Vocations and Learning (2013) 6:297–321
DOI 10.1007/s12186-013-9096-2

ORIGINAL PAPER

Perspectives on Age and Continuing Professional Development for Nurses: A Literature Review

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Received: 13 August 2012 / Accepted: 10 January 2013 /
Published online: 31 January 2013

Abstract The need for nurses to participate in continuing professional development (CPD) is growing to keep abreast of rapid changes in nursing care. Concurrently, the nursing workforce is growing older. Ageing leads to changes in biological, psychological, and social functioning. Little is known about the effects of age-related changes on nurses' CPD. A literature review was conducted to examine whether and how CPD differs across age groups. A framework with five perspectives on age was used in an attempt to distinguish factors contributing to these age differences. Given the limited research on this topic with respect to nurses, we also included studies of workers in general. The literature search revealed 27 relevant studies. In general, older workers appeared less likely to participate in CPD, when considering formal learning activities and late-career workers (older than 50/55 years). We found no clear age patterns for motivation to participate in CPD, for learning outcomes, and for participation in informal and non-formal learning activities. The study showed that more nuanced results are found when studies distinguish at least three age groups. By using different perspectives of age, a comprehensive overview of age-related factors in CPD was generated and gaps in current research were identified. Recommendations for further research are discussed, such as the need for research on whether the types of learning activities that nurses undertake change with ageing.

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Keywords Continuing professional development · Age differences · Nurses · Older workers · Workplace learning · Literature review

Introduction

Continuing professional development (CPD) in nursing is increasingly necessary for nurses to keep abreast of rapid changes in patient care due to advancements in knowledge and technology (Atack 2003; Berings 2006; Gopee 2001). In addition, there is a growing sense that CPD contributes to higher job satisfaction, organisational commitment, and lower stress (Berings 2006; Chien et al. 2008). Lack of CPD influences nurses' decisions to leave their profession (Hallin and Danielson 2008) and to retire early (Andrews et al. 2005; Armstrong-Stassen and Schlosser 2008).

At present, the nursing workforce is ageing, and fewer young people are entering the nursing profession. In Dutch hospitals, the percentage of workers over 50 years of age has grown from approximately 19 % in 2003 to 27 % in 2009, and it is expected to grow further to 36–39 % in 2018 (Van der Windt et al. 2009). To prevent a looming nursing shortage, there is a need to retain older nurses and sustain their employability beyond existing retirement ages. This trend is seen in other Western countries (Spinks and Moore 2007; Wray et al. 2009).

Consequently, employers, nurses' associations, and national health agencies, accustomed to a workforce traditionally dominated by younger nurses (Palumbo et al. 2009), face the challenge of having to develop CPD approaches geared towards the needs of all age groups (Andrews et al. 2005; Lammintakanen and Kivinen 2012). This underscores the importance of understanding CPD in different age groups and, in particular, in older nurses. However, few studies have examined older nurses' CPD, and even fewer have studied differences with other age groups. In an attempt to fill this gap a research project on nurses' CPD from a life span perspective was started (Pool et al. 2013). Part of this project is a literature review which is presented in this paper. It examines the ways in which older nurses' CPD differs from other age groups' CPD, and which age-related factors contribute to these differences. Because we expected the number of studies in the nursing field to be low, this review also includes relevant literature on workers in general. Before addressing the research questions, the concepts of CPD and age are discussed.

Continuing Professional Development

The American Nurses Association (ANA) has defined nursing professional development as 'a life-long process of active participation by nurses in learning activities that assist in developing and maintaining their continuing competence, enhancing their professional practice, and supporting achievement of their career goals' (ANA 2011). This is a useful definition because it encompasses different purposes of CPD. It fits with nurses' perceptions of CPD as important for enhancing service provision, maintaining safety for patients and themselves, and increasing career and personal opportunities (Gould et al. 2007).

Opinions vary on the learning activities that can be qualified as CPD (Friedman and Phillips 2004). Some confine CPD to planned learning in an educational setting. However, the growing concern about maintaining workers' competence has led to increased attention to ongoing development at the workplace and to development through work experiences (Harteis and Billett 2008). Other researchers, therefore, use a broader definition of CPD that includes learning activities in a workplace environment. This accords with research showing that nurses develop their expertise through a broad range of learning activities varying from formalised courses to interactions with colleagues and other daily work experiences (Berings 2006; Eraut 2007; Estabrooks et al. 2005). Discussion on the learning activities that can be considered CPD is hindered by the lack of a widely accepted typology of learning activities. Often, formal learning is distinguished from informal learning, with the former referring to intentionally planned learning in an educational setting and the latter to learning in a workplace environment. Nevertheless, this distinction does not take into account the fact that learning at the workplace can also be highly structured and designed to ensure the continuity of an organisation (Billett 2006). Tynjäla (2008) identifies three modes of workplace learning: incidental and informal learning as a side effect of working, intentional but non-formal learning activities, and formal on- and off-the-job training. In this paper, we will review the literature by using a broad perspective on CPD.

