication administration: oral	15	15
2318. Medication administration: vaginal	15	15
2311. Medication administration: inhalation	15	20
2214. Analgesic administration: intraspinal	3	15
2319. Medication administration: interspinal	3	15
7820. Sample handling	2	19
5510. Health education	12	15
5568. Parent education: infant	12	60
5244. Breastfeeding counseling	12	60
5618. Teaching: procedure/treatment	12	15
1100. Nutrition management	12	15
3740. Fever treatment	9	15
4190. Intravenous insertion	5	14
4235. Phlebotomy: channeled route	5	14
4238. Phlebotomy: blood sample	5	15
4035. Capillary blood sample	3	7
3620. Suturing	14	30
1750. Perineal care	14	23
6680. Vital signs monitoring	2	15
6771. Electronic fetal monitoring: antepartum	60	60
6772. Electronic fetal monitoring: intrapartum	60	60
840. Postural change	1	15
6482. Environmental management: comfort	1	15
7140. Family support	12	22
5250. Decision-making support	12	22
5270. Emotional support	12	22
5420. Spiritual support	12	22
4920. Active listening	12	22
5440. Support system enhancement	12	22
5340. Presence	12	22
5460. Touch	12	22
6710. Attachment promotion	12	22
6800. High-risk pregnancy care	12	41
7310. Admission care	12	30
6520. Health screening	12	28
6574. Patient identification	12	20
7960. Healthcare information exchange	1	15
7920. Documentation	15	22
6656. Surveillance: late pregnancy	12	33
7650. Delegation	2	15
8100. Referral	23	49

Table 1 – Cont.

Nursing Interventions Classification	Real time (Minutes)	Consensus time
6720. Birthing	38	240
6830. Intrapartal care	55	47
6834. Intrapartal care: high-risk delivery	55	60
6972. Resuscitation: fetus	1	14
5294. Grief work facilitation: perinatal care	38	60
1770. Postmortem care	23	60
6750. Cesarean birth care	48	60
2880. Preoperative coordination	48	15
2930. Surgical preparation	48	15
7710. Physician support	14	60
2870. Postanesthesia care	29	64
6824. Infant care	2	60
6974. Resuscitation: neonate	6	27
6930. Postpartal care	5	60
7370. Discharge planning	5	18
8140. Handoff report	4	15
6850. Labor induction	60	60
7840. Supply chain management	8	32
7980. Incident reporting	1	15
7880. Technology management	3	15
7660. Emergency car checking	8	21
6486. Environmental management: safety	3	37
6489. Environmental management: worker safety	3	37
8020. Multidisciplinary care conference	6	35
7830. Staff supervision	60	10
7640. Critical path development	60	60
8700. Program development	60	60
7800. Quality monitoring	60	60
7726. Preceptor: student	23	60
7222. Preceptor: employee	23	60
8120. Research data collection	23	15
6140. Cognitive restructuring	38	45
6320. Resuscitation	23	45
4030. Blood products administration	60	60
580. Urinary catheterization: intermittent	2	15
6630. Seclusion	3	31
1480. Massage	12	17
5880. Calming technique	12	17
1380. Heat/cold application	12	17
2400. Patient-controlled analgesia (PCA) assistance	3	15
1410. Pain management: acute	29	15
4026. Bleeding reduction: postpartum uterus	53	42
6860. Labor suppression	60	60
6870. Lactation suppression	23	60
1052. Bottle feeding	38	15
4021. Bleeding reduction: antepartum uterus	53	35
6522. Breast examination	15	15
2910. Surgical instrument management	60	60

*The time measured in minutes for the execution of each NIC, determined both in the consensus group established by the three focus groups and in the real-time group measured at the delivery unit.

DISCUSSION

One of the most relevant attributes of this research is the fact of using a qualitative and quantitative methodology to design a scale. This allows a more thorough analysis of its reliability and validity. It is increasingly necessary to use both types of methodologies and not just quantitative ones to check the validity or reliability of an instrument[29–30], since qualitative analysis complements the numerical data provided by quantitative methodology.

