

Vezna sestra za prevenciju i kontrolu infekcija u akutnim bolnicama – opsežan pregled literature

Link nurse for infection prevention and control in acute hospitals - scoping review

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Sažetak

Uvod: Infekcije povezane sa zdravstvenom skrbi (IPZS) spadaju u najčešće štetne događaje u zdravstvu. Sprečavaju se različitim metodama, od kojih je jedna vezna sestra (VS) za prevenciju IPZS-a.

Metode: Pregledana je literatura u bazama PubMed, CINAHL i Google Scholar. Termini su bili „link nurse“, „liaison nurse“, „infection control“. Posljednji datum pregleda bio je 31. 1. 2024. godine. Uključeni su radovi iz akutnih bolnica. Radove su pregledala 2 koautora. Krihička procjena radova nije rađena.

Rezultati: U pregled je uključeno 65 radova (83 % iz razvijenih zemalja). Nađeno je 6 skupina tema: uloga, odgovornosti i kompetencije VS-a; osobne značajke; edukacija; uspostavljanje programa; evaluacija sustava i efekti djelovanja te liječnik kao veza za kontrolu infekcija.

Rasprava sa zaključkom: Vezna sestra (VS) uspostavljena je 1981. godine u SAD-u kao pomoć epidemiološkom odjelu prilikom praćenja IPZS-a; danas je rasprostranjena u mnogim zemljama. VS je sestra u smjenskom radu na odjelu koja poznaje specijalnost odjela, ima poseban interes za infekcije i u dijelu svojeg radnog vremena bavi se poslovima IPZS-a. Povezuje odjel i službu za prevenciju infekcija. Funkcija VS-a volonterska je. Osim znanja i vještina prevencije infekcija, VS mora imati i psihološke vještine za rad s ljudima i edukaciju odraslih osoba. VS educira bolnička služba za prevenciju IPZS-a; u svakodnevnoj praksi primjenjuje EBM standarde prevencije te služi kao model i izvor informacija za ostalo osoblje. Održivost sustava ovisi o podršci uprave bolnice, glavne sestre odjela, sestre za prevenciju IPZS-a i drugih veznih sestara u bolnici. Funkcioniranje programa otežavaju: premali broj i velika fluktuacija osoblja, neprioritetna kontrola infekcija, nedefinirana uloga VS-a, liječnikovo neprihvatanje VS-a i nedostatak povezanosti između VS-a na različitim odjelima za razmjenu iskustava. Iako nema mnogo radova o efektu VS-a u smanjenju IPZS-a u randomiziranim studijama, mnoge studije „prije-poslije“ pokazuju nesumnjivu vrijednost programa VS-a, a neke novije studije opisuju i ulogu liječnika kao veznog liječnika.

Ključne riječi: infekcije povezane sa zdravstvenom skrbi, prevencija, vezna sestra, edukacija

Kratki naslov: Vezna sestra za infekcije

Abstract

Introduction: Healthcare-associated infections (HAIs) are among the most common adverse events in healthcare. They are prevented by different methods, one of which is the link nurse (LN) for the prevention of HAI.

Methods: The literature was searched in PubMed, CINAHL and Google Scholar databases. The terms were „link nurse“, „liaison nurse“, and „infection control“. The last review date was January 31, 2024. Papers from acute hospitals are included. Papers were reviewed by 2 co-authors. No critical evaluation of the papers was done.

Results: The review included 65 papers (83% from developed countries). 6 groups of topics were found: roles, responsibilities and competencies of the LN; personal characteristics; education; program establishment; evaluation of the system and the effects of action and the physician as a link for infection control.

Discussion with conclusion: LN was established in 1981 in the USA as an aid to the epidemiological service in the monitoring of HAIs, and today is widespread in many countries. LN is a shift nurse who knows the specialty of the ward, has a special interest in infections, and deals with HAI tasks in part of her work time. She/he connects the ward and the infection prevention service. The LN function is voluntary. In addition to infection prevention knowledge and skills, she/he must also have psychological skills for working with people and adult education skills. The hospital's HAI prevention service educates her/him; applies EBM prevention standards in daily practice, and serves as a model and source of information for other staff. The system's sustainability depends on the support of the hospital administration, the head nurse of the ward, the nurse for the prevention of HAIs, and other LNs in the hospital. The program's effectiveness is hindered by various factors: insufficient staffing and high turnover, lack of emphasis on infection control, the undefined role of LN, doctors' reluctance to accept LN, and a lack of communication between staff in different wards to exchange experiences. Although there are not many papers on the effect of LN in reducing HAI in randomized studies, many „before-after“ studies show the undoubted value of the LN program, and some recent studies also describe the role of the physician as a link person.

Keywords: healthcare-associated infections, prevention, link nurse, education

Short title: Infection prevention link nurse

Uvod

Infekcije povezane sa zdravstvenom skrbi (IPZS) jedan su od najčešćih štetnih događaja u zdravstvu [1]. Javljuju se u bolesnika, posjetitelja i zdravstvenih radnika. Povećavaju morbiditet i mortalitet bolesnika, produljuju njihov boravak u bolnici te povećavaju cijenu liječenja. Svjetska zdravstvena organizacija (SZO) navodi u svojem izvješću za 2020. i 2021. godinu [2] da u akutnim bolnicama 7 % bolesnika u zemljama s visokim dohotkom (HIC) i 15 % u zemljama sa srednjim i niskim dohotkom (LMIC) razvije najmanje jedan IPZS tijekom boravka u bolnici. Čak do 30 % bolesnika u jedinicama intenzivnog liječenja (JIL) može dobiti IPZS, s tim da je incidencija u LMIC-u od 2 do 20 puta veća, osobito u novorođenčadi. U Europskoj zajednici i zemljama EEA, opterećenje koje uzrokuje 6 najčešćih IPZS-a dvaput je veće od opterećenja svih 32 zaraznih bolesti koje prati ECDC [3]. Prema podacima iz 2022. i 2023. godine prevalencija IPZS-a iznosila je 6,3 %, (95 % CI 5,3 – 7,4) [4], od toga je 29,3 % bilo infekcija respiratornog sustava, 19,2 % mokraćnog sustava i 16,1 % infekcija kirurškog mjesta.

Sprečavanje IPZS-a provodi se korištenjem različitih metoda. Bitna komponenta prema SZO-u jest postojanje nacionalnog programa za prevenciju i kontrolu infekcija koji se primjenjuje, lokalno prilagođen, u svakoj zdravstvenoj ustanovi [2, 5]. Prevencija IPZS-a u rukama je liječnika i sestara te ostalog osoblja na prvoj crti tijekom različitih kliničkih postupaka, dijagnostike, liječenja i njege bolesnika, a oni često nemaju dovoljno znanja o tome. Djelotvorna kontrola infekcija mora se poduzeti na razini odjela i odgovornost mora snositi svaki pojedini član osoblja [6]. Ekspertno znanje o prevenciji IPZS-a u rukama je stručnog osoblja (liječnika i sestre) za prevenciju i kontrolu IPZS-a, no oni nemaju dovoljno vremena za trajnu edukaciju cjelokupnog osoblja. Tako nastaje jaz između teorije i prakse prevencije IPZS-a [7 – 10]. Da bi se premostio taj jaz [7, 9, 10] i pojačale mjere prevencije IPZS-a, uspostavljena je 1981. godine među kliničkim osobljem u Hartfordu, SAD, sestra koja je činila vezu između kliničkog odjela i Sekcije za infektivne bolesti i epidemiologiju bolnice [11]. Glavna je uloga te vezne sestre (VS) (*liaison nurse*) bila da prati praksu kontrole IPZS-a i nastale infekcije. Poznavajući rad na svojem odjelu, pomogla je u bržem prepoznavanju problema IPZS-a i boljem određivanju programa edukacije odjelnog osoblja. Kasnih 80-ih uspostavlja se VS (kasnije nazvana „*link nurse*“) u mnogim bolnicama u SAD-u i Velikoj Britaniji [12], a zatim i mnogim drugim zemljama u svijetu.

Ovaj bi pregled trebao odgovoriti na pitanje o vrijednosti sustava VS-a za prevenciju i kontrolu IPZS-a u akutnim bolnicama.

U daljnjem tekstu „VS“ znači „vezna sestra za prevenciju i kontrolu infekcija povezanih sa zdravstvenom skrbi“.

Metode

Pregledana je literatura u bazama PubMed, CINAHL i Google Scholar. Termini pretraživanja bili su „*link nurse*“, „*liaison nurse*“ i „*infection control*“. Vrijeme pregleda: od početka baze do 31. siječnja 2024. godine. Probirom su isklju-

Introduction

Healthcare-associated infections (HAIs) are one of the most common adverse events in healthcare [1]. They occur in patients, visitors, and healthcare workers. They increase the morbidity and mortality of patients, prolong their stay in the hospital, and increase the cost of treatment. The World Health Organization (WHO) states in its report for 2020-2021 [2] that in acute hospitals 7% of patients in high-income countries (HIC) and 15% in middle- and low-income countries (LMIC) develop at least one HAI during their hospital stay. Up to 30% of patients in intensive care units (ICUs) can get HAI, with the incidence in LMICs being 2 to 20 times higher, especially in newborns. In the European Community and EEA countries, the burden caused by the 6 most common HAIs is twice the burden of all 32 infectious diseases monitored by the ECDC [3]. According to data from 2022-2023, the prevalence of HAIs was 6.3% (95% CI 5.3-7.4) [4], of which 29.3% were respiratory tract infections, 19.2% were urinary tract infections, and 16.1% were SSI.

Prevention of HAI is carried out using different methods. An essential component, according to the WHO, is the existence of a national program for the prevention and control of infections, which is then applied, locally adapted, in each health facility [2, 5]. The prevention of HAI is in the hands of physicians, nurses, and other staff on the front line during various clinical procedures, diagnostics, treatment, and patient care, and they often do not have enough knowledge about the prevention. Effective infection control must be undertaken at the ward level, and the responsibility must lie with each staff member [6]. Expert knowledge about the prevention of HAIs is in the hands of professional staff (physicians and nurses) for the prevention and control of HAIs, but they do not have enough time for continuous education of the entire staff. Thus, there is a gap between the theory and practice of prevention of HAI [7-10]. To bridge this gap [7, 9, 10] and strengthen HAI prevention measures, in Hartford, USA, in 1981, a nurse was established among the clinical staff, who acted as a link between the clinical ward and the Section for Infectious Diseases and Epidemiology of the hospital [11]. The main role of the liaison nurse (LN) was to monitor the practice of controlling HAs and resulting infections. Knowing the work in her ward, LN helped in the faster recognition of HAI problems and better determining the education program of the ward's staff. In the late 80s, LN (later called „*link nurse*“) was established in many hospitals in the USA and Great Britain [12] and then in many other countries in the world.

