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LETTERS TO THE EDITOR

Design and development of an online personal learning environment for a neonatal intensive care unit☆,☆☆

Diseño e implementación de un entorno personal de aprendizaje en línea para una Unidad de Cuidados Intensivos Neonatal

Internet usage globalization and the introduction of information and communication technology into the health environment have truly revolutionized the way in which we communicate, access information and manage knowledge. This has given nurses the opportunity to face new challenges, such as the optimization in health outcomes through the acquisition of digital skills in clinical practice[1] and learning processes.

Taking advantage of what the Web 2.0 has to offer in terms of sharing, interacting and learning online,[2] the proposal was put forward for the creation of a virtual desktop with access to digital resources, aimed at healthcare professionals of the Neonatology Unit of the Hospital Universitari i Politècnic La Fe (UCI Neonatal and Neonates). The desktop was aimed at facilitating continuous, informal and self-directed training,[2] which would guide professionals to create their own personal learning environment (PLE), with this understood to be ''the combination of tools, information sources, connections and activities which each person uses assiduously to learn from''.[3]

The virtual environment design was made using the online and free Symbaloo tool, which enables desktop designs or panels called *webmix* using the compilation of direct accesses to web applications and services hosted in the cloud.[3] Also, their classification is permitted by categories or key words, interaction with other users, their diffusion on social media and sharing content in other online platforms.[4] At present, several experiences have already been found in the literature of learning developed using this tool, both in educational and health spheres.[2–5]

Selection of information and resources contained on the desktop was completed in 2 phases. The first included webs, blogs, social media and mobile applications which are reliable and good quality on neonatology, with inclusion criteria being those that were broadcast by clinical practice guidelines, of the national health system, Cochrane reviews and resources, contents created by the World Health Organization, the Spanish Paediatrics Association, the Spanish Neonatology Society, the Ministry of Health, Social Services and Equality and other national and international scientific societies. The second phase consisted of professional interviews with different categories related to neonatology where they were encouraged to communicate and share the most frequently used digital resources of their care practice, teaching and research activities.

After correcting web contents, analysing and filtering better quality and more relevant resources for learning and clinical practice and investigation the ''my virtual desktop: caring for neonates'' was created (https://www.symbaloo.com/mix/miev-cuidandoneonatos). Potential users are neonatology nurses, paediatricians and nurse technicians, and also resident paediatric physicians and nurses. Access can be gained from any hospital computer with internet access, and from mobile devices and personal tablets.

Finally, an infography was designed in which a QR code was included which enabled the spread of the virtual desktop and its applicability among newly incorporated staff to the neonatology unit. This infography was incorporated into the electronic field of the neonatal ICU and into support material provided in the training activities coordinated by the nursing team, as it is easily accessible from any device.

The tool developed provides the user with the necessary support to create their digital PLE, in a simple, appealing and intuitive manner, since the digital resources appear in an orderly fashion, grouped together into labelled images or icons. Consultation is made easy, in accordance with the specific information or learning requirements. It also includes a space for the Google® search engine to enable the search for new contents. The fact that Symbaloo allows for the extension of the number of resource blocks, promotes continuous updating, as required by the incorporation of new links.

''My virtual desktop: caring for neonates'' is a free tool the use of which will help neonatology professionals to keep up to date. It will provide them with a personalised space to train innovatively, in line with formal learning promoted by healthcare institutions, with the added advantages of social networks and the democratising of access to information on neonatology.

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☆☆ A poster on the theme was presented at the 7th Neonatal Nursing Congress.

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Topical probiotics in the treatment of infected wounds in critical care☆

Probióticos tópicos en el tratamiento de heridas

Difficult-to-heal and/or infected wounds are frequently encountered in patients in intensive care units. Studies in recent years have proposed the use of topical probiotics to treat wound infections due to their ability to reduce inflammation, lower pH, and release antimicrobial compounds.[1]

The 2019 study by Stanbro et al.[1] investigated the impact of lactobacilli (*Lactobacillus acidophilus*, *Lactobacillus casei* and *Lactobacillus reuteri*) on infected wounds. There were no adverse effects. The results showed that the topical application of *Lactobacillus* was effective against gram-negative multidrug-resistant (MDR) wound pathogens such as *A. baumannii*.

The 2019 article by Venosi et al.[2] presents the case of an 83-year-old woman with critical limb ischaemia and a difficult-to-treat, infected ulcer on her right leg. This patient received complementary treatment in intensive care with local application of probiotic bacteria. During the treatment, progressive healing of the lesion with microbiological resolution of the polymicrobial wound infection was observed. The results seem to confirm the usefulness of complementary probiotic therapy in difficult-to-treat infected wounds.

The 2020 study by Coman et al.[3] evaluated the probiotic efficacy of SynBio (1:1 combination of *Lactobacillus rhamnosus* and *Lactobacillus paracasei*) in counteracting chronic ulcer infections. The results showed that topical probiotics have a good antimicrobial capacity and adhesion percentage to HaCaT cells and fibroblasts was 19% and 17%, respectively, which highlights the possibility of creating a protective environment that prevents pathogens by forming biofilms to counter infections. Therefore, topical probiotics could be used successfully to complement conventional therapies in the treatment of chronic ulcers due to their ability to eliminate pathogenic microorganisms and improve ulcer healing.

The 2019 study by Lenzmeier et al.[4] found that patients with severe burns are susceptible to bacterial infection, which often results in sepsis, organ failure and death. The pathogen *Pseudomonas aeruginosa* (*P. aeruginosa*), an organism that is inherently resistant to multiple antibiotics, is a common cause of sepsis in critical patients. Therefore, it is essential to develop a topical treatment unrelated to conventional antibiotics for the prevention of *P. aeruginosa* infection. This study examines the effectiveness of a concentrated supernatant from *Lactobacillus gasseri* in inhibiting *P. aeruginosa* biofilms and reducing wound bioburden and sepsis. The results showed that probiotics inhibited *P. aeruginosa* growth, prevented biofilm development, and eliminated partially developed biofilms, reduced mortality and prevented systemic spread. Their results suggest the potential of topical probiotics in preventing sepsis from infection in critical burns patients and immunocompromised patients.

The 2016 study by Argenta et al.[5] analysed the efficacy of probiotics (*Lactobacillus plantarum*) in severe burns. The results showed that probiotics inhibited septicaemic accumulation of the pathogen in remote organs. In addition, probiotic therapy successfully suppressed infection-dependent induction of TNF-α and interleukins 6 and 10 in the liver. Topical probiotics show great potential as complementary treatment of complicated burns.

The potential of topical probiotics on infected wounds in critical patients can be proven through the analysis of the abovementioned recent studies. Moreover, as this treatment accelerates healing, it could reduce the costs of treating infected wounds and increase the quality of life of critical patients.

However, it is worth noting that although the evidence reviewed appears to indicate that we can expect positive results from topical probiotics, the few human studies are not sufficient to establish a general recommendation. More studies are needed to assess the efficacy and possible complications of this treatment in a larger sample of patients, and to analyse its effect in combination with other treatments. Thus, we can offer patients the best care based on the latest evidence.

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