The Concept of Age

There has been much debate on what is considered an 'older worker'. Age seems a simple concept, but a closer look reveals that age can be conceptualised in many ways (Schalk et al. 2010). During their lifetimes, people develop in biological, psychological, and social functioning (Sterns and Miklos 1995). These three types of ageing call for different approaches to conceptualise and operationalise age (Schalk et al. 2010; Sterns and Doverspike 1989). In a study on the (re)training of older adults, Sterns and Doverspike (1989) identified five approaches that recently have been used as a framework in two studies to examine issues of ageing and work (De Lange et al. 2006; Kooij et al. 2008). In order to ensure a broad conceptualisation, we have used these perspectives on age as a framework to review the literature on age differences in nurses' CPD.

Chronological Age

This refers to one's calendar age. The distinction between younger and older workers is frequently based on chronological age (Sterns and Miklos 1995). Although age in itself is not a useful indicator of behavioural change (Kooij et al. 2008; Settersten and Mayer 1997), chronological age is convenient and broadly used. The 'older nurse' is often conceptualised as nurses in their 40s, 50s, and 60s (Buchan 1999; Fitzgerald 2007). The demarcation between younger and older workers is not fixed, but depends on legal, governmental and organisational practices (Kooij et al. 2008; Palumbo et al. 2009). For instance, statutory regulations on retirement age and special provisions such as additional holidays, use chronological age to define the 'older worker'

(Schalk et al. 2010). According to the Lisbon Strategy of the European Union, those between 55 and 64 years of age are the priority group of older workers, while researchers often tend to take the age of 45 as the cut-off point between younger and older workers (Tikkanen and Nyhan 2006).

Many people experience their calendar age as a determining factor (Tikkanen and Nyhan 2006). Some people cannot keep working when they reach a certain chronological age, others feel discriminated against as they are considered too old when applying for a job, and recent retirement reforms force people to work for a longer period than they initially anticipated (Tikkanen and Nyhan 2006).

Functional Age

This construct recognises that ageing individuals go through various biological and psychological changes (Sterns and Doverspike 1989), which may be reflected in health status, physical capacity, and cognitive performance (Kooij et al. 2008; Sterns and Miklos 1995). When studying age differences in CPD cognitive functioning seems to be especially relevant.

Older workers are often viewed as less able to learn than are their younger colleagues (Gray and McGregor 2003). This view appears to be supported by the results of a meta-analytic review of the relationship between age and job-related training (Kubeck et al. 1996), which revealed that older adults show less mastery of training material, complete a final task more slowly, and take longer to complete a programme. However, these findings should be interpreted with some caution. Outcome differences could also reflect pre-training differences instead of indicating that older adults learn less (Kubeck et al. 1996). Furthermore, laboratory studies showed larger age differences than did field studies, probably implying that in real-world tasks, the effects of practice and experience may counter age-related declines. Finally, learning at the workplace may allow older workers to compensate for less mastery of training material (Kubeck et al. 1996).

Age differences in learning depend on the content to be learned and the cognitive abilities necessary. Kanfer and Ackerman (2004) argue that a decline in cognitive abilities is found when considering fluid intelligence (working memory, abstract reasoning, attention, and processing novel information). In contrast, crystallised intellectual abilities, representing aspects of educational and experiential knowledge, show increasing levels of performance into middle age and beyond. Therefore, it might be relevant to make a distinction between learning in a radically different field and learning new skills within the expert domain of the experienced worker (Lahn 2003). In addition, Beier and Ackerman (2005) provided a more optimistic view on the relationship between learning and ageing than that often assumed. Their research showed that prior knowledge was an important predictor of knowledge acquisition for learning.

Psychosocial Age

Psychosocial definitions of older workers include those based on social and self perceptions of the older worker (Kooij et al. 2008; Sterns and Doverspike 1989). Social perception refers to expectations and norms of appropriate behaviour and

characteristics for people at different ages (Schalk et al. 2010). A significant amount of research focuses on the perceived attributes (or stereotypes) of older workers. Several reviews show that although research results are equivocal, older workers are perceived as harder to train, less motivated to learn, inflexible, and less able to keep up with technological changes (Gray and McGregor 2003; Kooij et al. 2008; Sterns and Doverspike 1989). Perceived positive traits of older workers are that they have a strong work ethic, are conscientious, knowledgeable, and have greater commitment (Kanfer and Ackerman 2004; Kooij et al. 2008; Sterns and Doverspike 1989).