This review should answer the question about the value of the LN system for the prevention and control of infections in acute hospitals.

In the following text, „LN“ stands for „*link nurse for the prevention and control of healthcare-associated infections*“.

Methods

A literature review was performed in PubMed, CINAHL, and Google Scholar databases. The search terms were „*link nurse*“, „*liaison nurse*“ and „*infection control*“. The last review

čeni radovi koji nisu odgovarali terminima za pretraživanje. Također su isključeni bili radovi o veznim sestrama koje nisu za kontrolu infekcija [13, 14]. Zadržali smo se na radovima iz akutnih bolnica. Svaki rad pregledala su dva koautora. Kritička procjena radova nije rađena. Postupak je slijedio naputke iz PRISMA ScR-a [15].

Rezultati

Tijek odabira radova prikazan je na Slici 1. U ovaj pregled uključeno je 65 radova: 26 radova bilo je iz Velike Britanije, po 7 iz SAD-a i Njemačke, 5 iz Nizozemske, 4 iz Australije, po 3 iz Kine i Japana, 2 iz Irana, po 1 iz Bruneja, Egipta, Finske, Indonezije, Irske, Italije, Kanade i Švicarske. Uključeni su: originalni radovi (45), pregledni radovi (8), mišljenja (7), smjernice (4) i izvješća (1).

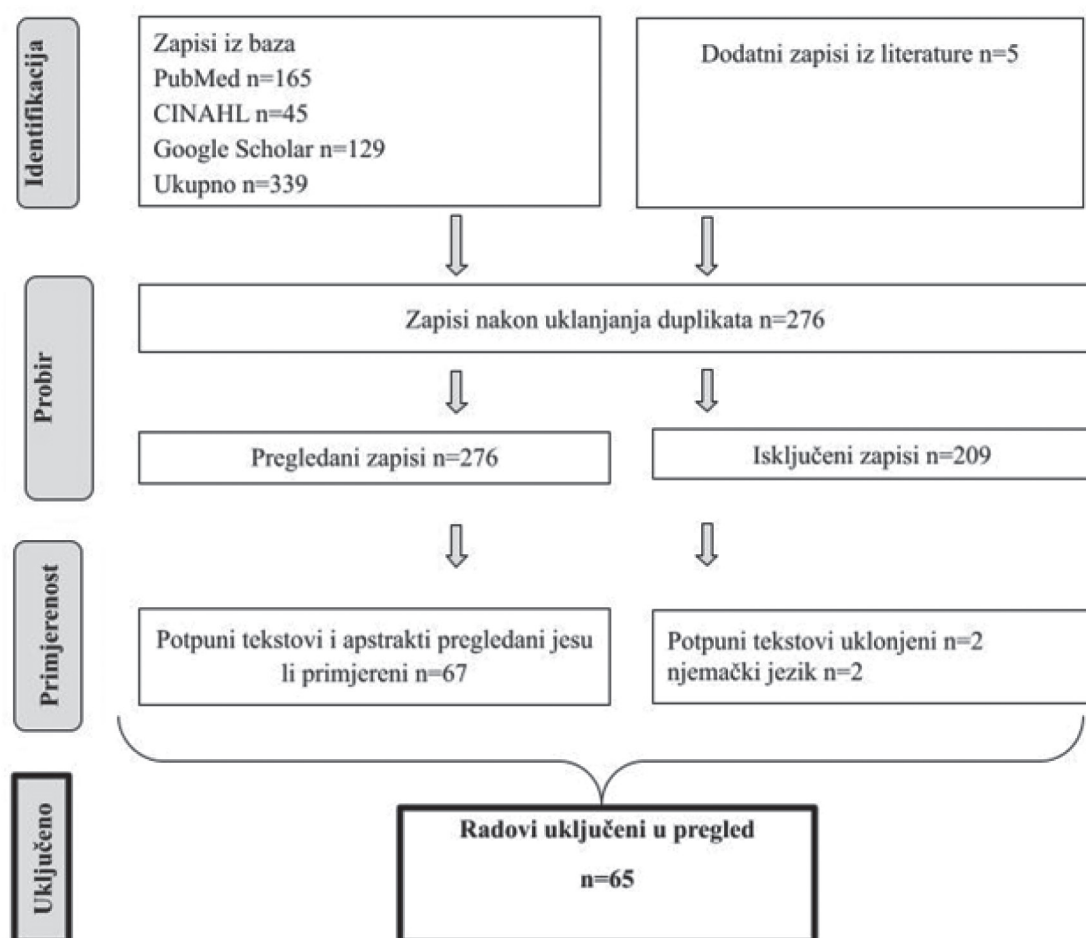
Teme obrađene u ovim radovima svrstane su u 6 skupina: 1. uloga, odgovornosti i kompetencije VS-a, 2. osobne značajke i odabir VS-a, 3. edukacija VS-a, 4. uspostavljanje programa VS-a zajedno sa zaprekama i olakšavajućim faktorima za održivost, 5. evaluacija sustava i efekti djelovanja VS-a te 6. liječnik kao veza za kontrolu infekcija.

was on January 31, 2024. Papers that did not correspond to the search terms were excluded from the screening. Also excluded were papers on non-infection control link nurses [13, 14]. We focused on papers from acute hospitals. Each paper was reviewed by 2 co-authors. Critical evaluation of the papers was not done. The procedure followed the instructions from PRISMA ScR [15].

Results

The process of paper selection is shown in Figure 1. Sixty-five papers were included in this review. Twenty-six papers were from Great Britain, 7 each from the USA and Germany, 5 from the Netherlands, 4 from Australia, 3 from China and 3 from Japan, 2 from Iran, and 1 each from Brunei, Egypt, Finland, Indonesia, Ireland, Italy, Canada and Switzerland. These were original papers (45), review papers (8), opinions (7), guidelines (4) and reports (1).

The topics covered in these papers are classified into 6 groups: 1. roles, responsibilities and competencies of LN, 2. personal characteristics and selection of LN, 3. education of LN, 4. establishment of LN programs together with obstacles and facilitating factors for sustainability, 5. evaluation of the system and the effects of the action of LN, and 6. the physician as a liaison for infection control.



SLIKA/FIGURE 1. Tijek odabira radova za pregled literature / Process of selecting papers for literature review

Uloga, odgovornosti i kompetencije VS-a

VS definira se kao sestra iz prakse koja ima izražen interes za određeno specijalističko područje i formalnu vezu s članovima specijalističkog tima [8, 14, 16, 17 – 19]. Ustanovljena je za različita specijalistička područja [20]: inkontinenciju, dijabetes [14], palijativnu skrb [21], prevenciju pada, upravljanje lijekovima, bol, dekubitus, domove za starije [13] te prevenciju i kontrolu infekcija [6, 22]. „VS (za prevenciju infekcija) je sestra koja ima znanja o prevenciji infekcija i specijalistička znanja svojeg odjela“ [23]. VS za prevenciju infekcija povezuje vlastiti klinički prostor s timom za prevenciju i kontrolu infekcija [18, 24 – 26], ali ni na koji način ne zamjenjuje bolničku službu za prevenciju i kontrolu IPZS-a [6, 27, 28], nego „proširuje broj osoblja koje se bavi prevencijom (infekcija) u svakodnevnom kliničkom radu“ [20, 28, 29]. Ključno svojstvo VS-a jest: dio je odjelnog osoblja, sestra u smjeni, izravno uključena u skrb o pacijentima [22] jer je to stavlja u položaj da vidi i utječe na praksu kolega [24]. To je sestra iz prakse kojoj je ostavljen dio radnog vremena za ulogu VS-a (npr. 8 sati tjedno [19], 2 sata tjedno [25], 4 sata mjesečno [29]). U nju se ugledaju drugi članovi tima [19, 24, 30], a razumijevanje problema odjela rezultira relevantnim edukacijskim programima [11]. Povećava suradljivost kliničkog osoblja sa standardima prevencije i kontrole infekcija [19, 24] i premješta fokus na infekcije s tima za infekcije na kliničko osoblje [10]. „To je volonterska pozicija i provodi se zajedno s drugim dužnostima sestree u smjeni“ [11]. VS podiže svjesnost o prevenciji i kontroli infekcija na odjelu [6, 18, 24, 26]. Podizanje svjesnosti, premda nemjerljivo, ključan je faktor u promjeni ponašanja [31]. VS postavlja odjelne standarde za prevenciju IPZS-a [26] pomažući sestri za prevenciju bolničkih infekcija u primjeni politika i prikupljanju podataka o infekcijama [24] i tako povezuje dokaze i praksu [10].

VS mora biti kvalificirana sestra da može prenositi znanje [7, 14, 32]. Osobita joj je vrijednost edukacija osoblja i širenje novih informacija [6, 13, 18], praćenje prakse prevencije i kontrole infekcija te podržavanje pojedinaca i kliničkih timova prilikom provjere prakse i praćenja infekcija [16, 33]. Djeluje kao lokalni izvor znanja o prevenciji infekcija [26] te je značajna njezina uloga u ranom otkrivanju klastera infekcije i epidemija [16]. Program VS-a jedna je od strategija za pojačanje edukacije [34]. Njezin je zadatak povećati znanje i promijeniti ponašanje kliničkog osoblja [6, 35]. Ako ima čvrstu podršku glavne sestree odjela i sestree za prevenciju IPZS-a, osjeća se osnaženom, preuzima inicijativu i može poboljšavati praksu prevencije na odjelu [36] gledajući na sebe kao na osobu koja informira svoje kolege i olakšava im prevenciju infekcija u svakodnevnoj praksi. Uloga VS-a pruža sestri priliku povećanja profesionalne prakse i stjecanje drugih znanja i vještina – upravljanje promjenom, edukaciju i vodstvo [33]. Uspjeh VS-a nastaje zbog visoke prisutnosti VS-a na odjelu [35, 37, 38]. VS često mora mijenjati praksu kad nauči nešto novo. Za to mora imati čvrstu podršku sestree za IPZ, a osobito glavne sestree odjela [39]. Utjecaj VS-a ovisi o poštovanju kolega i količini njezina znanja [39].

