



## Exploring The Advanced Role Of Nursing In Ophthalmology.

Ali Khalaf Ali Almutairi <sup>1\*</sup>, Abeer Khalif Al-Anazi <sup>2</sup>, Nuwayir Dhaifallah Alotaibi<sup>3</sup>, Malik Nasser Alghamdi<sup>4</sup>, Misfer Shaya Ali Aldosari<sup>5</sup>, Norah Jaber Alasmari<sup>6</sup>, Amani Gassim Khormi<sup>7</sup>, Ahmed Ibrahim Mohammed Habadi <sup>8</sup>, Hasana Alaswad Katey Alanazi<sup>9</sup>, Wardh Aoun Awdh Alharthi<sup>10</sup>, Fatima Awether Gathwan Alshammri<sup>11</sup>, Jaber Nashmi Eid Aldhafeeri<sup>12</sup>, Hatem Shabbab Almutairi<sup>13</sup>, Mashaal Farhan Alruwaili<sup>14</sup>, Arwa Wadman Alsahey<sup>15</sup>

<sup>1\*</sup>,<sup>2,3,4,5,6,7,8,9,10,11,12,13,14,15</sup>Ksa , ministry of health

### Abstract:

Advanced practice nursing in ophthalmology holds promise for addressing the increasing demand for eye care services globally. This paper examines the role and impact of ophthalmic nurse practitioners in managing chronic eye conditions and providing emergency eye care. Drawing on studies from various countries, including Australia, New Zealand, and South Africa, the effectiveness of nurse-led clinics in expanding workforce capacity, improving patient satisfaction, and optimizing healthcare resource utilization is highlighted. Despite the potential benefits, challenges such as role ambiguity and varying perceptions among healthcare professionals hinder the full realization of ophthalmic nurse practitioners' potential. Standardizing roles, enhancing interdisciplinary collaboration, and promoting education and awareness are essential steps to overcome these challenges. Overall, ophthalmic nurse practitioners play a crucial role in preventing avoidable blindness, improving patient outcomes, and enhancing healthcare system efficiency. By leveraging their specialized skills, knowledge, and autonomy, ophthalmic nurse practitioners contribute significantly to meeting the evolving needs of patients with eye conditions, thereby advancing the field of ophthalmic nursing, and enhancing the overall quality of eye care services.

**Keywords:** Advanced practice nursing, ophthalmology, nurse-led clinics, nurse practitioner, eye care services.

### Introduction:

The International Council of Nurses (ICN, 2020) defines advanced practice nursing as a higher level of healthcare delivery in which skilled nurses, functioning at an advanced level, have an impact on clinical healthcare outcomes while providing direct healthcare services to individuals, families, and communities. According to the Finnish Nurses Association, the acronym APN has two functions: it refers to the professional field of advanced practice nursing as well as the individual practitioner (FNA, 2016). It is a broad framework that includes various jobs that are common around the world, like the Clinical Nurse Specialist (CNS) and Nurse Practitioner (NP) (Jokiniemi et al., 2020). But the development of these positions varies from country to country, which results in differences in the range of practice, duties, requirements for entry, and borders within the profession (ICN, 2020). In addition, there is uncertainty in the field due to the variety of job names (Jokiniemi et al., 2020).

A panel of experts was assembled in 2013 by the board of the Finnish Nurses Association with the goal of clarifying the global meaning of advanced practice nursing in the context of Finland. In addition to defining advanced practice nursing (APN), the committee also defined position descriptions and terminology, and established training requirements and competency standards for aspiring APNs working in Finnish healthcare settings (FNA, 2016). The development of advanced practice nursing becomes extremely important when considering the numerous issues that healthcare systems face, such as lengthy wait times, poor service accessibility, a shortage of doctors, and rising expenses. By maximizing the use of advanced education, extensive nursing expertise, and specific abilities, advanced practice nurses can effectively handle these difficulties when they are integrated into organizational frameworks (Jokiniemi et al., 2020). Ansah et al. (2019) state that as people age, the incidence of chronic eye conditions increases, which means that there is a global need for ocular healthcare services as a result of demographic aging. Carefully planned eye care services are essential, especially for older adults, as poor vision can lead to a lower quality of life and make it more difficult to live independently. As such, this situation could increase the costs associated with healthcare and put more strain on family caregivers. Insufficient planning of service delivery to meet the increasing demand could worsen morbidity, increase waiting times, prolong unmet healthcare needs, and lower the quality of care.