Negative stereotypes of older workers lead to a paradox (Billett et al. 2011). Employers are increasingly in need of the service of older workers, but negative views about their performance and adaptability can lead to discriminatory managerial decisions (Billett et al. 2011; Kooij et al. 2008), such as providing fewer opportunities for training and development (Gray and McGregor 2003). Paradoxically, social support is important for older workers' participation in CPD (Liu et al. 2011). Stereotypical views can also influence older workers' motivation for CPD. An experimental study showed that older workers confronted with negative stereotypic information were less motivated to learn and develop than workers confronted with positive stereotypic information (Gaillard and Desmette 2010).

Self-perception of age refers to how old a person feels, with which age cohort one identifies, and how old the person desires to be (Kooij et al. 2008; Settersten and Mayer 1997). In this view, ageing refers to a shift in time orientation. The socioemotional selectivity theory (Carstensen et al. 1999) claims that when people move through life, their perception of time changes from time as open-ended to time as limited. Older people become increasingly aware that their time is running out. This influences the selection of social goals. When ageing, people become mostly present-oriented and less concerned with the distant future.

Self-perception of age also influences preferences for activities that support one's self-concept (Kooij et al. 2008). Ageing individuals try to protect their self-concept, avoiding development activities that make use of fluid intelligence and preferring activities that build upon their expertise (Kanfer and Ackerman 2004). Along these lines, Morgenthaler (2009) suggests that returning to school might be intimidating for nurses because people do not like to be novices again after attaining recognition as a professional in their field.

Finally, one's self-perception of age is also likely to affect self-efficacy (Kooij et al. 2008), thereby affecting older workers' participation in CPD (Maurer 2001). Maurer (2001) argues that various processes (including a decline in social support and an exposure to age stereotypes) might negatively affect older workers' self-confidence for learning and development.

Organisational Age

Older workers have often spent a substantial amount of time in a job and even more time in an organisation (Sterns and Doverspike 1989). This perspective recognises this confounding of age and job or company tenure (Schalk et al. 2010; Sterns and Doverspike 1989). Organisational age may refer to tenure and career stage.

A longer work history can have two opposite effects. Work experience can lead to an increased level of expertise (Benner 1984), which might influence workers' preference

for certain CPD activities. Daley (1999) found that novice nurses benefited from formal training, while more experienced nurses preferred work-based opportunities like dialogue with colleagues. In contrast, longer tenure might lead to deterioration of knowledge and skills. Obsolescence can be expected to increase with age (Kooij et al. 2008), leading to a higher need for CPD.

In their careers, workers progress through different stages in which CPD needs may vary. Super (1984) proposed a sequence of career stages starting with trial (characterised by identifying interests, capabilities, and fit between self and work), then establishment (increasing commitment to career, career advancement, and growth), maintenance (maintaining self-concept, holding onto accomplishments earlier achieved), and finally decline (developing new self-image independent of career success). It should be noted that career paths have ceased to show a linear pattern. People enter and exit different life arenas at different times (Lahn 2003). At the beginning of a career, workers might need support in identifying their interests and developing their capabilities. In late career, after doing the same task for ten or twenty years, a concentration of experience might be a problem, making it difficult for workers to learn or to change jobs (Nauta et al. 2010).

Life-span Age

This perspective adds that behavioural change can occur at any point in the life cycle (Kooij et al. 2008; Sterns and Doverspike 1989). Many variables may impact the ageing process, such as unique career and life changes and individual health and stress-inducing events. A possible indicator of life-span age is the individual's personal situation and situation at home (De Lange et al. 2006). Exploring possible barriers for nurses to pursue additional education, Morgenthaler (2009) argues that one's situation at home can be a significant barrier. Going to school might not be an option for nurses who have the responsibility for older parents while also caring for their own families. The financial situation at home might be another barrier. The life-span approach stresses that more individual differences exist as people grow older (Sterns and Doverspike 1989).

Comparing the Five Perspectives

An underlying continuum of these perspectives is that age can be a characteristic of the individual (e.g. calendar age), the environment (e.g. social age in the psychosocial perspective), or the person-environment interaction (e.g. tenure in the organisational perspective) (Schalk et al. 2010). A critique on these conceptualisations of age might be that they are discussed mainly on a theoretical level and that, to our knowledge, no studies have validated the conceptualisations and their independent qualities. The overlap between some conceptualisations complicates the description of possible indicators. Kooij et al. (2008), for instance, used 'skills obsolescence' as a possible indicator of organisational age, whereas others (Sterns and Doverspike 1989; Sterns and Miklos 1995) discussed skills obsolescence under the psychosocial perspective. Similarly, career stage is an indicator of organisational age (Kooij et al. 2008) or of the life-span perspective (Sterns and Doverspike 1989; Sterns and Miklos 1995).

