

# Addressing learning needs in neonatal care: an overview of resources for self-directed learning

This article explores the rationale behind the need for self-directed learning resources for health professionals working within the neonatal specialty, in the context of current healthcare education. It also discusses what makes a learning tool useful in relation to the facilitation of independent learning. Finally, given that, compared to other areas of health, the range and availability of neonatal-specific learning tools is limited, the paper draws together a pool of accessible educational resources for self-directed learning in neonatal care.

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The specialty of neonatal nursing requires a grasp of a wide range of knowledge and skills across all dependency levels in order for practice to be supported by sound underlying rationale and understanding. Formal neonatal nurse training within higher education institutions (HEIs) coupled with bedside, clinical-based teaching enables neonatal nurses to become 'qualified in specialty' (QIS) and beyond<sup>1,2</sup>. However, given the current higher education climate with a decrease in classroom time and concurrent increase in emphasis on self-directed learning, there is a clear need for neonatal nurses to access educational resources. Moreover, any health professional working within this specialty requires acquisition of and familiarity with subject-specific information to impart knowledge to support the care they deliver.

Following on from a discussion of why resources are needed, this article discusses who would most benefit from self-directed learning in this area and explores what makes a learning resource effective. Finally, the article summarises those resources that are available in the neonatal field.

## Why is there a need for learning resources in neonatal care?

Face-to-face lectures along with clinical exposure have traditionally been used to teach knowledge to post-basic learners about their chosen specialty. Such conventional methods are suited to those who favour more formal settings and who prefer to learn directly from subject

experts<sup>3</sup>. However, this can lack the flexibility that is necessary for today's *trained* nurse who requires continuous professional development (CPD) in line with a wider cultural shift towards more flexible work and study patterns. In addition, there may be a lack of opportunity to attend structured, pre-arranged study days due to time constraints at the workplace. The demands of caring for very sick neonates along with shortages of staff and reduced availability of study leave have meant more limited training opportunities in the clinical area. The current situation has nurse educators seeking alternative means of teaching CPD for specialty-related knowledge, with a move to an emphasis on self-directed, flexible learning.

The increasingly limited resources to deliver essential curriculum within HEIs further highlights the increased emphasis on the importance of self-directed study within nursing and healthcare programmes. As direct contact hours reduce, self-directed time has increased and post-basic students, even those inexperienced or new to neonatal care, are expected to know what to learn in the absence of any specified curricula for independent learning content. Therefore, self-directed neonatal-specific learning tools are essential to fill this self-directed time<sup>4</sup>.

In addition, there is now more of an emphasis on the importance of combining formal education with independent, flexible study within higher education as well as pre- and post-registration

## Keywords

neonatal education; learning resources; self-directed learning

## Key points

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1. Neonatal nurses need access to self-directed educational resources to enrich their knowledge base and augment classroom and clinical-based teaching.
2. Health professionals working with neonates and their families require subject-specific knowledge to support best practice and care delivery.
3. Although limited, 'open access' neonatal-specific learning resources are available.

healthcare programmes<sup>5-9</sup>. The value of combining self-directed study, including recent innovations in online programmes, with both classroom and clinical teaching has been highlighted within the educational literature in line with a 'blended' approach to learning<sup>10,11</sup>, where resources are developed to 'scaffold' classroom-led curricula content<sup>12,13</sup>. However, structured self-directed learning resources specifically in neonatal care that are openly accessible and available to all, are limited.

### How does an education resource facilitate learning?

Central to self-directed study is *guided learning*, ie the *facilitation of*, rather than, simply *giving* information. This is fitting with the work of Knowles<sup>14</sup>, based on the premise that learning should occur when learners undertake independent enquiry and are motivated to learn with a need to know as relevant to their own area of experience, in this case neonatal care. Following this thread, in order to be effective, learning tools should capture the important elements of the adult learner as shown in **TABLE 1**.

Literature pertains to the need for guided facilitation to support adult education<sup>16,17</sup>. The benefits of 'directing' the learner towards lines of enquiry are well documented as is the promotion of interaction with a given tool that challenges learners to participate and engage in learning rather than just receive information passively<sup>18,19</sup>. This has been shown to increase learner motivation and interest and so facilitate knowledge acquisition. For example, literature on the use and benefits of quizzes and tests as learning aides support this form of active learning<sup>18,19</sup>. A recent literature review concluded that interactive self-regulated testing can be a valuable learning strategy that can be incorporated into self-directed programmes of study<sup>20</sup>.