Royal College of Nursing postavio je 2012. godine okvir za VS za prevenciju i kontrolu IPZS-a (revidirano izdanje 2021. [33]). Okvir u četiri ključne teme obuhvaća navedene zna-

Role, responsibilities and competencies of LN

LN is defined as a shift nurse who has a strong interest in a specific specialist area and a formal relationship with members of the specialist team [8, 14, 16, 17-19]. LN has been established for various specialist areas [20]: incontinence, diabetes [14], palliative care [21], fall prevention, medication management, pain, pressure ulcers, nursing homes [13], and infection prevention and control [6, 22]. “LN (infection prevention) is a nurse who knows infection prevention and specialist knowledge of her ward” [23]. The LN for infection prevention connects its own clinical space with the infection prevention and control team [18, 24-26], but in no way replaces the hospital service for the prevention and control of HAIs [6, 27, 28], but “expands the number of staff who deal with (infection) prevention in daily clinical work” [20, 28, 29]. The key feature of the LN is that she is part of the ward staff and is directly involved in patient care as a nurse on shift [22]. This places her in a position to see and influence the practice of her colleagues [24]. She/he is a practice nurse who has been given part of the working time for the role of LN (e.g., 8 hours per week [19], 2 hours per week [25], 4 hours per month [29]). Other team members look up to her [19, 24, 30], and her understanding of the ward’s problems results in relevant educational programs [11]. She/he increases clinical staff compliance with infection prevention and control standards [19, 24] and shifts the focus on infections from the infection team to clinical staff [10]. “It is a volunteer position and is carried out together with other duties of the nurse on shift” [11]. LN raises awareness of infection prevention and control in the ward [6, 18, 24, 26]. Awareness raising, although immeasurable, is crucial in behavior change [31]. Further, LN sets ward standards for HAI prevention [26], helping hospital infection prevention nurses implement policies and collect infection data [24] and thus link evidence and practice [10].

LN must be a qualified nurse to transfer knowledge [7, 14, 32]. The special value of the link nurse is staff education and dissemination of new information [6, 13, 18], monitoring of infection prevention and control practices, and supporting individuals and clinical teams during practice audits and infection monitoring [16, 33]. She/he acts as a local source of knowledge about infection prevention [26], and its role in the early detection of infection clusters and outbreaks is significant [16]. The LN program is one of the strategies for strengthening education [34]. Its role is to increase the knowledge and change the behavior of clinical staff [6, 35]. If they have the strong support of the head nurses of the department and the HAI prevention nurses, LNs feel empowered, take initiative, and can improve the prevention practice in the ward [36] by looking at their role as a person who informs their colleagues and facilitates infection prevention in their daily practice. The role of LN provides the nurse with the opportunity to increase professional practice and acquire other knowledge and skills – change management, education, and leadership [33]. The success of LN is due to the high presence of LN in the ward [35, 37, 38]. LN often has to change its practice when it learns something new. For that, she/he must have the firm support of the nurse for the HAI, and especially the head nurse of the ward [39]. The influence of LN depends on the respect of colleagues and the amount of her knowledge [39].

čajke: uzor i lokalni vođa, omogućuje pojedincima i timovima da uče, umrežuje odjelno osoblje i tim za prevenciju i kontrolu infekcija, te podupire pojedince i timove u lokalnoj provjeri suradljivosti i praćenju infekcija. Mjesto vezne sestre nije sistematizirano radno mjesto i nije posebno plaćeno.

Sličan su dokument napravile i Sjeverna Irska [40] i Republika Irska [41]. Uloga VS-a podijeljena je u nekoliko područja: klinička praksa, edukacija i učenje, istraživanje i praksa temeljena na dokazima te upravljanje i vodstvo. Kao dodatak, napravljen je i predložak ugovora za veznu sestru [41].

Osobne značajke i odabir VS-a

Prilikom odabira sestre za funkciju VS-a treba razmotriti i njezine osobne značajke [33]. Vezna bi sestra u prvom redu trebala biti zainteresirana za prevenciju i kontrolu infekcija, motivirana i entuzijastična, odgovorna za vlastite akcije, proaktivna, ne smije osuđivati, treba biti pristupačna, autoritativna, uporna, karizmatična, puna poštovanja, odgovorna, vidljiva na području prakse, inovativna, metodična, stroga, vješta u prezentiranju znanja, te treba aktivno razmišljati, cijeniti učenje, biti odličan komunikator i aktivni sudionik mreže veznih sestara [11, 25, 33]. Nadalje, treba biti marljiva [24], samopouzdana [10], *lider* [11], iskusna [42]. Osim tehničkih vještina (znanje i vještine prevencije infekcija), mora imati i psihološke vještine za rad s ljudima te vještine za edukaciju odraslih osoba i sposobnost prenošenja znanja. [8, 9, 39].

Edukacija VS-a

Većina autora koji se bave istraživanjem uloge VS-a opisuju edukaciju veznih sestara, tj. stjecanje specifičnih kompetencija (znanja, vještina i stavova).

Bitno je istaknuti da edukaciju VS-a planiraju, osmišljavaju i provode sestara za prevenciju IPZS-a i drugi članovi tima za prevenciju IPZS-a iste bolnice. Za pojedine teme oni pozivaju stručnjake iz bolnice ili izvan bolnice. Edukacija VS-a koju provodi tim za IPZS prilagođena je odjelu na kojem VS djeluje. Različite bolnice imaju različite programe edukacije koji ovise isključivo o osoblju za prevenciju IPZS-a pojedine bolnice [18], odnosno o prisutnoj problematici.

Edukacija VS-a zauzima značajan dio programa i velik dio vremena VS-a. Provodi se u dva dijela: priprema za ulogu VS-a [5, 6, 8, 10, 11, 16, 26, 29, 39, 43 – 49] i edukacija uz rad [6, 9, 10, 16, 18, 26, 29, 30, 32, 39, 41, 47, 50, 51] (Tablica 1. u Prilogu). Pripremna edukacija traje različito vrijeme, uglavnom od 2 do 10 dana, a sadržaj je podjednak: mikrobiologija, prijenos infekcija, bolničke infekcije, prijenos EBM-a u praksu, standardi, smjernice, politike prevencije i kontrole, provjera prakse, praćenje infekcija, vještine prenošenja znanja kolegama (edukacija odraslih), vještine primjenjivanja promjene ponašanja i vještine vodstva. Zatim slijedi neformalna edukacija tijekom rada (uvijek je prisutna i praktična obuka), akcijsko učenje (rješavanje aktualnih problema), sastanci s timom za IPZS i sastanci svih veznih sestara bolnice. Posebna se pažnja posvećuje metodologiji učenja i podučavanja, s naglaskom na metode prilagođene odraslim osobama uz interaktivni pristup [41, 52, 53]. Osobito je značajan pristup edukaciji pomoću računala koje olakšava

In 2012, the Royal College of Nursing set out a framework for LN for the prevention and control of HAIs (revised edition 2021 [33]). The framework in four key themes encompasses all the above features (role model and local leader, enables individuals and teams to learn, networks ward's staff and the infection prevention and control team, and supports individuals and teams in local collaboration and infection control). The position of LN is not systematized and is not paid separately.

A similar document was made by Northern Ireland [40] and the Republic of Ireland [41]. The role of LN is divided into several areas: clinical practice, education and learning, research and evidence-based practice, and management and leadership. In addition, a contract template for the LN was made [41].

Personal characteristics and selection of LN

When selecting a nurse for the function of LN, her characteristics should also be considered [33]. LN should be primarily interested in infection prevention and control, be motivated and enthusiastic, responsible for her actions, be proactive, non-judgmental, approachable, elastic, authoritative, persistent, charismatic, thinking, respectful, responsible, active participant in the network of nurses, excellent communicator, visible in the field of practice, innovative, values learning, methodical, strict, adept at presenting knowledge [11, 25, 33], diligent [24], self-confident [10], leader [11], experienced [42]. In addition to technical skills (knowledge and infection prevention skills), she/he must also have psychological skills for working with people, adult education skills, and the ability to transfer knowledge. [8, 9, 39].

Education of LN

Most authors who are engaged in the research of the role of LN also describe their education, i.e., the acquisition of specific competencies (knowledge, skills, and attitudes).

It is important to emphasize that the education of LN is planned, designed, and carried out by the HAI prevention nurse and other members of the HAI prevention team of the same hospital. For certain themes, they invite experts from the hospital or outside the hospital. The training of LN carried out by the HAI team is adapted to the ward in which LN operates. Different hospitals have different education programs that depend exclusively on the staff for HAI prevention in that hospital [18].

LN education occupies a significant part of the program and a large part of LN time. It is carried out in two parts: the first is the preparation for the role of LN [5, 6, 8, 10, 11, 16, 26, 29, 39, 43-49], and the second is education along with work [6, 9, 10, 16, 18, 26, 29, 30, 32, 39, 41, 47, 50, 51] (Table 1 in the Annex). Preparatory education takes a different amount of time, mostly 2 to 10 days. The content is the same: microbiology, transmission of infections, hospital infections, transfer of EBM to practice, standards, guidelines, prevention and control policies, audits of practice, monitoring of infections, skills of transferring knowledge to colleagues (adult education), behavioral change, and leadership skills. Then, there is informal education during work (practical training is always present), action learning (solving current

učenje zaposlenim odraslim osobama, ali i računalo treba kombinirati s učenjem licem-u-lice [52]. Uspješnim se pokazalo učenje rješavanjem problema, učenje temeljeno na akciji, na pitanjima, razmišljanjem o praksi, (razmišljanje o praksi i razmišljanje tijekom prakse), istraživanjem temeljenom na akciji [53], fleksibilnim upravljanjem promjene i prilagodljivim na lokalne potrebe.