Despite these shortcomings, we think this framework enhances the discussion and the research on issues of age and CPD. It illustrates the multidimensional process of ageing

and shows that these issues can be studied from different perspectives. It gives reason to believe that CPD of older nurses differs from that of younger workers. However, the exact relationship between age and CPD remains poorly understood. The main research questions of this study are therefore, 'Is CPD for older and younger nurses different and if so, in what respect?' and 'Which age-related factors contribute to these differences?' An understanding of the relationship between age and CPD will help to better adjust CPD approaches to the needs of different age groups.

Methods

A literature review was conducted in four phases. First, inclusion and exclusion criteria were formulated. To be eligible for inclusion, publications must have reported (1) on age differences in CPD, (2) on an empirical study or meta-analysis in a peer-reviewed journal, and (3) in the English language. Publications were excluded when (1) reporting on one age group without examining age differences, (2) having an experimental design with workers participating in non-work-relevant learning, and (3) reporting on differences between generations. When publications reported on the same study, the most informative publication was selected. We did not limit our search to a specific time frame.

Second, a search strategy was developed. Key publications were analysed to identify relevant search terms. We used a broad definition of CPD referring to various learning activities, and, therefore, listed search terms such as learning, training, and staff development. As we expected that relevant studies in the nursing field would be scarce, we also searched for studies on workers in general. In addition, we observed two viewpoints in the research on age differences. Some of the researchers were interested in age differences in CPD, while others were mainly interested in older workers' CPD and examined whether this CPD differs from that for younger workers. In order to identify studies from both viewpoints, we used a double search strategy on the combination 'nurses-age differences-CPD' and the combination 'older nurses-CPD'. Various search terms and their combinations were listed and pilot tested. After careful consideration of the consequences of removing potential search terms, we identified the most informative search terms (see Fig. 1).

Third, literature was searched in five databases: PubMed, Web of Science, Scopus, PsycINFO, and CINAHL in December 2011. We focused on the title, abstract, and keywords. All abstracts were screened for relevancy. If the abstract did not give sufficient information, the full text was scanned. The search resulted in 786 unique publications, which were screened for relevancy. Finally, 27 articles met the inclusion criteria (Fig. 2 shows the flow chart of the review). A relatively large amount of literature that was excluded from the review did not focus on CPD. These publications used the search word "training" or "learning" in the abstract, for instance when recommending more training for nurses or other workers, without studying the learning or training of these workers. A smaller amount was excluded because it was on people above the retirement age, or because it examined one age group without making comparisons with other age groups.

Fourth, the literature was reviewed using a self-devised review form. For each study, background information (e.g. research design, sample, country) and a short

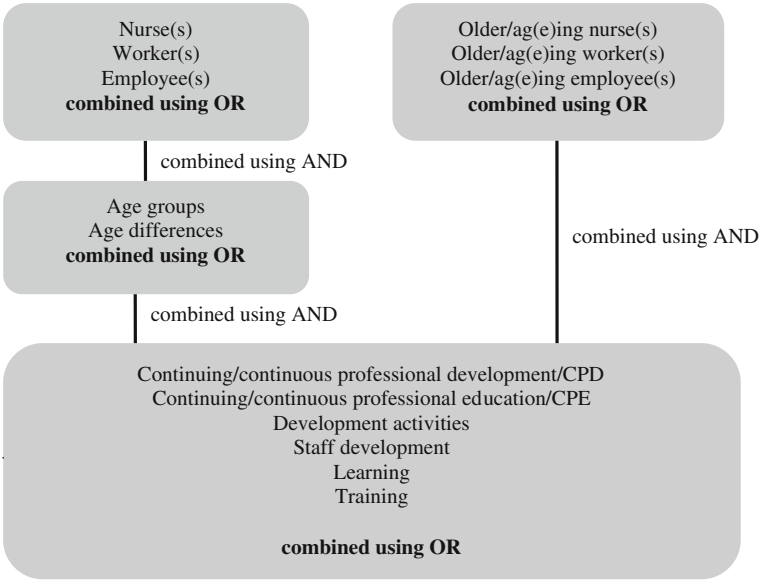

Fig. 1 Search terms

summary of the relevant findings were described. Then, several questions were answered concerning the examined age differences in CPD and the perspective used on age. Many studies used several indicators (e.g. tenure, marital status, calendar age), but a perspective on age was marked only when the study reported and analysed the results of these indicators.