Also linked to the increased effectiveness of learning tools is active learning through interaction using multimedia formats. Literature on the use and benefits of interactive approaches using a range of technologies and media is emerging as important and increasingly popular within certain areas of health care, again to increase interest, stimulation, engagement and motivation<sup>21-25</sup>. However, tools for neonatal care have not been explored in

| Element of the self-directed adult learner <sup>15</sup> | Feature of the learning resource  |
|--|---|
| Self-concept and self-direction                          | Learning is more self-directed, eg independent enquiry by suggesting useful resources, reading material, websites and other resources.                                      |
| Experience as a resource for learning                    | Makes reference to the learner's clinical area where the experience is more real and relevant.  |
| Readiness to learn                                       | Focuses on subjects that have immediate relevance to the learner's own field.   |
| Orientation to learning                                  | Comprises gathering of knowledge for immediate application, eg examples of cases with real problems that learners can relate to.  |
| Motivation to learn                                      | Incorporates feedback in response to interaction, eg informal quizzes, guided units on specific topics.<br>Use of multimedia to stimulate.<br>Range of means used to teach. |
| Relevance  | Clearly states aims and objectives and applicability to a given specialty.  |

**TABLE 1** Elements of self-directed learning resources.

this way. Using a variety of media to teach, serves to accommodate the different learning styles of adult learners. By this, to have optimum effect learners should have access to a range of different mediums depending on their preference for learning, albeit traditional or online platforms or a combination of both. Ideally, learning resources that teach a specialty should be accessible for all: the concept of 'open access'. This should also apply nationally, and even globally, so that all health professionals can learn from and share knowledge with each other, wherever they work within the world<sup>26</sup>. However, it should be remembered that information should be relevant, not only to the specialty, but also to context, country and culture. Learners must be aware of practice differences and indeed resource limitations in certain countries that affect the applicability and cultural relevance of any given learning tool. Overall, in the same way that all neonates and their families deserve the same standard of care, as long as this care is culturally appropriate and the resource limitations are acknowledged and/or managed as much as possible, the aims of any learning resource should also be the same.

### Who needs neonatal learning resources?

The following groups may benefit from neonatal-specific learning resources:

- Neonatal nurses undertaking neonatal programmes of study at post-basic level within the 'blended' mode of learning.

- Nurses who are not on a programme of study but who wish to revise their neonatal theory and rationale for practice.
- Nurses who are new to the area of neonatal care, particularly those who have trained in other specialties (eg adult or children's nursing and midwifery) or those with little previous neonatal exposure during training.
- Other allied health professionals with a different professional background who work with neonates as part of their role (eg physiotherapists, occupational therapists, speech, language or feeding specialists).

It could be argued that anyone working in clinical neonatal practice requires ongoing education in the name of life-long learning<sup>1</sup>, again stressing the importance of open access resources.

### What resources are available to health professionals working with neonates?

Given that neonatal-specific resources and literature in this field are limited, where can nurses and health professionals working in neonatal care look for their self-directed learning? The following selection of resources is in accordance with the important elements of a learning resource (**TABLE 1**). It should be emphasised that the learning tools included aim to enhance *knowledge* and increase understanding of the underlying *rationale* for care of the neonate. They are not aimed at teaching *skills*, which need to be learnt in the clinical area while caring for neonates