The advanced practice nurse's function in Finnish ophthalmic units is still relatively new, in contrast to established norms. However, some qualified nurses carry out advanced clinical treatments such as intravitreal injections. Early in 2014, Helsinki University Hospital (HUS) began training registered nurses in intravitreal injection delivery. Initially, these nurses trained alongside physicians; however, at this point, trained nurses administer most injections (Ahvenniemi & Pessinen, 2020). On the other hand, advanced nursing positions are well-established in the healthcare system in Britain. The nursing staff of London's Moorfields Eye Hospital is highly qualified, having usually completed a bachelor's or

master's degree. A portion of these skilled nurses perform sophisticated treatments such as YAG laser capsulotomies and small eyelid operations (Feeney et al., 2010). Similar to this, Australia has embraced the role of the advanced practice nurse in ophthalmology, with nurse practitioners taking on duties from specialist postoperative care to preoperative assessment of visually debilitating cataracts. This has resulted in positive outcomes such as shorter wait times, increased patient satisfaction, and more economical service delivery (Kirkwood et al., 2006).

The diverse range of duties that are inherent in the advanced practice nurse position in ophthalmology highlight the role's adaptability and importance. The growth of advanced nursing positions has wider consequences, not just in terms of improving healthcare or society as a whole but also in terms of preserving the appeal of the nursing profession. Professional fulfillment and job satisfaction are increased when there are opportunities for clinical growth with corresponding responsibilities (FNA, 2016). Advanced practice nurses expressed greater confidence in themselves as a result of greater autonomy and responsibility in patient care and treatment in a study by Wisur-Hokkanen et al. (2015). Advanced practice nursing began in the middle of the 20th century in the United States and then spread to English-speaking countries such as Canada, the United Kingdom, and Australia. But in the Nordic nations—including Finland—the development of advanced practice nursing began somewhat later and picked up speed in the early 2000s (Finnish Nurses Association, 2016; Sheer & Wong, 2008). The need for specialist healthcare, especially in neglected rural areas with a shortage of physicians, led to the emergence of advanced practice nursing (Lowe et al., 2012). However, long-term issues remain such as the lack of doctors, lengthy wait times for medical care, and the increasing needs of patients with chronic illnesses for care (Finnish Nurses Association, 2016; Lowe et al., 2012). The 2016 report from the Finnish Nurses Association emphasizes how new positions in nursing are necessary to meet the population's changing healthcare requirements, improve healthcare accessibility, and provide high-quality, affordable care. At the same time, the healthcare industry struggles with difficulties related to nursing staff availability, retention, and recruitment. Although there are still not many advanced roles held by nurses worldwide, the implementation of advanced practice nursing and related roles offers a novel approach to increase the appeal of the nursing profession, especially by providing more opportunities for career progression in clinical settings.

#### **Nursing Practice:**

According to the International Council of Nurses (2020), an advanced practice nurse is a healthcare practitioner who possesses a greater degree of autonomy, abilities, and responsibilities than a generalist nurse. According to the Finnish Nurses Association (2016), advanced practice nurses are clinical nurses who have specialized in a particular area and are able to use research findings to create evidence-based practices. Different nations have different positions that are recognized for advanced practice nurses; the most prevalent roles are nurse practitioners, clinical nurse specialists, nurse anesthetists, and nurse midwives. Although all of these roles are recognized in the United States, other countries mainly recognize clinical nurse specialists and nurse practitioners (Sheer & Wong, 2008). Compared to the nurse practitioner function, the clinical nurse specialist role was first introduced as an advanced nursing post in Finland (Jokiniemi, Heikkilä, et al., 2022). The responsibilities of nurse practitioners and clinical nurse specialists in advanced practice nursing are primarily examined in this review. Clinical Nurse Specialist: In advanced practice nursing, one of the most well-known positions is that of the clinical nurse specialist (CNS). Capable of providing complex, specialized care, the CNS improves the standard of medical care. The function includes indirect aspects like research, education, and nurse assistance in addition to direct patient care. As a result of their increased critical thinking and decision-making abilities, CNSs frequently take on a more extended role in enacting improvements and changes within healthcare systems, evaluating the effects of numerous elements on nursing care (International Council of Nurses, 2020). A graduate degree (master's or doctorate) is normally required for preparation for the CNS function; however, due to differing titles and qualifications, it can be difficult to discern between clinical nurse specialists and specialized nurses globally (International Council of Nurses, 2020).

Nurse Practitioner: A nurse practitioner (NP) is a generalist nurse with a master's or doctoral degree who works independently as a clinician. NPs are prepared to provide treatment to a wide range of patients, mainly in primary care settings but also in ambulatory and home care settings. NPs base their practice on guidelines and nursing principles, emphasizing patient-centered and comprehensive treatment with an emphasis on patient education, health promotion, and prevention. However, due to differences in legislation, the NP role's extent differs throughout nations. NPs are authorized to independently diagnose, order and interpret laboratory tests, administer medications, and coordinate patient care in a number of English-speaking countries, including the USA and New Zealand (International Council of Nurses, 2020). International Council of Nurses (2020) states that while NP education requirements vary by country, a master's degree is usually considered the minimum entry level. This is supplemented by specific studies encompassing advanced physical assessment, clinical reasoning, pharmacology, and leadership, in addition to supervised clinical practice.