Table 1 presents information on the studies reviewed. As expected, only a small number of studies (n=3) examined CPD for nurses in hospitals and other health care

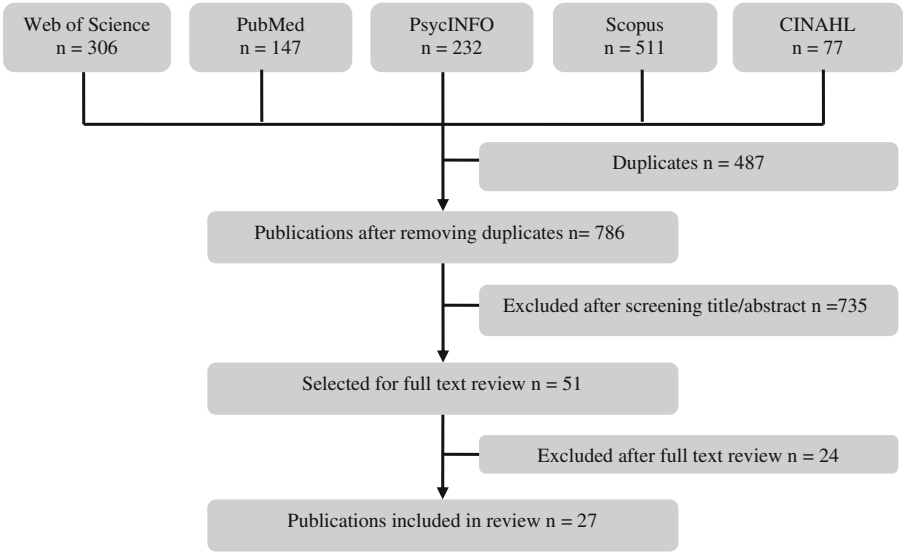

Fig. 2 Search results

Table 1 Reviewed studies

Authors	Design	Data collection method	Sample	Country and profession	Age groups	Categorie[a]	Perspectives on age				
							calender	functional	psychoscial	organisational	life span
Nurses											
Lammintakanen and Kivinen (2012)	Cross sectional	Survey	*N*=653 (9 without age information)	Finland (6 hospital districts) Nurses	<39, 40–50, ≥ 51	B	x		x		
Tones et al. (2010)	Cross sectional	Survey	*N*=110	Australia Private hospital employees	<45, 45–55	A	x		x		
Wray et al. (2009)	Cross sectional	Postal survey	*N*=510	United Kingdom Nurses and midwives	< 50, and ≥50	B	x				
Other professions											
Berg and Chyung (2008)	Cross sectional	Online survey	*N*=125	5 list serv of professionals working in field of l earning and performance improvement	Mean age 42.36 (SD 10.02)	B	x				
Cully et al. (2000)	Cross sectional	Data from 3 surveys between 1989–1993 Australian Bureau of Statistics of training and education and other sources	Not reported	Australia Diverse sectors & jobs	Different age groups	B	x			x	
De Lange et al. (2009)	3 wave, 3 years longitudinal	Survey	*N*=1742 (T1) *N*=1473 (T3)	Netherlands Diverse sectors & jobs	≤30, 31–44, ≥45	A	x		x	x	
Delgoulet and Marquié (2002)	Quasi-experimental	Survey, video-observation, written knowledge tests	*N*=43	France Maintenance operators railway	25–49 ≤ 38 and ≥39	C	x		x		
Felstead (2010)	Cross sectional	Data from 5 surveys between 1986–2006: Social change and economic life initiative, Employment in Britain, Skills surveys	*N*=22,000	United Kingdom Diverse sectors & jobs	20–34, 35–49, 50–60 (one survey 61–65)	A,B,C	x		x	x	

Table 1 (continued)