Važno je istaknuti da je prevencija i kontrola IPZS-a multidisciplinarni rad, kao i većina poslova u medicini, stoga je tomu nužno prilagoditi i edukaciju, učiniti je multidisciplinarnom, odnosno „zajedničkim učenjem“ [34, 46].

Uspostavljanje programa VS-a u akutnim bolnicama

K. Ross i suradnici [11] uveli su 1981. godine na odjel veznu sestru radi praćenja infekcija. Pratila je praksu prevencije, a obučila ju je sekcija za epidemiologiju; pomagala je sekciji uočiti problem i bolje je pratila aseptičku praksu. Uspostavljanje VS-a donijelo je odjelu velike prednosti u prevenciji infekcija. Prema E. L. Teare [6], sustav VS-a uspostavlja se u tri koraka. Prvi je odabir VS-a na svakom odjelu, redovna veza VS-a sa sestrom za IPZS i edukacija putem jednosatnih sastanaka s članovima tima za IPZS. VS je zatim spremna biti primjer kolegama na odjelu u provođenju ispravne prevencije IPZS-a, educirati odjelno osoblje i pratiti pojavu infekcija na odjelu. Drugi je korak utvrđivanje odjelnih standarda i provjere tih standarda, a treći uvođenje procjene rizika i upravljanje rizikom od IPZS-a na odjelu, čime zapravo problem prevencije IPZS-a prelazi s osoblja za IPZS na odjelno osoblje. Tu se javlja moguća opasnost da odjelno osoblje shvati VS odgovornim za sve vezano za infekcije, a ono samo postaje pasivno [6, 25].

Održivost sustava zahtijeva određene uvjete. Prvi je podrška glavne sestre odjela [10, 18] koja omogućava VS-u da odvoji vrijeme za vlastitu edukaciju i edukaciju osoblja, odlazak na sastanke s drugim veznim sestrama i članovima tima za IPZS, za poslove praćenja infekcija i drugo. Nadalje, mora postojati čvrst stav uprave bolnice o sustavu VS-a koji omogućuje slobodno vrijeme rutinskoj kliničkoj sestri za poslove VS-a. Također, veznu sestru trebaju prihvatiti druge vezne sestre i kolege na odjelu. Čini se da bi profesionalno bilo korisno da ta skupina bude priznata formalno na nacionalnoj razini [6]. Nužna je i dostupnost infrastrukture [54]. Osobito je značajna podrška sestre i cijelog tima za prevenciju IPZS-a jer tada se bez poteškoća odvijaju njihovi sastanci i edukacija [10, 28]. Ciljevi i uloga moraju biti detaljno opisani [25]; po mogućnosti treba napraviti i pismeni ugovor [40]. Treba postojati jasna definicija odgovornosti, zadani kurikulum za edukaciju i trajna edukacija [9]. Značajna olakšavajuća okolnost jest atmosfera učenja na odjelu [50].

Važno je ponovo istaknuti da VS ni na koji način ne zamjenjuje sestru za prevenciju i kontrolu IPZS-a, nego lokalno nadopunjuje njezin rad [6, 28, 41].

Manjak osoblja i velika fluktuacija sestara negativno utječu na funkciju VS-a [16, 24, 25, 50, 55] i ne ostavljaju im dovoljno vremena za edukaciju [24]. Nekoliko autora navodi da se uz jednu veznu sestru bira i njezina zamjena zbog kontinuiteta službe [6, 25, 42, 48]. Daljnje prepreke kod uspostavljanja VS-a sljedeće su: kontrola infekcija nije prioritet

(problems), meetings with the HAI team, and meetings of all hospital LNs. Special attention is paid to the methodology of learning and teaching with an emphasis on methods adapted to adults with an interactive approach [41, 52, 53]. The computer-assisted learning approach is particularly significant as it facilitates learning for employed adults, but it should also be combined with face-to-face teaching [52]. Problem-solving learning, action-based learning, question-based learning, reflection on practice (reflection on practice and reflection during practice), action-based research [53], flexible change management, and adaptability to local needs have proven successful.

It is important to point out that the prevention and control of HAI is multidisciplinary work, like most jobs in medicine. Therefore, it is necessary to adapt education to this, to make it multidisciplinary, that is, “joint learning” [34, 46].

Establishment of LN programs in acute hospitals

In 1981, Ross [11] introduced an LN to the ward to monitor infections. She monitored the prevention practice, was trained by the epidemiology service, helped the service to spot the problem, and better monitored the aseptic practice. The establishment of LN brought great advantages to the ward in the prevention of infections. According to Teare [6], the LN system is established in three steps: the first step is the selection of the LN in each ward, the regular contact of the LN with the HAI nurse, and education through one-hour meetings from the HAI team members. LN is then ready to be an example to colleagues in the ward in implementing the correct prevention of HAI, to educate the ward staff, and monitor the occurrence of infections in the ward; the second step is the establishment of ward's standards and the auditing of these standards, and the third is the introduction of risk assessment and management of the risk of HAIs in the ward, which transfers the problem of HAI prevention from the hands of the HAI personnel to the hands of the ward staff. There is a possible danger that the ward staff will perceive LN as responsible for everything related to infections and become passive [6, 25].

System sustainability requires certain conditions. The first is the support of the head nurse of the ward [10, 18], which enables the LN to take time for his/her education and the education of the staff, to go to meetings with other LNs and with members of the HAI team, for infection monitoring tasks, and more. Furthermore, there must be a firm position of the hospital administration on the LN system, which allows free time for the routine clinical nurse for LN tasks. Then, acceptance by other LNs and colleagues in the ward is important. It seems that it would be professionally useful for this group to be formally recognized at the national level [6]. However, the availability of infrastructure is also necessary [54]. The support of the nurse and the entire team for the prevention of HAIs is particularly significant because then their meetings and education run smoothly [10, 28]. Furthermore, the goals and role must be described in detail [25], and preferably a written contract should be made [40]. There should be a clear definition of responsibility, a specified curriculum for education, and continuous education [9]. A significant mitigating circumstance is the learning climate in the ward [50].

odjela, uloga VS-a nije definirana, liječnici nisu prihvatili VS, VS program uvode, razvijaju i uspostavljaju samo stručnjaci za prevenciju i kontrolu IPZS-a, odgovornost za njihovu edukaciju snose samo stručnjaci za prevenciju IPZS-a, nema prave povezanosti veznih sestara na različitim odjelima za razmjenu iskustava i najbolje prakse [50].

Također je izazov održati interes i motivaciju VS-a dulje vrijeme [29]. Jedan je od razloga i činjenica da je funkcija VS-a volonterska [44, 56]. Većina se autora slaže da ta funkcija mora biti volonterska [6, 9, 11, 14, 20, 24, 25, 31, 33, 42] te da plaćena funkcija može sprečavati djelovanje VS-a [9] ako uz to ne postoji interes. Nadalje, npr. u Nizozemskoj 8 % bolnica zatvorilo je funkciju VS-a jer nije imala podršku uprave i VS nije imala vremena [18], u Velikoj Britaniji 7 % jer su vezne sestre bile mlađe sestre koje nisu imale autoritet, a događala se i velika fluktuacija sestara [24], što se opisuje i u Australiji [44].

Osobit problem koji se iskazuje u sustavu VS-a nesuradljivost je liječnika, tj. liječnici nisu spremni prihvatiti VS s obzirom na to da je ona sestra [6, 55, 37, 57], a s druge strane, njihovo prihvaćanje znači puno za sam sustav [6]. Tu do izražaja dolazi činjenica poštivanja hijerarhije u zdravstvu (nesrazmjer moći) [16, 25, 50], međutim, neovisno o rangu koji neki zdravstveni radnik ima na odjelu, svaki profesionalac treba moći obratiti pažnju na suboptimalnu praksu ako je uoči kod drugog [58].

Program rada vezne sestre značajan je dio bolničkog programa rada u prevenciji i kontroli infekcija i obično je lokalnog karaktera. U Nizozemskoj 67 % bolnica ima VS, a čak u 76 % bolnica taj program specifičan je za pojedinu bolnicu i ovisi o bolničkoj službi za IPZS [18]. Bitna je značajka programa adaptabilnost, što znači da se program prilagođava problemima konkretnog odjela prema trenutnim potrebama odjela [18]. Sastavni dio programa opis je zadataka i svi sadrže opis edukacije vezne sestre koju provodi tim za prevenciju i kontrolu infekcija, prilagođene instituciji i odjelu na kojem VS djeluje; nadalje se opisuje edukacija odjelnog osoblja koju provodi vezna sestra (upoznavanje sa smjernicama i politikama bolnice, praktična primjena preventivnih mjera, primjena standardnih (EBM) postupaka za IPZS u praksi, uloga u provjeri prakse i praćenju infekcija, redoviti kontakti s timom za IPZS).

Navedeni uvjeti detaljno su opisani u službenim dokumentima koje je moguće naći na mrežnim adresama [27, 33, 40, 41].

Evaluacija sustava i efekti djelovanja VS-a

U evaluaciji programa VS-a često se provjerava promjena ponašanja na odjelu, s povećanjem suradljivosti ili znanja ili povećanjem broja bodova prilikom provjere [26], koristeći unutarnju i vanjsku provjeru [13]. Pritom se određuju indikatori djelovanja VS-a i suradljivosti odjelnog osoblja sa standardima prevencije IPZS-a [24, 27]. Prema dokumentu Južne Australije [27] pokazatelji djelovanja VS-a su: broj osoblja educiranog o ispravnoj uporabi osobne zaštitne opreme, broj osoblja educiranog o higijeni ruku, broj osoblja educiranog na drugim područjima, opservacija higijene ruku te druge provjere i aktivnosti.

It is important to emphasize that LN in no way replaces the nurse for the prevention and control of HAI but complements her work locally [6, 28, 41].

The lack of staff and high turnover of nurses negatively affect the function of LNs [16, 24, 25, 50, 55] and do not leave them enough time for education [24]. Several authors state that along with one LN, its replacement is chosen to ensure continuity of service [6, 25, 42, 48]. Further obstacles during the establishment of LN are following: infection control is not a priority of the ward, the role of LN is not defined, LN is not accepted by physicians, the LN program is introduced, developed, and established only by specialists for the prevention and control of HAIs, the responsibility for their education lies only with specialists for the prevention of HAIs, and there are no real connections between LNs in different wards to exchange experiences and best practices [50].