#### **Nursing Outcomes:**

According to a scoping analysis by Maier et al. (2016), nurse practitioners have the ability to safely provide up to 93% of primary care services, demonstrating their ability to fulfill unmet healthcare requirements. Although this study focuses on primary care, it highlights how nurse practitioners can help ease the burden on healthcare systems that are facing an increase in patients who are chronically ill, staffing shortages, and lengthy wait times (Finnish Nurses Association, 2016; Lowe et al., 2012; Maier et al., 2016). The study conducted by Wisur-Hokkanen et al. (2015) investigated the elements that contributed to the growth of advanced practice nursing (APN) in Finland. The findings indicated that the participants

were able to provide more comprehensive care and gained more profound understanding of their patients' health statuses through careful observation and listening. Participants' increased self-assurance made it possible for them to provide colleagues with consultation support, especially in urgent circumstances. Although they provide less direct patient care than nurse practitioners, clinical nurse specialists are essential to healthcare organizations because they support evidence-based practices, coordinate care for patients with complex needs, encourage inter-unit collaboration, and improve information flow (Jokiniemi, Heikkilä, et al., 2022; Jokiniemi, Kärkkäinen, et al., 2022).

Patients are very satisfied with advanced practice nurses' services; in fact, some patient groups even say they prefer them to doctors, especially when the advanced practice nurses spend more time interacting with patients (Wisur-Hokkanen et al., 2015; Eriksson et al., 2017). Unlike doctors' offices, where patients frequently feel hurried, advanced practice nurses are seen by patients as truly attentive and engaged in their well-being. Furthermore, improved patient experiences are a result of advanced practice nurses' accessibility, which includes lower appointment wait times (Eriksson et al., 2017). According to Woo et al. (2020), there is broad consensus regarding the advantages of having more advanced practice nurses (APNs) in the healthcare system. These advantages include improved care effectiveness, patient-centricity, shorter wait times, cost-effectiveness, safety, and equity. Despite these favorable opinions, there was little real interest in advanced practice nursing among registered nurses. This was mostly because supervisors did not support the role's fit and raised doubts about the necessary schooling.

### **Ophthalmic Nursing:**

Ophthalmology is a distinctive medical specialty because of its wide patient base, which includes everyone from old people to premature infants. Ophthalmology patients require care for a range of reasons, such as injuries, acute or chronic illnesses, and the need for rehabilitation (Shaw & Lee, 2017). According to the 2019 World Health Organization (WHO) study, eye disorders are common and impact almost everyone at some point in their lives. According to estimates, at least 2.2 billion individuals worldwide are blind or visually impaired, and about 1 billion of these instances are avoidable (World Health Organization, 2019). Between 50,000 and 60,000 people in Finland are thought to be visually impaired; the elderly, particularly those 85 years of age and beyond, make up the majority of those affected. Age-related macular degeneration, genetic retinal dystrophies, and diseases of the optic nerve and visual pathways are the most common eye conditions in Finland (Finnish Federation of the Visually Impaired, 2021). Likewise, age-related macular degeneration, cataracts, diabetic retinopathy, glaucoma, and uncorrected refractive errors are among the internationally acknowledged causes of visual impairment (World Health Organization, 2022). It is important to remember, nevertheless, that not all eye disorders result in vision impairment, and figures of the worldwide prevalence of people who have at least one eye illness are still elusive (World Health Organization, 2019).

The lack of qualified medical personnel is one of the main obstacles to guaranteeing the provision of sufficient eye care services. The WHO data from 2019 states that high-income countries use eye care services more frequently than low- and middle-income countries. A number of factors, such as accessibility, price, acceptability, and availability, affect how often people use eye care services. Healthcare workers who are not medical doctors, such as optometrists and ophthalmic nurses, are essential in the management of many eye disorders. One viable strategy for extending the reach of health care is the establishment of nurse-led clinics. In a nurse-led clinic for Indigenous Australians, Atkinson-Briggs et al. (2022) investigated patient adherence to national eye screening recommendations and the coverage of diabetes eye screenings. The majority of Indigenous Australians live outside of large cities, which increases their risk of diabetes. For this reason, the nurse-led clinic combined eye screening with tailored diabetes education based on screening findings. The results indicated that nurse-led interventions were helpful in improving the accessibility of eye care and the adherence to screening protocols among vulnerable populations. They also demonstrated improved patient adherence and achieved adequate coverage for eye screenings.