Authors	Design	Data collection method	Sample	Country and profession	Age groups	Categorie[a]	Perspectives on age				
							calender	functional	psychoscial	organisational	life span
Greller (2006)	Cross sectional	Survey	*N*=450	United States of America College-educated men	23–31, 32–39, 40–49, 50–70 Mean age 45	B	x			x	
Guthrie and Schwoerer (1996)	Cross sectional	Survey	*N*=380	United Sates of America, Managerial & supervisory employees of a public employer	≤35, 36–49, ≥ 50. Mean age 43,7	A, D	x	x	x	x	
Kyndt et al. (2011)	Cross sectional	Survey	*N*=628	Belgium Public health sector, diverse jobs	<45, ≥45	A	x		x	x	x
Maurer et al. (2003)	3 wave, 13 month longitudinal	Survey	*N*=1395 (T1) *N*=800 (T3)	United Sates of America Diverse sectors & jobs	Mean age 43.87 (SD 10.75)	A, B	x	x	x	x	x
Maurer and Weiss (2010)	Cross sectional	Survey	*N*=906	United Sates of America Telecommunications company, managerial jobs	Mean age 43.21 (SD 7.95)	D	x	x		x	
Newton (2006)	Cross sectional	Data from Labour force survey (Spring 2004) & National adult learning survey 2002, and qualitative interviews	Not reported	United Kingdom	Grouped in 5 years	B	x		x		
Ng and Feldman (2008)	Meta-analysis		380 empirical studies, 438 samples		<30, 31–35, 36–40, >40	C	x				
Paloniemi (2006)	Phenomenographical	Group and individual interviews	16 interviews *N*=43	Finland Employees from SME's	Mean age 41	A	x			x	
Pillay et al. (2003)	Phenomenographical	Interviews	*N*=55	Australia Diverse jobs in medical service & transport industry	< 40 (*n*=16), > 40 (*n*=39)	A	x				

Table 1 (continued)

Authors	Design	Data collection method	Sample	Country and profession	Age groups	Categorie[a]	Perspectives on age				
							calender	functional	psychoscial	organisational	life span
Pillay et al. (2006)	Cross sectional	Survey	*N*=397	Australia Diverse jobs of local government councils	≤ 40, > 40	A	x		x		
Schmidt (2009)	Cross sectional	Survey	*N*=301	United Sates of America & Canada Call centre services, diverse jobs	57 % between 20–35 years	C	x			x	
Simpson et al. (2002)	Cross sectional	Data from National household education survey	N=19,722	United Sates of America Diverse sectors & jobs	16–39 40–65 40–49 50–65	B	x		x		
Stamov Roßnagel et al. (2009)	Cross sectional Experimental	Online survey E-learning with knowledge test	*N*=479 *N*=60	Germany Mail order company, diverse jobs	Study 1: 18–35, 36–50, 51–65 Study 2: 18–35 (*n*=30), 51–65 years (*n*=30)	C, D	x	x	x		
Taylor and Urwin (2001)	Cross sectional	Data from Labour force survey (Spring 1997)	*N*=55,085	United Kingdom Diverse sectors & jobs	16–24 25–39 40–49 40–49 50–59/64	B	x		x	x	
Thangavelu et al. (2011)	Cross sectional	Data from Singapore Labour Force survey 2004	98 % of 2400	Singapore Diverse sectors and jobs	Not reported	B	x		x	x	x
Tones and Pillay (2008)	Cross sectional	Survey	*N*=112	Australia Government employees, different jobs (blue and white collar)	51 % ≤45	A	x		x		

Table 1 (continued)

Authors	Design	Data collection method	Sample	Country and profession	Age groups	Categorie[a]	Perspectives on age				
							calender	functional	psychoscial	organisational	life span
Tones et al. (2011)	Cross sectional	Survey	*N*=137	Australia Local government employees (professional/ managerial jobs)	58 % <45	A	x		x		
Urwin (2006)	Cross sectional	Data from Labour force survey (Spring 2004)	Not reported	United Kingdom Diverse sectors & jobs	16–24 25–39 40–49 50–59/64	B	x			x	
Van Vianen et al. (2011)	Cross sectional	Survey	Employees: *n*=208, supervisors *n*=30	Netherlands Diverse jobs in public city council	Employees' mean age 44.4 (SD 10.42) Supervisors' mean age: 49.1 (SD 6.47) < 45, ≥ 45	A	x		x	x	

[a] Studies fell in four categories: (A) motivation for CPD, (B) participation in CPD, (C) learning outcomes and (D) learning competence

settings. The table shows that the other studies examined workers in various other professions and occupational branches. Although we did not use a limited time frame, relevant publications were only found in the years 1996–2012. Earlier studies did not meet the inclusion criteria. All studies were from industrialised countries, mostly from Australia (n=6), the United Kingdom (n=5), and the United States (n=6). Most studies (n=21) had a cross sectional design, some were longitudinal (n=2), (quasi) experimental (n=2), phenomenographical (n=2), and meta-analytic (n=1). Some cross-sectional studies used data from large general-purpose surveys such as the *Labour Force Survey* (UK) and others used specifically designed surveys.