| Resource   | URL and further details   |
|--|---|
| <b>E-journals</b>  |   |
| <b>Infant</b>  | Open access for articles older than two years. More recent issues available via subscription.<br><a href="http://www.infantgrapevine.co.uk">www.infantgrapevine.co.uk</a>   |
| <b>Journal of Neonatal Nursing</b>                               | Subscription required.<br><a href="http://www.journalofneonatalnursing.com">www.journalofneonatalnursing.com</a>  |
| <b>Advances in Neonatal Care</b>                                 | Subscription required.<br><a href="http://journals.lww.com/advancesinneonatalcare/pages/default.aspx">http://journals.lww.com/advancesinneonatalcare/pages/default.aspx</a><br>Also available as an Apple® iPad application.  |
| <b>ADC: Fetal and Neonatal Edition</b>                           | Open access on selected articles on fetal, neonatal and topics:<br><a href="http://fn.bmj.com/content/98/2/F103.full">http://fn.bmj.com/content/98/2/F103.full</a>  |
| <b>ADC: Education and Practice Edition</b>                       | Open access articles on neonatal and paediatric education and practice-based topics:<br><a href="http://ep.bmjjournals.com/cgi/collection/unlocked">http://ep.bmjjournals.com/cgi/collection/unlocked</a>   |
| <b>The Cochrane Library</b>                                      | Full text systematic reviews on all areas of health including neonatal care:<br><a href="http://www.thecochranelibrary.com/view/0/index.html">www.thecochranelibrary.com/view/0/index.html</a>  |
| <b>International Journal of Epidemiology</b>                     | Selected issues are open access. <a href="http://ije.oxfordjournals.org">http://ije.oxfordjournals.org</a>  |
| <b>Research and Reports in Neonatology</b>                       | An open access journal on neonatal health:<br><a href="http://www.dovepress.com/research-and-reports-in-neonatology-journal">www.dovepress.com/research-and-reports-in-neonatology-journal</a>  |
| <b>The Internet Journal of Pediatrics and Neonatology</b>        | <a href="http://www.ispub.com/journal/the-internet-journal-of-pediatrics-and-neonatology/archives.html#sthash.PVZBrGn2.ihbA65W5.dpbs">www.ispub.com/journal/the-internet-journal-of-pediatrics-and-neonatology/archives.html#sthash.PVZBrGn2.ihbA65W5.dpbs</a>  |
| <b>International Breast Feeding Journal</b>                      | An open access journal published in the UK: <a href="http://www.internationalbreastfeedingjournal.com">www.internationalbreastfeedingjournal.com</a>  |
| <b>Directory of open access journals – health related topics</b> | A full directory of all open access journals:<br><a href="http://www.doaj.org/doaj?func=subject&amp;cpid=20&amp;uiLanguage=en">www.doaj.org/doaj?func=subject&amp;cpid=20&amp;uiLanguage=en</a><br>Access My Library (from the home page search 'neonatal'): <a href="http://www.accessmylibrary.com">www.accessmylibrary.com</a>   |
| <b>INTECH</b>  | Open access journals and books: <a href="http://www.intechopen.com/search?q=neonatal">www.intechopen.com/search?q=neonatal</a>  |
| <b>Neonatal web-based learning resources</b>                     |   |
| <b>Knowledge for Neonatal Nursing Practice</b>                   | A self-directed learning tool with 'think points', multimedia, quizzes with feedback, reading lists and downloadable fact sheets: <a href="http://www.cetl.org.uk/learning/neonatal/neonatal_care.html">www.cetl.org.uk/learning/neonatal/neonatal_care.html</a>  |
| <b>Antenatal and Newborn Screening E-learning</b>                | The UK National Screening Committee's CPD website for England:<br><a href="http://cpd.screening.nhs.uk/elearning">http://cpd.screening.nhs.uk/elearning</a>   |
| <b>Developmental care</b>  | 'Practice points' to download and pertinent issues central to developmental care:<br><a href="http://www.neonataldevelopmentalcare.com/Resources/index.html">www.neonataldevelopmentalcare.com/Resources/index.html</a>   |
| <b>Global audience e-learning</b>                                |   |
| <b>HEAT resources</b>  | Free-to-access training modules written by African authors in collaboration with the Open University, covering areas of healthcare including maternal, newborn and child health.<br><a href="http://www.open.ac.uk/africa/heat/heat-resources">www.open.ac.uk/africa/heat/heat-resources</a>  |
| <b>WHO</b>   | A range of maternal and neonatal health fact sheets:<br><a href="http://www.who.int/mediacentre/factsheets/en/index.html#N">www.who.int/mediacentre/factsheets/en/index.html#N</a>  |
| <b>Jhpiego</b>   | Learning packages for global health – mother and newborn:<br><a href="http://reprolineplus.org/resources/trainer-educator/learning-resource-packages">http://reprolineplus.org/resources/trainer-educator/learning-resource-packages</a>  |
| <b>COINN</b>   | Educational resources page: <a href="http://www.coinnurses.org/edu_resources.php">www.coinnurses.org/edu_resources.php</a>  |
| <b>Neonatal-specific websites</b>                                |   |
| <b>Stanford Newborn Nursery website</b>                          | A website using multimedia and covering a range of neonatal conditions and care (USA-based).<br>Home page: <a href="http://newborns.stanford.edu">http://newborns.stanford.edu</a><br>Professional education link: <a href="http://newborns.stanford.edu/RNMDEducation.html">http://newborns.stanford.edu/RNMDEducation.html</a><br>Photo gallery: <a href="http://newborns.stanford.edu/photogallery/galleryindex.html">http://newborns.stanford.edu/photogallery/galleryindex.html</a><br>Videos: <a href="http://newborns.stanford.edu/photogallery/galleryindex.html#video">http://newborns.stanford.edu/photogallery/galleryindex.html#video</a><br>Audio files: <a href="http://newborns.stanford.edu/PhotoGallery/GalleryIndex.html#audio">http://newborns.stanford.edu/PhotoGallery/GalleryIndex.html#audio</a> |
| <b>Medscape nurses education website</b>                         | USA-based learning website for nurses (search 'neonatal' and view all neonatal-specific learning resources): <a href="http://www.medscape.org/nurses">www.medscape.org/nurses</a>   |
| <b>Neonatology on the web</b>                                    | Clinical resources for neonatology and perinatology: <a href="http://www.neonatology.org/neo.clinical.html">www.neonatology.org/neo.clinical.html</a>   |