It is also a challenge to maintain the interest and motivation of LN over a long time [29]. One of the reasons is the fact that the function of LN is voluntary [44, 56]. Most authors agree that this function must be voluntary [6, 9, 11, 14, 20, 24, 25, 31, 33, 42] and that a paid function can impede the operation of the LN [9] if there is no interest. Furthermore, for example, in the Netherlands, 8% of hospitals closed the LN system because they did not have the support of the management and did not have time [18], and in Great Britain 7% because the LNs were younger nurses who did not have authority. In addition, there was a high turnover of nurses [24], which is also described in Australia [44].

A particular problem expressed in the LN system is the non-compliance of physicians, i.e., physicians are not ready to accept LN, given that she is a nurse [6, 55, 37, 57], and on the other hand, their acceptance means a lot for the system itself [6]. That is where the fact of respecting the hierarchy in healthcare (imbalance of power) is seen [16, 25, 50]. However, regardless of the health worker's rank in the ward, every professional should be able to pay attention to suboptimal practice if she/he notices it in another [58].

The LN program is a significant part of the hospital's infection prevention and control program and is usually local. In the Netherlands, 67% of hospitals have LN, and in as many as 76% of hospitals, this program is specific to a particular hospital and depends on the hospital's HAI service [18]. An essential feature of the program is adaptability, which means that the program adapts to the problems of the specific ward according to the ward's current needs [18]. An integral part of the program is the description of the tasks, and they all contain a description of the education of the link nurse by the infection prevention and control team adapted to the institution and the ward where the LN operates; the education of the ward staff by the link nurse is further described (learning hospital guidelines and policies, practical application of preventive measures, application of standard (EBM) procedures for HAI prevention in practice, role of auditing and monitoring of infections, regular contacts with the HAI team). The above-mentioned conditions are described in detail in official documents at web addresses [27, 33, 40, 41].

Evaluation of the system and effects of LN action

In the evaluation of the LN program, the change of behavior in the department is often used, with an increase in

Djelotvornost funkcije VS-a pokazana je u mnogim radovima: djelotvornost VS-a u praćenju infekcija na odjelu [11]; smanjenje neispravne prakse njege urinarnog katetera [59]; povećanje suradljivosti s higijenom ruku (s 50 % na 83 %) [57]. Nadalje, redukcija HA-MRSA [29, 57, 60], povećanje suradljivosti s higijenom ruku i bolje poznavanje standardnih mjera [61]; povećanje suradljivosti s higijenom ruku, ali ne i bolje poznavanje standardnih mjera [48], više bodova u provjeri [12]; smanjenje infekcija u neonatalnoj jedinici intenzivnog liječenja [37]; smanjenje infekcija povezanih s trajnim vaskularnim kateterom [62, 63] i urinarnim kateterom [43]. M. M. Thandar i suradnici [64] pretražili su literaturu o djelotvornosti tima za IPZS s VS-om i bez VS-a u smanjenju IPZS-a, smanjenju smrtnosti i duljine boravka bolesnika s IPZS-om te suradljivost s praksom prevencije IPZS-a. Našli su da se prvo troje nije promijenilo u odnosu na bolnice bez tima za IPZS, osim posljednjeg koje se značajno povećalo samo u bolnicama koje su imale i tim za prevenciju IPZS-a i VS. Supervizija VS-a značajno je povećala suradljivost bolničara s higijenom ruku [65]. U nekoliko je radova pokazano da je program VS-a bio važno sredstvo za lokalnu odgovornost, podizanje svjesnosti o prevenciji IPZS-a [24, 26], povećanje suradljivosti sa standardima i podizanje profila prevencije infekcija u cijeloj ustanovi [6, 8], povećanje suradljivosti liječnika s higijenom ruku [30]; uspješan rad VS-a na psihijatrijskom odjelu [54], VS je uspješno educirala osoblje operacijske sale o standardnim mjerama uz upotrebu neutralne zone za oštre instrumente [23].

Yahia [66] opisuje procjenu rada veznih sestara u 20 bolnica koje su bile glavne sestre odjela u tim bolnicama – njih 200, pomoću tri vrste upitnika: o ulozi, o znanju i o vlastitoj percepciji. Rezultati su očekivani: od 74,6 % do 78,4 % VS nije nikada provodilo edukaciju osoblja, konzultacije o prevenciji infekcija, ni istraživanje, a radile su administraciju i superviziju. Ukupno 53,7 % imalo je slabo znanje, ali je čak 79 % imalo visoku percepciju o svojoj kontroli infekcija. Taj je rad pokazao da VS mora biti sestra u smjeni, a ne glavna sestra koja nema vremena za funkciju VS-a, a možda ni interesa za prevenciju infekcija.

Vezni liječnik

Potrebno je spomenuti da se u nekim zemljama uz VS pojavljuje i vezni liječnik (VL): u Nizozemskoj [18], Kanadi [25], Francuskoj [46], Portugalu i Velikoj Britaniji [24], a u Njemačkoj je funkcija veznog liječnika za prevenciju IPZS-a dobro etablirana – u malim bolnicama nema ih uvijek, ali specijalističke klinike zakonski su obvezne zaposliti veznog liječnika za kontrolu infekcija [51, 67 – 69].

Rasprava

VS je strategija za smanjenje IPZS-a povećanjem znanja osoblja i povećanjem svjesnosti o infekcijama, što dovodi do promjene prakse prevencije i povećanja suradljivosti sa standardima prevencije infekcija [6, 19, 20, 24, 31, 35]. Taj je sustav prisutan već oko 40 godina [11], no i danas se još raspravlja o njegovoj vrijednosti. Većina se autora ipak slaže da je institucija vezne sestre značajno poboljšanje u prijenosu odgovornosti za prevenciju i kontrolu IPZS-a s tima za prevenciju i kontrolu IPZS-a na odjelno osoblje.

compliance or knowledge or an increase in the number of points during the audit [26], using internal and external audits [13]. The indicators of the action of the LN and the compliance of the ward staff with the standards of prevention of HAIs are determined [24, 27]. According to the document of South Australia [27], the indicators of the performance of LN are the number of personnel educated on the correct use of personal protective equipment, the number of personnel educated on hand hygiene, the number of personnel educated in other areas, observation of hand hygiene and other audits and other activities.

The effectiveness of the LN function has been demonstrated in many studies: monitoring infections in the ward [11]; reduction of improper urinary catheter care practices [59]; increase in compliance with hand hygiene (from 50% to 83%) [57]. Furthermore, reduction of HA-MRSA [29, 57, 60], increase in compliance with hand hygiene and better knowledge of standard precautions [61]; increasing compliance with hand hygiene, but not better knowledge of standard precautions [48], more points in the audit [12]; reduction of infections in the neonatal intensive care unit [37]; reduction of bacteremia associated with indwelling venous catheter [62, 63] and urinary catheter [43]. Thandar [64] searched the literature on the effectiveness of the HAI team with or without LN in reducing HAI, reducing mortality and length of stay in HAI patients, and compliance with HAI prevention practices. They found that the first three did not change compared to hospitals without an HAI team except for the last one, which increased significantly only in hospitals that had both an HAI prevention team and LN. LN supervision significantly increased paramedics' compliance with hand hygiene [65]. In several papers, it was shown that the LN program was an important tool for local responsibility, raising awareness about HAI prevention [24, 26], increasing compliance with standards and raising the profile of infection prevention in the entire institution [6, 8], increased cooperation of physicians with hand hygiene [30]; successful work of LN in a psychiatric ward [54], LN successfully educated operating room staff on standard measures using a neutral zone for sharp instruments [23].

Yahia [66] describes the assessment of the work of link nurses in 20 hospitals, who were head nurses of the wards in those hospitals – 200 LNs, using three types of questionnaires: on role, on knowledge, and own perception. The results are as expected: 74.6% to 78.4% have never done staff education, consultations on infection prevention, or research, and they did administration and supervision. 53.7% had poor knowledge, but 79% had a high perception of own infection control. This work showed that the LN must be the nurse on shift, not the head nurse who has no time for the function of the LN and perhaps no interest in infection prevention.

Link physician

Finally, it should be mentioned that in some countries, in addition to the LN, there is also a link physician (LP) (in the Netherlands [18], Canada [25], France [46], Portugal and Great Britain [24]; in Germany, the function of a link physician for the prevention of HAIs are well established - in small hospitals they are not always available, but specialist clinics are legally obliged to employ a link physician for infection control [51, 67-69].

Infekcije povezane sa zdravstvenom skrbi nastaju na mjestu pružanja skrbi i na tom ih mjestu treba sprečavati. Zdravstveni radnici na prvoj crti imaju svoje specijalističko znanje, a znanje o kontroli infekcija i mikrobiologiji obično je nedovoljno [32] jer se vrlo malo o tome nauči u školovanju prije rada (medicinski fakulteti, sestrinske škole), a tijekom rada najviše se pažnje posvećuje obnovi specijalističkog znanja. S druge strane, ekspertno znanje o prevenciji i kontroli IPZS-a ima bolnička služba koja je za to posebno educirana [16, 46, 70]. Značajan dio njihova posla trajna je edukacija osoblja uz rad o prevenciji IPZS-a. S jedne strane, sve je više zahtjeva za tu edukaciju [34], a s druge se strane takva edukacija teško može provoditi po mjeri (potrebi) svakog odjela, već je jednaka za cijelu bolnicu. Osim toga, u bolnici je mali broj sestara za prevenciju IPZS-a: 1/250 kreveta [22]. Još je 1984. godine P. M. Ashworth [71] utvrdio da je medicinska sestra koja radi s bolesnicima na odjelu ključna osoba za prevenciju infekcija jer poznaje specijalističke probleme odjela koji su dio procesa zdravstvene njege i shvaća kako u konkretnih bolesnika nastaje i kako se sprečava infekcija [17] te od svih zdravstvenih radnika najviše vremena provede uz bolesnika [17]. Na toj je ideji zamišljena i ostvarena vezna sestra za prevenciju i kontrolu IPZS-a koju educira sestra za kontrolu IPZS-a [11, 22]. M. Dekker ustanovila je 10 najvažnijih strategija za uspostavljanje uspješnog sustava VS-a [50]. Za uspješnu funkciju VS-a potrebna je odluka uprave bolnice, čvrsta podrška glavne sestre odjela (osigurava jasnu ulogu VS-a, osigurava vrijeme za funkciju VS-a, olakšava pristup učenju, upravlja nejasnoćama, održava lokalni registar VS-a te zapise o učenju i aktivnosti VS-a) i sestre za prevenciju i kontrolu IPZS-a (olakšava redovne sastanke i pruža podršku, komunicira promjene politika i kliničkih smjernica, djeluje kao uzor za VS, promovira VS na njezinu području, djelotvorno komunicira s glavnom sestrom s ciljem osiguranja nesmetane službe) i podrška drugih veznih sestara u bolnici. Hale [38] navodi da su glavne sestre zahvalne veznim sestrama na njihovoj aktivnosti te svjedoči o djelotvornosti koja je posljedica visoke prisutnosti VS-a na odjelu [10]. Budući da vezne sestre ulažu velik napor, a često i svoje privatno vrijeme, bilo bi potrebno bolje vrednovati i nagraditi njihov rad.