Results

We examined the literature to identify whether and in what respect CPD differs across age groups. The results revealed four themes relevant to age differences in CPD: motivation for CPD (n=12), participation in CPD activities (n=12), learning outcomes (n=5), and learning competence (n=3). In addition, we identified factors contributing to these age differences using the framework with five perspectives on age. Table 1 shows that all studies used a chronological perspective on age (n=27), and only a few used a functional (n=4) or life-span (n=3) perspective. The psychosocial (n=17) and organisational perspective (n=14) were used most often. The findings for each of these themes and perspectives on age are described below. The findings on the learning-competence theme were related to cognitive abilities and will therefore be described as part of functional age.

Age Differences in Motivation

Twelve studies examined whether younger and older workers differ in their motivation for CPD. The results showed some age differences in motivation, but without a clear direction. Some studies found that older workers were less willing to invest in learning and training (Van Vianen et al. 2011) and to improve their working skills and qualification (Pillay et al. 2006) compared to younger workers. These results should be interpreted with some caution. The effect sizes in Pillay's study were low, and motivation in Van Vianen's study was examined in a particular situation. Workers' motivation was defined as the attitude towards a request from the organisation to participate in learning and training activities. Another study (De Lange et al. 2009) revealed no motivational differences between younger and older workers. This longitudinal study showed that middle-aged workers (31–44 years) reported significantly higher motivation to learn than both younger (≤31 years) and older workers (≥45 years).

According to life-span theories, people can strive for different goals during their lives, influenced by a reciprocal interaction between the individual and the environment. Based on these ideas, Tones and Pillay (2008) developed a learning and development survey to investigate workers' selection of learning and development goals. This survey was tested with different demographic variables in three studies (Tones and Pillay 2008; Tones et al. 2010; Tones et al. 2011). A study among local

government workers found that older workers were less engaged in learning and development goals than were younger workers (Tones and Pillay 2008). Unexpectedly, a study among nurses revealed that goals associated with decreased career involvement were linked with younger workers (Tones et al. 2010). The researchers suggested that a large proportion of the nurses work part time and were probably balancing career and family life.

Age Differences in Participation

Twelve studies examined whether participation in CPD activities is influenced by age. The results of the studies seemed to be contradictory. Greller (2006) found that career motivation, rather than age, was a factor in the hours spent in professional development. Late-career workers did not spend less time on professional development than the other age groups. Two other studies showed that older workers participated even more in CPD activities than younger workers did, especially in informal learning activities (Berg and Chyung 2008; Lammintakanen and Kivinen 2012). However, most studies found that participation in CPD decreased with age. A survey of employment experiences of older nurses in the United Kingdom showed that 73 % of the sample aged 50 and over had not accessed any CPD activities in the last 2 years compared with 27 % of those under 50, with women experiencing greater barriers than men (Wray et al. 2009). Also in other professions, the incidence of training declined with age (Felstead 2010; Thangavelu et al. 2011; Urwin 2006).

Studies distinguishing between middle-aged and older workers, or mid- and late-career ones, showed more nuanced results. Participation rates of 45–54 year-olds in CPD activities were not substantially lower than that of younger cohorts, while participation rates of workers above 54 years were much lower (Cully et al. 2000). Others reported similar results for workers above 50 years (Simpson et al. 2002; Taylor and Urwin 2001).

Younger and older workers also differed in the type of CPD activity they undertook. Older workers were more likely to undertake short training courses of less than 1 week's duration (Urwin 2006) or activities that develop focused occupational skills (Simpson et al. 2002). Older nurses participated more in information meetings and had more appraisals, but they participated slightly less in in-service training programmes and mentoring than did younger nurses (Lammintakanen and Kivinen 2012).

Age Differences in Learning Outcomes

Five studies examined age differences in learning outcomes at two different levels: satisfaction and performance.

Schmidt (2009) examined learning outcomes at the level of job training satisfaction, which refers to workers' feelings about the job training they received as a whole (not a single course or training programme). They found no significant correlation between age and job training satisfaction. Job tenure, or experience on the job, did relate to satisfaction. Workers in the first year of employment were more satisfied than workers with a longer tenure were.

In a meta-analysis of the relationship of age to ten dimensions of job performance, Ng and Feldman (2008) examined learning outcomes at the level of training

performance. They found that the training performance of older workers was slightly lower than that of younger workers, but noted that only studies with post-training scores on performance were included and that a large proportion of the studies were on technology training (Ng and Feldman 2008). In another study, workers who received training rated its impact on performance as high, but these ratings fell a little with age. For older workers, training was less likely to result in a pay increase or more enjoyment of their work (Felstead 2010).