| Resource   | URL and further details  |
|--|--|
| <b>Neonatal-specific websites <i>continued</i></b> |  |
| <b>National bodies:</b>                            |  |
| <b>NNA</b>   | <a href="http://www.networks.nhs.uk/nhs-networks/neonatal-nurses-association">www.networks.nhs.uk/nhs-networks/neonatal-nurses-association</a>   |
| <b>BAPM</b>  | <a href="http://www.bapm.org/publications">www.bapm.org/publications</a>   |
| <b>NICE</b>  | Search for 'neonatal' on the home page and view all neonatal-specific NICE documents:<br><a href="http://www.nice.org.uk/Search.do?searchText=neonatal&amp;newsearch=true&amp;x=15&amp;y=15#/search/?reload">www.nice.org.uk/Search.do?searchText=neonatal&amp;newsearch=true&amp;x=15&amp;y=15#/search/?reload</a>  |
| <b>RCOG</b>  | <a href="http://www.rcog.org.uk/womens-health/clinical-guidance/results?filter0=&amp;filter1%5B%5D=35&amp;op.x=14&amp;op.y=13">www.rcog.org.uk/womens-health/clinical-guidance/results?filter0=&amp;filter1%5B%5D=35&amp;op.x=14&amp;op.y=13</a>   |
| <b>Family and parent resources</b>                 |  |
| <b>NHS Choices website</b>                         | Care of the healthy newborn baby (click on the 'Your newborn' tab):<br><a href="http://www.nhs.uk/conditions/pregnancy-and-baby/pages/pregnancy-and-baby-care.aspx">www.nhs.uk/conditions/pregnancy-and-baby/pages/pregnancy-and-baby-care.aspx</a><br>Sick and preterm special care neonates:<br><a href="http://www.nhs.uk/conditions/pregnancy-and-baby/pages/baby-special-intensive-care.aspx">www.nhs.uk/conditions/pregnancy-and-baby/pages/baby-special-intensive-care.aspx</a> |
| <b>Bliss</b>                                       | Advice and care issues in relation to preterm and small neonates:<br>Home page: <a href="http://www.bliss.org.uk">www.bliss.org.uk</a><br>Parent link: <a href="http://www.bliss.org.uk/help-for-families">www.bliss.org.uk/help-for-families</a><br>List of guidelines for health professionals: <a href="http://www.bliss.org.uk/order-publications/#hp">www.bliss.org.uk/order-publications/#hp</a>   |
| <b>Contact a Family website</b>                    | Information on a range of neonatal and infant conditions for parents and professionals:<br><a href="http://www.cafamily.org.uk/professionals">http://www.cafamily.org.uk/professionals</a>   |
| <b>Tommy's</b>                                     | A charity website providing information for health professionals on research into preterm birth prevention and stillbirth:<br><a href="http://www.tommys.org/page.aspx?pid=345">www.tommys.org/page.aspx?pid=345</a>   |
| <b>Together for Short Lives</b>                    | A children's palliative care website: <a href="http://www.togetherforshortlives.org.uk/professionals/resources">www.togetherforshortlives.org.uk/professionals/resources</a>   |

**TABLE 2** (opposite and above) E-learning in neonatal care: selected open access web-based resources.

Key: ADC = Archives of Disease in Childhood; HEAT = Health Education and Training; WHO = World Health Organization; COINN = Council of International Neonatal Nurses; NNA = Neonatal Nurses Association; BAPM = British Association of Perinatal Medicine; NICE = National Institute for Health and Clinical Excellence; RCOG = Royal College of Obstetricians and Gynaecologists.

and families first hand. In addition, the resources are separate from those provided for sole use by students taking formal programmes of study within HEIs.

### Books

Neonatal books are available for purchase – the majority are now in electronic form, often at a reduced price. Some extracts are available free of charge. Selecting a book for reference purposes should be gauged by country of work as practice points and units of measurement may differ. It must be remembered that books will not have the most current research due to the time period necessary to complete publication.