In addition to having a thorough understanding of the many eye conditions and their treatments, ophthalmic nurses must also be knowledgeable about other medical specialties like oncology, neurology, endocrinology, and rheumatology because these fields treat diseases that can cause symptoms in the eyes. Advanced practice ophthalmic nurses take on patient groups to manage, such as patients with cataracts, ocular crises, or stable glaucoma. Because patients with eye diseases come across a wide range of age demographics, ophthalmic nursing has certain qualities that distinguish it apart from other specializations. In addition to having the information and abilities required to provide successful care for people with visual impairments, ophthalmic nurses must also be skilled at meeting the needs of different age groups, especially those of children and the elderly (Shaw & Lee, 2017).

Patients, particularly those with chronic or incurable eye disorders like wet age-related macular degeneration, may experience severe stress when faced with the possibility of losing their vision. Efficient nursing care is essential to reducing patient anxiety during the course of treatment. Emfors et al. (2017) emphasized the significance of providing patients with courteous and stimulating nursing care, in which ophthalmic nurses enhance patient confidence and well-being by encouraging patient participation in treatment planning and decision-making processes. Shaw and Lee (2017) outline the range of ophthalmic nursing responsibilities in the British healthcare system in a number of contexts, such as wards, day surgery units, emergency clinics, and outpatient clinics. Conjunctival swabs, suture removal, contact lens manipulation, eye drop administration, dry eye testing, bandaging, taking visual acuity readings, doing ocular examinations with torches or slit lamps, extracting foreign bodies from the eye, irrigating the eye, and performing minor surgical procedures are just a few of the many tasks that fall under this broad category. In order to determine whether there are any underlying medical issues causing symptoms related to the eyes, ophthalmic nurses may also be engaged in

taking vital signs and performing laboratory testing. Furthermore, essential nursing duties including obtaining a patient's history, educating them, and promoting their health are equally important parts of providing ophthalmic nursing care.

The literature in Finland is largely focused on nurse-led intravitreal injection services, which are more in line with specialist nursing duties than advanced practice nursing. As a result, the function of advanced practice nurses in ophthalmology is still largely unknown. The Finnish Nurses Association (2016) outlined the educational prerequisites and job descriptions for advanced practice nurses and specialists, but because advanced nursing positions are not legally recognized, it is still unclear in practice how these two professions differ from one another. As such, it is up to each organization to decide what nursing positions they use and what titles they assign to them (Jokiniemi et al., 2020). In order to better understand the roles, importance, and developmental requirements of clinical nurse specialists at HUS Helsinki University Hospital, Viholainen (2018) carried out qualitative research. According to the study, clinical nurse specialists play six primary roles: they develop nursing, participate in nursing operational strategies, educate, research, support, and collaborate. The fact that none of the participants provided direct patient care is noteworthy and highlights the idea that the primary goals of a clinical nurse specialist are to develop evidence-based practices and improve nursing care. Over the course of several years, nations like the United Kingdom have made progress in expanding the role of advanced practice nurses in ophthalmology. Apart from the conventional tasks of advanced practice nurses, the function of an ophthalmic nurse practitioner has become more significant, especially when it comes to the management of eye disorders such as melanocytic uveal tumors that require continuous monitoring. In a clinical trial, Sandinha et al. (2012) built a nurse-led ocular oncology unit with highly qualified nurses who have a great deal of experience in ophthalmology. Specialized training in eye examination techniques and diagnostic processes was provided to the lead nurse. Patients expressed great satisfaction with the nurse-led care, and ophthalmologists' workload reduced. Nevertheless, there were difficulties, such as a shortage of patients because of strict selection standards and the uneven participation of ophthalmic nurse practitioners in ocular oncology clinics—some of which had ophthalmologists working alone.

Another ailment that requires long-term management is diabetes, which places a heavy burden on ophthalmic units because diabetics must have regular eye exams. The increasing incidence of diabetes in Australia has resulted in a burden on ophthalmic settings, which has led to the creation of nurse-led screening clinics for diabetic retinopathy. In a research by Kirkwood et al. (2006), patients who were scheduled for yearly diabetic eye exams had thorough eye assessments performed by ophthalmic nurse practitioners. The ophthalmic history was taken, intraocular pressure and visual acuity were measured, anterior segment inspections were performed, and fundal checks were performed to identify diabetic retinopathy. Additionally, patients received education regarding the significance of controlling their blood sugar levels and scheduling follow-up appointments as needed. More complex patients were sent to ophthalmologists; however, some patients were handled inside the nurse-led clinic. The continuity of nurse-led clinics was assisted by high concordance in diabetic retinopathy assessment between ophthalmologists and ophthalmic nurse practitioners.