Međutim, često dolazi do zapreka za uvođenje ili funkciju VS-a [50]. Manjak osoblja dovodi do toga da VS ostaje u rutini cijelo svoje radno vrijeme te ne ostaje vremena za poslove VS-a [16, 50]; velika fluktuacija osoblja, imenovanje bez obzira na interes i motivaciju (tada će VS postojati formalno, ali neće stvarno djelovati). Nadalje, važna prepreka uspostavljanju VS-a jest nedostatak vremena osoblja za prevenciju i kontrolu infekcija za edukaciju VS-a [24].

Evaluacija sustava VS-a nije se često provodila. Metode evaluacije obično su prije-poslije istraživanja, s pažnjom usmjerenom na pojedinačne elemente ili ishode prevencije ili najčešće na elemente suradljivosti sa standardima prevencije (higijena ruku, standardne mjere). Uglavnom zbog etičkih razloga, teško je provoditi randomizirane kliničke pokuse na ovom području.

Ograničenje je ovog pregleda to što je pregledana samo literatura na engleskom jeziku, a na drugim jezicima samo ako je sažetak bio na engleskom jeziku te se umjesto teksta upotrebljavao sažetak; također je ograničenje i to što nije

Discussion

LN is a strategy to reduce HAIs by increasing staff knowledge and infection awareness, which leads to change in prevention practices and increased compliance with infection prevention standards [6, 19, 20, 24, 31, 35]. This system has been around for about 40 years [11], but even today, its value is still being discussed. However, most authors agree that the institution of a link nurse is a significant improvement in transferring responsibility for HAI prevention and control from the HAI prevention and control team to ward staff.

Healthcare-associated infections occur at the point of care and should be prevented there. Health workers on the front line have specialist knowledge, and knowledge about infection control and microbiology is usually insufficient [32]. The reason for this is that very little is learned about it in education before work (medical schools, nursing schools), and during work, the most attention is paid to renewing specialist knowledge. On the other hand, specially trained hospital experts have knowledge of the prevention and control of HAI [16, 46, 70]. A significant part of their work is the permanent education of the staff, in addition to working on the prevention of HAI. However, on the one hand, there are more and more requests for this education [34], and on the other hand, such education can hardly be tailored (to the needs) of each ward but is the same for the entire hospital. The hospital has only a small number of nurses for the prevention of HAIs: 1/250 beds [22]. As early as 1984, Ashworth [71] established that the nurse who works with patients in the ward is a crucial person for infection prevention because she/he knows the specialist problems of the ward that are part of the health care process and understands how infection occurs in specific patients and how it is prevented [17] and of all healthcare workers, she/he spends the most time with the patient [17]. Based on this idea, a link nurse for the prevention and control of HAIs, educated by a nurse for the control of HAIs, was conceived and implemented [11, 22]. Dekker established the 10 most important strategies for implementing a successful LN system [50]. The successful function of the LN requires the decision of the hospital management, the strong support of the head nurse of the ward (ensures a clear role of the LN, provides time for the LN function, facilitates access to learning, manages ambiguities, maintains a local LN registry and records of LN learning and activities) and nurses prevention and control of the HAI (facilitates regular meetings and provides support, communicates policy and clinical guideline changes, acts as a role model for the LN, promotes the LN in her area, communicates effectively with the head nurse to ensure smooth service) and support from other LNs in the hospital. Hale [38] states that head nurses are grateful to LNs for their activity and testify to the effectiveness resulting from a high presence of LNs in the ward [10]. Since LN invests a lot of effort and often their private time, it would be necessary to better value and reward their work.

Often, however, there are obstacles to the introduction or function of LN [50]. The lack of staff leads to the fact that the LN remains in routine throughout its working hours and does not have time for LN tasks [16, 50]; high staff turnover, appointments regardless of interest and motivation (then there will be a formal LN, but it won't really work).

rađena procjena radova. Dobra je strana pregleda što su u obzir uzeti, osim originalnih radova, pregledi, smjernice i mišljenja.

Zaključak

Na temelju većine pregledanih radova, može se zaključiti da VS nedvojbeno predstavlja značajnu strategiju povećanja suradljivosti sa standardima prevencije i kontrole IPZS-a u kliničkom okruženju, proširenje prevencije IPZS-a i uspostavljanje prevencije na mjestu na kojem infekcije nastaju. To je volonterska pozicija sestre u smjeni koja ima osobit interes za prevenciju IPZS-a. VS predstavlja vezu odjela s bolničkom službom za IPZS i ni na koji način nije zamjena, nego je nadopuna te službe. Međutim, rijetki su radovi koji ispituju djelotvornost VS-a na smanjenje IPZS-a iako je VS u funkciji već oko 40 godina, stoga je to područje široko otvoreno za daljnja istraživanja.

Nema sukoba interesa.

Furthermore, an important barrier to the establishment of LN is the lack of time for LN education by infection prevention and control staff [24].

Evaluation of the LN system was not often carried out. Evaluation methods are usually before-after research, with attention to individual elements or outcomes of prevention or, most often, elements of compliance with prevention standards (hand hygiene, standard precautions). Mainly due to ethical reasons, it is not possible to conduct randomized clinical trials in this area.

The limitation of this paper is that only literature in English was reviewed and in other languages only if the abstract was in English and the abstract was used instead of the full text. Also, a limitation is that no evaluation of the included papers was done. The good side of the review is that, in addition to the original works, reviews, guidelines and opinions were taken into account.

Conclusion

Based on the majority of reviewed papers, it can be concluded that, undoubtedly, LN is a significant strategy for increasing compliance with the standards of prevention and control of HAI in the clinical environment, expanding prevention of HAI, and establishing prevention at the place where infections occur. It is a volunteer position for a shift nurse who has a special interest in the prevention of HAIs. LN represents the connection of the ward with the hospital service for HAI prevention and is in no way a replacement but a complement to that service. However, there are few papers examining the effectiveness of LN in reducing IPZ, although LN has been in operation for about 40 years, so the area is wide open for further research.

Authors declare no conflict of interest.

Literatura / References

- [1] Allegranzi B, Bagheri Nejad S, Combescurie C, Graafmans W, Attar H, Donaldson L, et al. Burden of endemic health-care-associated infection in developing countries: systematic review and meta-analysis. *Lancet*. 2011; 377 (9761): 228–41.
- [2] Global report on infection prevention and control. Geneva: World Health Organization; 2022. Licence: CC BY-NC-SA 3.0 IGO
- [3] Cassini A, Plachouras D, Eckmanns T, et al. Burden of Six Healthcare-Associated Infections on European Population Health: Estimating Incidence-Based Disability Adjusted Life Years through a Population Prevalence-Based Modelling Study. *PLoS Med* 2016; 13 (10): e1002150.
- [4] Suetens C, Kärki T, Plachouras D. European Centre for Disease Prevention and Control. Point prevalence survey of healthcare-associated infections and antimicrobial use in European acute care hospitals. Stockholm: ECDC; 2024.
- [5] Guidelines on core components of infection prevention and control programmes at the national and acute health care facility level. Geneva: World Health Organization; 2016. Licence: CC BY-NC-SA 3.0 IGO.
- [6] Teare EL, Peacock A. The development of an infection control link-nurse programme in a district general hospital. *J Hosp Infect* 1996; 34 (4): 267–278.
- [7] Charalambous L. Development of the link-nurse role in clinical settings. *Nursing Times*. 1995; 01 (11): 36–37., citirano iz: T. Cooper 2001. [8] Cooper T. Educational theory into practice: development of an infection control link nurse programme. *Nurse Educ Pract*. 2001; 1 (1): 35–41.
- [9] Peter D, Meng M, Kugler C, Mattner F. Strategies to promote infection prevention and control in acute care hospitals with the help of infection control link nurses: A systematic literature review. *Am J Infect Control* 2018; 46: 207–216.
- [10] Williams L, Cooper T, Bradford L, et al. An evaluation of an infection prevention link nurse programme in community hospitals and development of an implementation model. *J Infect Prevention* 2019; 20 (1): 37–45.
- [11] Ross KA. A program for infection surveillance utilising an infection control liaison nurse. *Am J Infect Control* 1982; 10 (1): 24–28.
- [12] Millward S, Barnett J, Thomlinson D. A clinical infection control audit programme: evaluation of an audit tool used by infection control nurses to monitor standards and assess effective staff training. *J Hosp Infect* 1993; 24 (3): 219–232.
- [13] Roberts C, Casey D. An infection control link nurse network in the care home setting. *Br J Nurs*. 2004; 13 (3): 166–70.
- [14] Macarthur C. Communication and collaboration: link nurses in diabetes care. *Semantic Scholar*. Medicine. Corpus ID: 76888737. Published 1998.
- [15] Tricco AC, Lillie E, Zarin W, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med*. 2018; 169: 467–473.
- [16] Isahak M, Zolkefli Y. The Role of The Infection Control Link Nurse in Hospital Settings: Challenges and Opportunities *Inter J Care Scholars*, 2022; 5 (1): 88–90.