The members of the different focus groups show us their urgent need to have a scale that measures their workloads in line with studies[1–2], because on many occasions they encounter obstacles both in terms of staffing and material resources to be able to provide the quality care that mother-child demands. These high workloads to which midwives are subjected have an impact on parturient women, since they can only dedicate their work time to tasks that, during the birth process, are essential, ceasing to do those things that are dispensable, but no less important, for mothers' satisfaction and empowerment, who expect childbirth care to be a loving, pleasant and positive experience as determined in studies[20].

Given that the time that midwives dedicate to the execution of NIC is linked to existing work overload in these units, which in turn affects the quality and safety of maternal and neonatal care, evidence[20,31–32] determines that reduced quality of care has a high impact on maternal and neonatal health. Morbidity-mortality indices, as factors that indicate the occurrence of adverse events and human errors, cause ethical-legal implications and increased health costs. To this we must add physical and mental overload, due to structural changes and the way of working, caused by the health pandemic situation, which led to structural and work changes indicated by international studies.This situation causes harm to staff and at the same time their actions are many (they carry out several interventions at the same time), multitasking arises, with consequent repercussions for both the professionals themselves, in this case midwives and women in labor, generating a feeling of dissatisfaction, results that agree with the study[5]. The multiple execution of interventions meant the grouping of the items that make up the scale in order to facilitate handling and speed in its application.

Furthermore, the determination of times for each of the interventions was a topic of debate by focus groups, due to the controversy that arose, since setting a time for each task to be carried out is not simple, since one must have the necessary usual situations, but also with extraordinary or complicated situations that require more time in execution and staff involvement. When comparing the objective data (real times measured in a delivery unit) with the subjective data (provided by the groups), we found a substantial difference in NIC execution times, due to multiple realities surrounding the birth process; the existing work overload that hinders comprehensive and individualized high-quality care; the consecutive performance of multiple and overlapping activities; the organizational structure of the different delivery units; and the different models of care and actions developed by the same professional profile.

This study gives a voice to professionals, using different methodologies to see their consensus qualitatively to enrich the instrument design, reflecting the real healthcare of this type of units and consequently facilitating its applicability and assimilation by midwives, all this to improve human resources management and improve the quality of care they provide to their patients[33]. The continuous and desired development of the areas of quality care management in nursing specialties are still slower than expected. This makes it difficult to find studies on validated scales that quantify the workloads of this professional group, so a limitation is that it is impossible for us to compare the methodology used and results obtained with other scientific articles.

CONCLUSION

An ad hoc scale was constructed with 4 dimensions (care, management, teaching and research) that allow visualization of the four intrinsic functions of midwives, in which the interventions and activities are incorporated using our own language, based on NIC taxonomy, which subsequently obtained construct validity by the midwives of this study.

The existing need among midwives to measure and quantify the workload they bear associated with real NIC carried out in birth units is confirmed. These interventions are the most reliable indicator to determine the proportion of midwifery staff needed and consider the proposed scale as a relevant management tool when associating midwives' human resources with pregnant women's real demands and care needs to improve mother-child's quality of care and safety.

This study is part of a broader research project, a doctoral thesis, which continued with the real multicenter application, in three public hospitals of the designed scale to carry out its complete validity. The use of this tool will guarantee effective work organization within the delivery service, as it will contribute to guaranteeing adequate, timely and quality healthcare.

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NOTES

ORIGIN OF THE ARTICLE

Article extracted from the thesis – *Diseño, validación y aplicación multicéntrica de una escala de medición de cargas de trabajo de matronas, basadas en intervenciones NIC, para unidades de paritorio*, presented to the Doctoral Program of the Health Science of *Universidad de Murcia*, Spain, 2023.

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ACKNOWLEDGMENT

We would like to thank all the midwives who have participated in this study, putting part of their time at the service of science, in addition to publicly recognizing the facilities provided by both the HUVA delivery service management and professionals (Murcia, Spain).

APPROVAL OF ETHICS COMMITTEE IN RESEARCH

Approved by the HUVA Research Ethics Committee, Murcia, Spain, with internal code 2021-1-5-HCUVA-TD. Assessed protocol version: 10.0.04/02/2021.

CONFLICT OF INTEREST

There is no conflict of interest.

TRANSLATED BY

Letícia Belasco

HISTORICAL

Received: May 30, 2023.
Approved: November 29, 2023.

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