Global ophthalmology difficulties are seen in a variety of healthcare systems, including lengthy waiting lists and a paucity of workers. The glaucoma clinical nurse specialist post was established in a large metropolitan hospital in New Zealand in response to the growing glaucoma waiting lists, as reported by Slight et al. (2009). Using preset criteria, the clinical nurse specialist triaged patients referred for an initial expert glaucoma assessment. The nurse specialist not only evaluated new patients but also handled stable glaucoma or glaucoma suspect cases, which allowed ophthalmologist appointments to be freed up. The introduction of the nurse specialist role resulted in shorter waiting lists; however, its influence was less pronounced in instances that were more complex and required referral to consultant clinics. However, the clinical nurse specialist's responsibilities go beyond shortening wait times for patients; they also facilitate individualized patient and family education, promote treatment compliance, provide favorable health results, and maximize the use of healthcare resources.

A vital role in emergency eye care settings can be played by ophthalmic nurse practitioners, in addition to managing chronic eye problems. In 2005, Kirkwood and colleagues set up a nurse-run emergency eye clinic at Flinders Medical Centre in Adelaide, South Australia, with the goal of increasing the capacity of clinical services and reducing the strain of ophthalmologists. The prescription of eye drugs and the ordering of laboratory tests were added to the clinic's original scope of service, which was established by senior ophthalmology personnel. Later, after receiving specialized training, it was expanded to include the use of topical steroids and corneal scraping. Comprehensive evaluations were carried out by ophthalmic nurse practitioners, who also performed supplementary exams as necessary. These assessments included visual acuity evaluations, slit-lamp examinations of the anterior segment, and thorough patient histories. In addition to evaluating and treating a range of ocular disorders, including trichiasis, dry eyes, and allergic conjunctivitis, they also offered patient education and promoted good health. The benefits of nurse-led clinics were emphasized in the study, which included increased workforce capacity, improved emergency eye care accessibility, and cost-effectiveness as comparison to junior registrar involvement.

Furthermore, Kyriacos et al. (2009) highlighted the critical role that ophthalmic nurse practitioners play in reducing preventable blindness, especially in Western Cape, South Africa's tertiary-level hospitals. The goal of the study was to address the lack of clarity regarding the scope and capabilities of ophthalmic nurse practitioners by examining the clinical skills required for this role. Regarding more specialist abilities, such as performing a diagnostic B-scan and managing corneal rust rings, respondents differed, despite agreement on basic competence like obtaining patient histories and educating patients. Remarkably, compared to ophthalmologists and other nurse practitioners, residents, nurse managers, and technicians indicated greater concern about the role of the ophthalmic nurse practitioner. This could be because they were unaware of the full extent of the role. Underutilizing the wide range of skills that nurse practitioners possess can

limit the development of their roles as well as the optimization of patient care quality, higher throughput of patients, decreased waiting times, and the release of ophthalmologists from some of their fundamental examination obligations. Thus, improving the skill set of ophthalmic nurse practitioners is crucial to improving patient care and making the most use of healthcare resources.

### Conclusion:

In conclusion, the role of advanced practice nurses in ophthalmology represents a significant opportunity to enhance healthcare delivery, particularly in addressing the growing demands for eye care services worldwide. From managing chronic eye conditions to providing emergency eye care, ophthalmic nurse practitioners play a crucial role in improving access to high-quality care, reducing waiting times, and optimizing healthcare resource utilization. Studies from various countries, including Australia, New Zealand, and South Africa, highlight the effectiveness and benefits of nurse-led clinics in expanding workforce capacity, increasing patient satisfaction, and promoting cost-effective care delivery. However, challenges persist in fully realizing the potential of advanced practice nurses in ophthalmology. Issues such as role ambiguity, limited recognition of advanced nursing roles in legislation, and varying perceptions among healthcare professionals regarding the scope of practice hinder the optimal utilization of ophthalmic nurse practitioners. Addressing these challenges requires concerted efforts to define and standardize the roles of advanced practice nurses, enhance interdisciplinary collaboration, and promote education and awareness among healthcare stakeholders. Overall, the evidence suggests that advanced practice nurses in ophthalmology are well-positioned to contribute significantly to the prevention of avoidable blindness, improved patient outcomes, and enhanced healthcare system efficiency. By leveraging their specialized skills, knowledge, and autonomy, ophthalmic nurse practitioners can play a vital role in meeting the evolving needs of patients with eye conditions, thereby advancing the field of ophthalmic nursing, and enhancing the overall quality of eye care services.