- [17] Storr J, Topley K, Privett S. The ward nurses's role in infection control. *Nurs Standard* 2005; 19 (41): 56–64.
- [18] Dekker M, van Mansfeld R, Vandenbroucke-Grauls C, de Bruijne M, Jongerden I. Infection control link nurse programs in Dutch acute care hospitals; a mixed methods study. *Antimicrob Res Infect Control* 2020; 9: 42.
- [19] Dekker M, van Mansfield R, Ket JCF, van der Werff S, Vanderbroucke-Grauls CMJE, de Bruijne MC. Infection control link nurses in acute care hospitals: a scoping review. *Antimicrob Res Infect Control* 2019; 8: 20–33.
- [20] Moroz VD, Ward L. Infection Control Liaisons, Partners in CARES: Infection Prevention & Control. *AJIC* 2006; 34 (5) E85 Poster Abstract, Publication Number 11-97.
- [21] Downing J, Batuli M, Kivumbi G, et al. A palliative care link nurse programme in Mulago Hospital, Uganda: an evaluation using mixed methods. *BMC Palliative Care*. 2016; 15: 40–53.
- [22] Horton R. Linking the chain. *Nurs Times*. 1988; 84 (26): 44 – 6., citirano iz: Dawson SJ [24]
- [23] Jacobsen W, Cadwallader H. Implementing standard precautions in the operating theatre: the role of the infection control liaison nurse. *Australian Infect Control* 1999;4(1)
- [24] Dawson SJ. The role of the infection control link nurse. *J Hosp Infect* 2003; 54 (4): 251–257.
- [25] Lloyd-Smith E, Curtin J, Gilbert W, Romney MG. Qualitative evaluation and economic estimates of an infection control champions program. *Am J Infect Control*. 2014; 42: 1303–1307.
- [26] Lene MT. Improving infection control practices through staff link programmes. *Infect Dis Health*. 2002; 7 (1): 24–26.
- [27] Role of the Infection Control Liaison (ICL). Fact sheet for Health Care Professionals. Version 3.2. (Jan 2024). Government of South Australia, Ministry of Health. Clinical programs and practice guidelines | SA Health, pregledano 10. 1. 2024.
- [28] Hamm, S. SWAHS infection control link nurse education program. *Australian Nurs J*; North Fitzroy Dec 2008/Jan 2009; 16 (6): 40.
- [29] Sopirala MM, Yahle-Dunbar L, Smyer J et al. Infection Control Link Nurse Program: An interdisciplinary approach in targeting healthcare-acquired infection *Am J Infect Control*. 2014 April; 42 (4): 353–359.
- [30] Ojanperä H, Kanstea OI, Syrjala H. Hand-hygiene compliance by hospital staff and incidence of healthcare-associated infections, Finland. *Bull World Health Organ* 2020; 98: 475–483.
- [31] Sartelli M, Kluger Y, Ansaloni L et al. Knowledge, awareness, and attitude towards infection prevention and management among surgeons: identifying the surgeon champion. *World J Emerg Surg*. 2018; 13: 37.
- [32] Horton R. Introducing high quality infection control in a hospital setting. *Br J Nurs*. 1993; 2 (15): 746–748.
- [33] Manley K, Gallagher R. The role of the link nurse in infection prevention and control (IPC): developing a link nurse framework: Royal College of Nursing. 2021. <https://www.rcn.org.uk/Professional-Development/publications/rcn-role-of-the-link-nurse-in-infection-prevention-and-control-uk-pub-009595> (pregledano 10. 1. 2024.)
- [34] Perry C. Three major issues in infection control. *Br J Nurs*. 1998;7(16):946-948.
- [35] Williams L, Burton C, Rycroft-Malon J. What works: a realist evaluation case study of intermediaries in infection control practice. *J Advanced Nurs*. 2012: 00
- [36] Dekker M, van Mansfeld R, Vandenbroucke-Grauls CMJE. Role perception of infection control link nurses; a multi-centre qualitative study. *Journal of Infection Prevention* 2022; 23 (3): 93–100.
- [37] Wright J, Stoyer BH, Wilkerson S, Bretcher D. Expanding the infection control team: development of the infection control liaison position for the neonatal intensive care unit. *Am J Infect Control*. 2002; 30 (3): 174–178.
- [38] Hale R, Powella T, Dreyb S, Gould DJ. Working practices and success of infection prevention and control teams: a scoping study. *J Hosp Infect*. 2015; 89: 77–81.
- [39] Teare EL, Peacock AJ, Dakin H, Bates L, Grant-Casey J Build your own infection control link nurse: an innovative study day. *J Hosp Infect*. 2001; 48: 312–319.
- [40] Department of Health (2021) Link Nurse Framework Supporting Nurses in HSC Trusts. Belfast: NIPEC <https://niopa.qub.ac.uk/bitstream/NIOPA/13932/1/doh-link-nurse-framework.pdf>, pregledano 10. 1. 2024.
- [41] Nolan JP. Infection Prevention & Control Link Practitioner Programme Framework. *Community Health & Social Care Settings* 2021-2022. <https://www.hse.ie/eng/about/who/healthwellbeing/our-priority-programmes/hcai/resources/general/ipc-link-practitioner-programme-framework.pdf>, pregledano 10. 1. 2024.
- [42] Dekker M, Jongerden IP, Caris MG, de Bruijne MC, Vandenbroucke-Grauls CMJE, van Mansfeld R. Evaluation of an infection control link nurse program: an analysis using the RE-AIM framework. *BMC Health Services Research* 2023; 23: 140–150.
- [43] Syed A, Hinkle C, Newman R, et al. A Multidisciplinary Approach to Reducing Catheter-Associated Urinary Tract Infections in the Intensive Care Units Utilizing Link Nurse Program at a Tertiary Care Academic Medical Center. Session: 57. HAI: Preventing Device-Associated Infections Thursday, October 27, 2016, 12:30 PM
- [44] Friedewald M. Link nurse programs: worth the effort? *Healthcare Infection* 2009; 14: 39–40.
- [45] Krüger C, Meng M, Mattner F, Kugler C. (Development of a curriculum for infection control nurses for the qualification of infection control link nurses - results of focus group interviews with ward managers and infection control nurses in acute care hospitals in Germany). *Pflege*. 2017; 30 (2): 65–75.
- [46] Jenner EA, Wilson JA. Educating the infection control team - past, present and future. *A British perspective*. *J Hosp Infect*. 2000; 46: 96–10.
- [47] Ober J, Wong M, Hodson M, Reynolds L, Richard M, Edmond M. Infection control nurse liaison: our link to the 1990s expanding „hospital“ environment. *Amer J Infect Control*. 1999; 27 (2): 211.
- [48] Ghorbanmovahhed S, Shahbazi S, Gilani N, Ostadi A, Shabanloei R, Gholizadeh L. Effectiveness of implementing of an infection control link nurse program to improve compliance with standard precautions and hand hygiene among nurses: a quasi-experimental study. *BMC Medical Education*. 2023; 23: 265–277.
- [49] Tsioutis C, Birgand G, Bathoorn E et al. Education and training programmes for infection prevention and control professionals: mapping the current opportunities and local needs in European countries. *Antimicrob Resist Infect Control*. 2020; 9: 183–195.
- [50] Dekker M, Jongerden IP, de Bruijne MC, Jelsma B. Vandenbroucke-Grauls CMJE, van Mansfeld R. Strategies to improve the implementation of infection control link nurse programmes in acute-care hospitals. *J Hosp Infect*. 2022; 128: 54e63.
- [51] Barre F, Kaba H, Dresselhaus I, May E, Voigt M, Schaumann R, Dierks M-L, Scheithauer S. Determining the need for additional training among hospital infection-control workforce - results from a multi-centric survey within the multiresistance network of southern Lower Saxony (MRNS), Germany. *GMS Hygiene and Infection Control*. 2022; 17: 1–7.
- [52] Ward, D. Role of the infection prevention and control link nurse. *Primary Health Care*. 2015; 26 (5), 28–31.
- [53] Cooper T. Delivering an infection control link nurse programme: improving practice. *Br J Infect Control*. 2004; 5 (6): 24–27.
- [54] Ahmed K. Audit of hand hygiene at Broadmoor, a high secure psychiatric hospital. *J Hosp Infect* 2010; 75: 128–131.
- [55] Tebest R, Honervogt FYM, Westermann K, Samel C, Redaelli M, Stock S. Hygiene trained nursing staff at wards - What can this additional educated nurses achieve? *Pflege*. 2017; 30 (5): 271–280.
- [56] Seifi A, Dehghan-Nayeri N, Rostamnia L, et al. Health care-associated infection surveillance system in Iran: Reporting and accuracy. *Am J Infect Control*. 2019; 47: 951–955.
- [57] Seto WH, Yuen SWS, Cheung CWY, Ching PTY, Cowling BJ, Pittet D. Hand hygiene promotion and the participation of infection control link nurses: an effective innovation to overcome campaign fatigue. *Am J Infect Control*. 2013; 41 (12): 1281–3.
- [58] Shah N, Castro-Sánchez E, Charani E, Drumright LN, Holmes AH. Towards changing healthcare workers' behaviour: a qualitative study exploring non-compliance through appraisals of infection prevention and control practices. *J Hosp Infect*. 2015; 90: 126e134.
- [59] Ching TY, Seto WH. Evaluating the efficacy of infection control liaison nurse in hospital. *J Adv Nurs*. 1990; 15 (10): 1128–1131.
- [60] Miyachi H, Furuya H, Umezawa K et al. Controlling methicillin-resistant *Staphylococcus aureus* by stepwise implementation of preventive strategies in a university hospital: impact of a link-nurse system on the basis of multidisciplinary approaches. *Am J Infect Control*. 2007; 35 (2): 115–21.
- [61] Donati D, Miccoli GA, Cianfrocca C, Di Stasio E, De Marinis MG, Tagliani D. Effectiveness of implementing link nurses and audits and feedback to improve nurses' compliance with standard precautions: A cluster randomized controlled trial. *Am J Infect Control*. 2020; 48 (10): 1204–1210.