### Journals

Journal subscriptions offer a more up-to-date view of the neonatal field including recent innovations and work. Printed or online subscriptions are available and some journals are given through membership of an association (eg members of the British Association of Perinatal Medicine receive *Infant* and have free online access to articles). Some journals offer back issues

free of charge (eg *Infant*, *Archives of Disease in Childhood*, *International Journal of Epidemiology*). All residents of the UK can access The Cochrane Library for free; at the time of writing, there are 305 systematic reviews listed in neonatal-specific topics.

### Accredited programmes

Accredited programmes of study usually have an associated cost. There are no UK-based courses/accredited resources in neonatal care. Those that do exist are based mainly within the USA, eg modules developed by March of Dimes and the National Association of Neonatal Nurses (NANN)<sup>27</sup>. The USA-based journal *Neonatal Network* has a series of continuing education topics that can be completed and submitted as part of subscription to the journal. Free learning modules are available to resource-limited countries<sup>28</sup>, such as those from Save the Children and the World Health Organization (WHO). The free-to-access Health Education and Training (HEAT) programme, created by the UK Open University and developed in partnership

with African health experts, covers a range of neonatal topics via modules on the OpenLearn website (**TABLE 2**).

### E-learning

Without a doubt, the use of technology enabled (TE) learning through online and/or computer-assisted platforms can accommodate different needs and work patterns. TE learning can either replace or blend with classroom-based teaching and learning within all spheres of higher education, including health<sup>11</sup>. Certainly within higher education, the place for learning technology is rapidly growing and can be a cost effective means of teaching<sup>10</sup>. In health, e-learning has become increasingly essential and the body of literature to support this is expanding<sup>29,30</sup>. However the development and use of e-learning in neonatal care is limited. The UK National Screening Committee's Continuing Professional Development website for England has e-learning, open access tools on various topics around newborn screening that can be accessed via free registration. Another





**FIGURE 1** Knowledge for neonatal nursing practice: a neonatal learning tool. An example of the contents of a unit. Available from: [www.cetl.org.uk/learning/neonatal/neonatal\\_care.html](http://www.cetl.org.uk/learning/neonatal/neonatal_care.html). Developed by Julia Petty and Natasa Perovic.

tool, written and developed by the author and Natasa Perovic (Learning Technologist), is a web-based neonatal-specific, open access, learning tool that comprises various distinct units (**FIGURE 1**). The tool was developed to harness the six core elements of self-directed learning theory outlined in **TABLE 1** (self-direction, experience, readiness, orientation and motivation to learn and relevance). Each unit contains learning objectives, 'think points', information slides incorporating a range of multimedia, reference lists, suggested further reading, fact sheets and interactive quizzes with feedback (**FIGURE 1**).

### Websites

There are numerous websites that can be accessed through any search engine but caution should be taken to identify reputable sites that are preferably endorsed and nationally agreed/available. **TABLE 2** details specific sites that serve to relay evidence-based, nationally agreed, UK-based information and guidelines. In addition, international sites are included with general useful information combining the use of multimedia. Again, learners should always bear in mind the contextual relevance of any site and whether it applies to their own workplace.

### Family/parent resources

Health professionals can learn much from websites aimed at parents and families.

**TABLE 2** lists those where guidelines and information can be freely downloaded.

### Mobile applications

Finally, in the age of innovation in mobile learning, 'apps' are emerging that are available, either free of charge or for a small cost, for use on smart phones and tablets. Neonatal-specific apps to date, tend to be brief calculation-based tools designed to work out drug calculations and tube sizes for use at the bedside. The majority of these are USA-based and again this must be considered when referring to any practice guideline. There is a useful quiz-based application focusing on theory, with questions and answers on a range of neonatal topics (Neonatal Nurse®). Another UK-developed application designed for use at the bedside (NeoCalc®), uses a neonate's weight to calculate and assist in a range of specific procedures, eg endotracheal tube length, fluid requirements and emergency drugs. Using mobile phones at the bedside may be questionable but away from the clinical area, these tools may serve as a useful reminder of specific facts and procedures.

### Conclusion

There is an important need for those working with neonatal populations and their families to keep abreast of current knowledge. Skills, of course, are best learnt within the clinical area and by simulated learning in practice-based training. But, in

relation to the theory of neonatal care, knowing where to access subject-specific knowledge can be difficult, as is identifying what resources are of most value to enhance knowledge. This article highlights a number of useful and accessible resources to broaden life-long learning within this specialty. However, it is clear that there is a real need for further development of more open access resources for the neonatal specialty that fulfill the needs of self-directed learning in a flexible and innovative way.

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