### References:

1. Åbo Akademi University. (2022). *Ethical Assessment*. Åbo Akademi University Intranet. <https://abofi.sharepoint.com/sites/intra-en-research/SitePages/Ethical-assessment.aspx>
2. Ahvenniemi, T., & Pessinen, K. (2020). *HUSin silmätautien verkkokalvopoliklinikan hoitajavastaanotto- ja injektiohoitajatodistuksen uudistaminen* [Bachelor's thesis]. Turku University of Applied Sciences.
3. Ansah, J. P., Koh, V., De Korne, D., Jayabaskar, T., Matchar, D. B., & Quek, D. (2019). Modeling manpower requirement for a changing population health needs: The case of ophthalmic nurses and allied health ophthalmic professionals. *Health Policy and Technology*, 8(3), 282–295. <https://doi.org/10.1016/j.hlpt.2019.08.004>
4. Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology*, 8(1), 19–32. <https://doi.org/10.1080/1364557032000119616>
5. Atkinson-Briggs, S., Jenkins, A., Ryan, C., Brazionis, L., & the Centre of Research Excellence in Diabetic Retinopathy Study Group. (2022). Mixed diabetic retinopathy screening coverage results in Indigenous Australian primary care settings: A nurse-led model of integrated diabetes care. *Journal of Advanced Nursing*, 78(10), 3187–3196. <https://doi.org/10.1111/jan.15163>
6. Bubb, L., Mathews, D., Oehring, D., & Harper, R. A. (2021). Ophthalmic nurse practitioner assessment of glaucoma: Evaluating agreement within an initiative to enhance capacity in glaucoma clinics. *Eye*, 35(12), 3258–3265. <https://doi.org/10.1038/s41433-021-01394-4>
7. DaCosta, J., Hamilton, R., Nago, J., Mapani, A., Kennedy, E., Luckett, T., Pavesio, C., & Flanagan, D. (2014). Implementation of a nurse-delivered intravitreal injection service. *Eye*, 28(6), 734–740. <https://doi.org/10.1038/eye.2014.69>
8. Dunlop, N., Ting, M., Rose, G., Baduna, J., & Ezra, D. (2020). Pilot study of a nurse-led adult lacrimal clinic at a tertiary ophthalmic centre. *British Journal of Nursing (Mark Allen Publishing)*, 29(22), 1341–1347. <https://doi.org/10.12968/bjon.2020.29.22.1341>
9. Emsfors, Å., Christensson, L., & Elgán, C. (2017). Nursing actions that create a sense of good nursing care in patients with wet age-related macular degeneration. *Journal of Clinical Nursing*, 26(17–18), 2680–2688. <https://doi.org/10.1111/jocn.13749>
10. Eriksson, I., Lindblad, M., Möller, U., & Gillsjö, C. (2018). Holistic health care: Patients' experiences of health care provided by an Advanced Practice Nurse. *International Journal of Nursing Practice*, 24(1), e12603. <https://doi.org/10.1111/ijn.12603>
11. Feeney, Á., Brookes, C., & Gibbons, H. (2010). Where the eyes have it. *Nursing Standard*, 24(18), 62–63. <https://doi.org/10.7748/ns2010.01.24.18.62.p4311>
12. Finnish Federation of the Visually Impaired. (2021). *The Finnish Register of Visual Impairment. Annual Statistics 2021*. <https://www.nkl.fi/fi/nakovammarekisteri>
13. Finnish National Board on Research Integrity TENK. (2023). *Responsible conduct of research and procedures for handling allegations of misconduct in Finland. Guidelines of the Finnish Advisory Board on Research Integrity 2012*. <https://tenk.fi/en/research-misconduct/responsibleconduct-research-rcr>
14. Finnish Nurses Association. (2016). *New roles for nurses – quality to future social welfare and health services* [Report]. [https://www.nurses.fi/nursing\\_and\\_nurse\\_education\\_in\\_f/advanced-roles-for-nurses/](https://www.nurses.fi/nursing_and_nurse_education_in_f/advanced-roles-for-nurses/)
15. Gallagher, M.-J. (2017). Introduction of a nurse-led intravitreal injection service in ophthalmology. *British Journal of Nursing*, 26(14), 800–803. <https://doi.org/10.12968/bjon.2017.26.14.800>