- [62] Tsuchida T, Makimoto K, Toki M, Sakai K, Onaka E, Otani Y. The effectiveness of a nurse-initiated intervention to reduce catheter-associated bloodstream infections in an urban acute hospital: an intervention study with before and after comparison. *Int J Nurs Stud.* 2007; 44 (8): 1324–33.
- [63] Thom KA, Li S, Custer M. Successful Implementation of a Unit-based Quality Nurse to reduce Central Line-associated Bloodstream Infections. *Am J Infect Control.* 2014; 42 (2): 139–143.
- [64] Thandar MM, Rahman O, Haruyama R et al. Effectiveness of Infection Control Teams in Reducing Healthcare-Associated Infections: A Systematic Review and Meta-Analysis. *Int J Environ Res Public Health.* 2022; 19, 17075.
- [65] Sidabalok J, Pujianto P. The effect of infection prevention and control link nurse supervision and resource availability on paramedic hand hygiene at Hanau hospital, Seruyan district, Central Kalimantan. Conference paper: 7th International Conference on Public Health 2020.
- [66] Yahia RM, Shaban FM, Hamouda SI, Mohamed LK. The role of head nurses as link for infection control at El-Behara hospitals. *ASNJ* 2012; 14 (2): 157–186.
- [67] Neuwirth MM, Marche B, Kugler C, et al. Evidence of the medical and economic benefits of implementing hygiene measures by a prevention link physician in trauma surgery: Study protocol for a biphasic multicenter prospective interventional pre-post cohort study using a structured intervention bundle development and tools of behaviour change management. *Contemporary Clinical Trials Communications.* 2021; 23: 100815.
- [68] Neuwirth MM, Herbrandt S, Mattner F, Otchwemah R. Standardized aseptic dressing change procedure: Optimizations and adherence in a prospective pre- and postintervention cohort study. *Infect Control Hosp Epidemiol.* 2022 Jun; 43 (6): 736–741.
- [69] Neuwirth MM, Marche B, Hoffmann J, Defosse J, Mattner F, Otchwemah R: Measures for reducing nosocomial infections in a tertiary care hospital-an interventional study with before-and-after comparison. *Dtsch Arztebl Int* 2023; 120: 536–537.
- [70] Republika Hrvatska Ministarstvo zdravlja. Pravilnik o uvjetima i načinu obavljanja mjera za sprečavanje i suzbijanje bolničkih infekcija. NN 85/2012.
- [71] Ashworth P. Infection control and the nursing process-making the best use of resources. *J Infect.* 1984; 5 (Supplement A): 35–44.

Prilog

TABLICA/TABLE 1. Edukacija vezne sestree / Link nurse education

PRIPREMNA EDUKACIJA			
Opis edukacije	Sadržaj edukacije	Tko povodi edukaciju	Zemlja, godina, referenca
Prva ideja bila je „uz rad“ od početka, što nije bilo dobro; core curriculum: 11 sesija po 2 sata (kasnije ukupno 8 sati)	Bakteriologija, dijagnoza infekcija, prevencija i kontrola infekcija, asepsa, izolacija, statistika, dezinfekcija i sterilizacija.	Epidemiološka služba bolnice	SAD, 1982. Ross KA [11]
Uvodni tečaj od 10 dana tijekom 10 tjedana	Osnove mikrobiologije i kontrole infekcija, ali ih i klinički psiholog podučava kako se nositi s opozicijom kolega.	NN*	SAD, 1988. Horton [22]
8 dana tijekom 12 tjedana+ posjet mikrobiološkom laboratoriju i sterilizaciji	NN	NN	UK, 1996. Teare EL [6]
Edukacijska konferencija	Temelji kontrole infekcija, izolacija, tuberkuloza, izvođenje edukacije, praćenje infekcija, dezinfekcija i sterilizacija.	Bolnički epidemiolog	SAD, 1999. Ober J [47]
Lokalno organizirani tečajevi	Opaska: treba pojačati kurikulum iz mikrobiologije i kontrole infekcija na studiju medicine i sestinstva.	NN	UK, 2000. Jenner EA [46]
Serijska predavanja	Sadržaj prema lokalnim potrebama; ističe edukaciju iz komunikacije, prezentacije i vještinu upravljanja i međuljudskih odnosa, te upravljanje promjenama.	Sestra za prevenciju IPZS-a**	UK, 2001. Cooper T [8]
Tečaj akreditiran od sveučilišta	NN	NN	UK, 2001. Teare EL [39]
Cjelodnevna radionica o revidiranim politikama prevencije	NN	Tim*** za prevenciju IPZS	Australija, 2002. Lene MT [26]
3 puna dana s razmakom od 6 tjedana između njih	NN	NN	Australija, 2009. Friedenwald M [44]
2 dana temeljni tečaj	NN	NN	SAD, 2014. Sopirala MM [29]

Opis edukacije	Sadržaj edukacije	Tko povodi edukaciju	Zemlja, godina, referenca
8-satni edukacijski program	NN	NN	SAD, 2016. Syed A [43]
Modularni kurikulum, prilagodljiv ustanovi i odjelu	Mora sadržavati veliki dio o higijeni, zatim o pedagogiji i didaktici i stjecanju psiholoških kompetencija, kao i praktičke oblike nastave.	Tim za prevenciju IPZS-a	Njemačka, 2017. Krueger C [45]
Prilagođeni <i>online</i> tečaj od 10 nastavnih jedinica	Principi prevencije infekcija, donošenje EBM u praksu, standardi, smjernice, provjera, vještina vođenja, vještina promjene ponašanja, razumijevanje kontekstualnih utjecaja na upravljanje pozitivnim promjenama.	Tim za prevenciju IPZS-a u suradnji s ustanovom za više obrazovanje	UK, 2019. Williams L [10]
Uvodni tečaj (2 sata); <i>in house</i> edukacija	NN	Tim za prevenciju IPZS-a	Nizozemska, 2020. Dekker M [18]
60 satni program u svim javnim bolnicama	NN	NN	Cipar 2020 Tsioutis C [49]
40 sati z VS ^S i VL ^{SS}	NN	NN	Njemačka, 2020. Tsioutis C [49]
<i>Online</i> i <i>on site</i> tečajevi	NN	NN	Italija, 2020 Tsioutis C [49]
Kratki tečajevi	NN	NN	Nizozemska, 2020. Tsioutis C [49]
6-dnevni tečaj	NN	NN	Švicarska, 2020. Tsioutis C [49]
1 tjedan temeljnog tečaja	NN	NN	Njemačka, 2022. Barre F [51]
Trodnevni temeljni tečaj	Uz stručno znanje, psihološke i komunikacijske vještine	NN	Brunei, 2022. Isahak M [16]
Praktična edukacija o standardnim mjerama i higijeni ruku	Pregled smjernica, rasprava o značenju tih smjernica.	Sestra za prevenciju IPZS-a, istraživači (za potrebe istraživanja)	Iran, 2023. Ghorbanmovahhed S [48]

EDUKACIJA TIJEKOM RADA

Opis edukacije	Sadržaj edukacije	Tko povodi edukaciju	Zemlja, godina, referenca
Tečajevi mogu biti i <i>online</i>	Shematski prikaz edukacije VS-a: prvi stadij: temeljne vještine i načela; drugi stadij: temeljno znanje koje podupire praksu; treći stadij: temeljna znanja i napredne vještine.	Tim za prevenciju IPZS-a	SAD, 1993. Horton R [32]
Svaka 2 – 3 mjeseca 1 sat tijekom 3 uzastopna dana, uz vrijeme za ručak	Teme povezane s kontrolom infekcija.	NN	UK, 1996. Teare EL [6]
Godišnji sastanci na kojima se provodi edukacija o novostima	NN	NN	SAD, 1999. Ober J [47]
Svaka 3 mjeseca sastanak u kući; studijski dan s 5 sekcija, učenje razmišljanjem	Studijski dan: najbrža svjetska provjera higijene ruku, zid znanja, kliničko upravljanje, kviz o IPZS-u, i napravi vlastitu VS.	Tim za prevenciju IPZS-a	UK, 2001. Teare EL [39]
Neformalne konzultacije, mjesečni forumi	NN	Tim za prevenciju IPZS-a	Australija, 2002. Lene MT [26]
Program trajnog učenja kratki tečajevi, sastanci	Uz znanje, tečajevi moraju sadržavati i vještine za promjene i za podučavanje odraslih.	Sestra za prevenciju IPZS-a	UK, 2003. Dawson SJ [24]

Opis edukacije	Sadržaj edukacije	Tko povodi edukaciju	Zemlja, godina, referenca
Redovni mjesečni 1-satni sastanci s epidemiologom	NN	NN	SAD, 2014. Sopirala MM [29]
NN	Mikrobiologija, praksa prevencije IPZS-a, temelji o dezinfekciji i sterilizaciji, higijena hrane i vode, rješavanje epidemije, provjera higijene, vještine poučavanja i psihološke vještine.	Tim za prevenciju IPZS-a	Njemačka, 2018. Peter D [9]
Mjesečni sastanci VS-a i tima za IPZS (licem-u-lice)	NN	NN	UK, 2019. Williams L [10]
2 sata 1 – 6 puta godišnje; edukacijski sastanci s timom za IPZS	NN	Tim za prevenciju IPZS-a	Nizozemska, 2020. Dekker M [18]
6 – 8 puta godišnje redovita edukacija i sastanci grupe	NN	NN	Finska, 2020. Ojanperä H [30]
Temeljni tečaj, nacionalno standardiziran; 5 uzastopnih dana; akreditiran: Irski centar sestrinstva i primaljstva; uglavnom za domove za starije	Uvod u prevenciju i kontrolu IPZS-a, standardne i za prijenos specifične mjere, procjena rizika i rezistencija, upravljanje i vođenje na području IPZS-a, higijena ruku/osobna zaštitna oprema (podučavanje učitelja).	Osoblje za prevenciju IPZS-a	Republika Irska, 2021. – 2022., Nolan JP [41]
Redoviti sastanci s timom za IPZS	NN	NN	Brunei, 2022. Isahak M [16]
Redovno ažuriranje	NN	NN	Njemačka, 2022. Barre F [51]

*NN = nije navedeno; **IPZS = infekcije povezane sa zdravstvenom skrbi; ***Tim = liječnik i sestra; ^SVS = vezna sestra; ^SVL = vezni liječnik