16. Hasan, H., Flockhart, S., Qureshi, W., Khan, S., Ahmed, S., & Shah, N. (2017). Intravitreal injections service: A patient experience evaluation. *British Journal of Nursing*, 26(12), 678–682. <https://doi.org/10.12968/bjon.2017.26.12.678>
17. Hasan, H., Mamtora, S., & Shah, N. (2020). Setting up a successful nurse-led intravitreal injections service: Pearls from Swindon. *British Journal of Nursing*, 29(20), 1178–1185. <https://doi.org/10.12968/bjon.2020.29.20.1178>
18. Hughes, F. (2020). Spotlight on: Diana Malata: “Nurse-led initiatives can reduce costs and waiting times.” *World of Irish Nursing and Midwifery*, 28(8), 21–21.
19. HUS. (2022). *Tutkimus ja opetus. Tutkijan ohjeet*. <https://www.hus.fi/tutkimus-ja-opetus/tutkijanohjeet>
20. International Council of Nurses. (2020). *Guidelines of advanced practice nursing* [Report]. <https://www.icn.ch/publications>
21. Jokiniemi, K., Heikkilä, A., Meriläinen, M., Junttila, K., Peltokoski, J., Tervo-Heikkinen, T., Mattila, E., & Mikkonen, S. (2022). Advanced practice role delineation within Finland: A comparative descriptive study. *Journal of Advanced Nursing*, 78(6), 1665–1675. <https://doi.org/10.1111/jan.15074>
22. Jokiniemi, K., Kärkkäinen, A., Korhonen, K., Pekkarinen, T., & Pietilä, A. (2022). Outcomes and challenges of successful clinical nurse specialist role implementation: Participatory action research. *Nursing Open*, nop2.1336. <https://doi.org/10.1002/nop2.1336>
23. Jokiniemi, K., Suutarla, A., Meretoja, R., Kotila, J., Axelin, A., Flinkman, M., Heikkinen, K., & Fagerström, L. (2020). Evidence-informed policymaking: Modelling nurses’ career pathway from registered nurse to advanced practice nurse. *International Journal of Nursing Practice*, 26(1). <https://doi.org/10.1111/ijn.12777>
24. Kirkwood, B. J. (2012, September). Alternative pathways to ophthalmic care: Advanced nursing perspective. *Insight: The Journal of the American Society of Ophthalmic Registered Nurses*, 37(3), 5–10.
25. Kirkwood, B. J., Coster, D. J., & Essex, R. W. (2006). Ophthalmic nurse practitioner led diabetic retinopathy screening. Results of a 3-month trial. *Eye*, 20(2), 173–177. <https://doi.org/10.1038/sj.eye.6701834>
26. Kirkwood, B. J., Pesudovs, K., Latimer, P., & Coster, D. J. (2006). The efficacy of a nurse-led preoperative cataract assessment and postoperative care clinic. *Medical Journal of Australia*, 184(6), 278–281. <https://doi.org/10.5694/j.1326-5377.2006.tb00237.x>
27. Kirkwood, B. J., Pesudovs, K., Loh, R. S., & Coster, D. J. (2005). Implementation and evaluation of an ophthalmic nurse practitioner emergency eye clinic. *Clinical and Experimental Ophthalmology*, 33(6), 593–597. <https://doi.org/10.1111/j.1442-9071.2005.01101.x>
28. Kyriacos, U., Scheepers, L. D., Hill, E. W., & Jordan, S. (2009). Clinical skills required of ophthalmic nurse practitioners in tertiary level public hospitals in the Western Cape Province. *Curationis*, 32(3), 22–29. <https://doi.org/10.4102/curationis.v32i3.1220>
29. Lowe, G., Plummer, V., O’Brien, A. P., & Boyd, L. (2012). Time to clarify - the value of advanced practice nursing roles in health care: The value of advanced practice nursing roles in health care. *Journal of Advanced Nursing*, 68(3), 677–685. <https://doi.org/10.1111/j.1365-2648.2011.05790.x>
30. Machin, H. (2017). Celebrating the Diverse Roles of Pacific Island Ophthalmic Nurses and Technicians. *Insight: The Journal of the American Society of Ophthalmic Registered Nurses*, 42(1), 15–21.
31. Maier, C. B., Barnes, H., Aiken, L. H., & Busse, R. (2016). Descriptive, cross-country analysis of the nurse practitioner workforce in six countries: Size, growth, physician substitution potential. *BMJ Open*, 6(9), e011901. <https://doi.org/10.1136/bmjopen-2016-011901>
32. Mapani, A. (2013). Implementing a shared care medical retina sub-speciality. *Nurse Prescribing*, 11(6), 304–308. <https://doi.org/10.12968/npre.2013.11.6.304>
33. Ministry of Social Affairs and Health. (2021). *Kliinisen hoitotyön erikoisalut: Ehdotukset kliinisesti erikoistuneen sairaanhoitajan osaamisen kehittämiseksi*. <http://urn.fi/URN:ISBN:978-952-00-8428-8>
34. Moussa, G., Kalogeropoulos, D., Ch’ng, S. W., Panthagani, J., Abdel-Karim, Z., & Andreatta, W. (2023). “Comparing outcomes of advanced nurse practitioners to ophthalmologists performing posterior YAG capsulotomy, a six-year study of 6308 eyes.” *Eye*, 37(3), 554–559. <https://doi.org/10.1038/s41433-022-01986-8>
35. Munn, Z., Peters, M. D. J., Stern, C., Tufanaru, C., McArthur, A., & Aromataris, E. (2018). Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Medical Research Methodology*, 18(1), 143. <https://doi.org/10.1186/s12874-018-0611-x>
36. Peters, M. D. J., Godfrey, C., McInerney, P., Munn, Z., Tricco, A. C., & Hanan, K. (2020). Chapter 11: Scoping reviews. In *JBI Manual for Evidence Synthesis*. JBI. <https://doi.org/10.46658/JBIMES-20-12>
37. Peters, M. D. J., Marnie, C., Colquhoun, H., Garritty, C. M., Hempel, S., Horsley, T., Langlois, E. V., Lillie, E., O’Brien, K. K., Tunçalp, Özge, Wilson, M. G., Zarin, W., & Tricco, A. C. (2021). Scoping reviews: Reinforcing and advancing the methodology and application. *Systematic Reviews*, 10(1), 263. <https://doi.org/10.1186/s13643-021-01821-3>
38. Raman, V., Triggol, A., Cudrnak, T., & Konstantinos, P. (2021). Safety of nurse-led intravitreal injection of dexamethasone (Ozurdex) implant service. Audit of first 1000 cases. *Eye*, 35(2), 388–392. <https://doi.org/10.1038/s41433-020-1114-7>
39. Rattanasirivilai, P., & Shirodkar, A. (2021). A study of the role and educational needs of ophthalmic specialist nurses. *British Journal of Nursing*, 30(14), 858–864. <https://doi.org/10.12968/bjon.2021.30.14.858>
40. Sandinha, T., Hebbar, G., Kenawy, N., Hope-Stone, L., & Damato, B. (2012). A nurse-led ocular oncology clinic in Liverpool: Results of a 6-month trial. *Eye*, 26(7), 937–943. <https://doi.org/10.1038/eye.2012.62>

41. Shaw, M. E., & Lee, A. (2017). *Ophthalmic Nursing* (Fifth edition). Routledge.
42. Sheer, B., & Wong, F. K. Y. (2008). The Development of Advanced Nursing Practice Globally. *Journal of Nursing Scholarship*, 40(3), 204–211. <https://doi.org/10.1111/j.1547-5069.2008.00242.x>
43. Simcock, P., Kingett, B., Mann, N., Reddy, V., & Park, J. (2014). A safety audit of the first 10 000 intravitreal ranibizumab injections performed by nurse practitioners. *Eye*, 28(10), 1161–1164. <https://doi.org/10.1038/eye.2014.153>
44. Slight, C., Marsden, J., & Raynel, S. (2009). The impact of a glaucoma nurse specialist role on glaucoma waiting lists. *Nursing Praxis in New Zealand Inc*, 25(1), 38–47.
45. Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., Moher, D., Peters, M. D. J., Horsley, T., Weeks, L., Hempel, S., Akl, E. A., Chang, C., McGowan, J., Stewart, L., Hartling, L., Aldcroft, A., Wilson, M. G., Garritty, C., ... Straus, S. E. (2018). PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Annals of Internal Medicine*, 169(7), 467–473. <https://doi.org/10.7326/M18-0850>
46. Viholainen, K. (2018). *Sairaanhoidajien laajavastuinen hoitotyön asiantuntijuus erikoissairanhoidossa* [Master's thesis]. University of Eastern Finland.
47. Wheeler, K. J., Miller, M., Pulcini, J., Gray, D., Ladd, E., & Rayens, M. K. (2022). Advanced Practice Nursing Roles, Regulation, Education, and Practice: A Global Study. *Annals of Global Health*, 88(1). <https://doi.org/10.5334/aogh.3698>
48. Winstanley, E., Carroll, V., Mander, G., Atkinson, D., & Gallagher, R. (2020). NHSBT Tissue and Eye Services: Nursing roles and responsibilities. *British Journal of Nursing*, 29(6), 374–375. <https://doi.org/10.12968/bjon.2020.29.6.374>
49. Wisur-Hokkanen, C., Glasberg, A.-L., Mäkelä, C., & Fagerström, L. (2015). Experiences of working as an advanced practice nurse in Finland—The substance of advanced nursing practice and promoting and inhibiting factors. *Scandinavian Journal of Caring Sciences*, 29(4), 793–802. <https://doi.org/10.1111/scs.12211>
50. Woo, B. F. Y., Zhou, W., Lim, T. W., & Tam, W. S. W. (2020). Registered nurses' perceptions towards advanced practice nursing: A nationwide cross-sectional study. *Journal of Nursing Management*, 28(1), 82–93. <https://doi.org/10.1111/jonm.12893>
51. World Health Organization. (2019). *World report on vision*. World Health Organization. <https://apps.who.int/iris/handle/10665/328717>
52. World Health Organization. (2022). *Blindness and vision impairment*. <https://www.who.int/newsroom/factsheets/detail/blindness-and-visual-impairment>