Chronological Age

All studies used calendar age to divide the sample of participants in age groups organised. Some studies divided the sample in two groups: older and younger workers, using a demarcation somewhere between 38 and 50 years. Others made a distinction in three (using a middle-aged group) or more groups. Not all studies used the term 'older worker' or 'mature-aged worker', but used calendar age as a demarcation between workers in the first and second half of their career (Kyndt et al. 2011) or late career (Greller 2006).

Although all studies used calendar age as a variable, only one used chronological age as a perspective to explain the relationship between calendar age and participation in CPD. Urwin (2006) argued that it was not age per se, but the time until retirement that explains the differential treatment of older workers. Raising the retirement age might influence employer support for older workers. Chronological age and participation in CPD seem therefore linked through the legal regulations of retirement (Urwin 2006).

Functional Age

From this perspective, differences between younger and older workers are defined by their cognitive abilities. Four studies examined indicators of functional age. CPD requires that workers possess learning competencies, which involve a cognitive dimension (the ability to learn new things); a meta-cognitive dimension (the ability to recognise strengths and weaknesses and to use strategies for planning, self-regulation, and evaluation of the learning); and a motivational dimension (a learning orientation and inner work standards) (Maurer and Weiss 2010; Stamov Roßnagel et al. 2009). Two studies reported that older workers felt less cognitively able and had lower perceptions of themselves as possessing learning qualities (Guthrie and Schwoerer 1996; Maurer et al. 2003). Nevertheless, this did not handicap them in overall involvement, according to the results of a longitudinal study of 800 workers (Maurer et al. 2003). Examining learning competencies in informal workplace learning, Stamov Roßnagel et al. (2009) found an age effect in an experimental study that was not found in their questionnaire study. They suggested that age effects on learning competencies might depend on the degree of self-regulation the learning activity provides. Self-regulated learning is likely to provide workers with opportunities to compensate for age-related cognitive decline (Stamov Roßnagel et al. 2009). In the experimental study, learning was relatively inflexible, resulting in lower performance for older workers. In the questionnaire study, participants referred to a variety of learning activities, including self-regulated learning, resulting in similar results for younger and older workers.

Psychosocial Age

Seventeen studies used a psychosocial perspective, mainly examining social perception and, less often, self-perception of age.

Stereotypical assumptions about older workers might lead to less social support for older workers by employers, resulting in age differences in CPD participation rates. Several researchers supported this idea when they concluded that the lower incidence of vocational education and training among older workers could be mainly attributed to employer decision-making (Newton 2006; Taylor and Urwin 2001). Tones and Pillay (2008) found that older workers reported fewer opportunities for learning and development at the workplace, with a stronger effect for blue-collar than for white-collar workers.

Labour economic models also suggest that older workers are less likely than are younger workers to receive employers' support when making human capital investments (Simpson et al. 2002). High costs related to productivity loss during training and the expected short payback period lead to these lower investments. However, testing this hypothesis, Simpson et al. (2002) found no significant differences—older and younger workers received the same support. It should be noted that the results were for workers who participated in some developmental activity (Simpson et al. 2002). Also in line with these results, other researchers did not find significantly lower levels of supervisory support for older workers than for other age groups (De Lange et al. 2009; Guthrie and Schwoerer 1996).

In contrast, three studies even reported lower levels of employer support for younger workers. Younger workers reported more reluctance of employers to offer training (Felstead 2010), more experiences of injustice in terms of CPD (Lammintakanen and Kivinen 2012), and they perceived less organisational support (Pillay et al. 2006) than older workers did.

In addition to social support, the psychosocial approach refers to self-perception of age. Only one study (Maurer et al. 2003) used two alternative age measures: subjective age (how old an individual perceives him- or herself) and perceived relative age (the perceived age of an individual compared with others in the workplace in terms of how they look, feel, and act). In this longitudinal study, subjective age did not add anything unique beyond chronological age. Perceived relative age, however, was negatively related to work support. Maurer et al. (2003) suggested that being older in a young group might lead to less support and encouragement, and they called for attention in the workplace to employees' relative age and not just chronological age.

Delgoulet and Marquié (2002) studied whether increased age was associated with higher learning anxiety. Some training activities might lead to greater anxiety for older workers when they perceive a gap between their capabilities and the requirements of the learning activity, depending on what is at stake for them (Delgoulet and Marquié 2002). Studying a vocational training course, they found that the older the trainee, the higher the training-related anxiety. This anxiety, however, had no significant effect on the performance of older trainees as measured by two tests.

Organisational Age

Fourteen studies examined two indicators of organisational age: career stage and tenure. Tenure and chronological age appear to be highly interrelated. Both Maurer et

al. (2003) and Van Vianen et al. (2011) reported that age effects were no longer significant when tenure was controlled for. More years of experience appeared to be related to motivation for and participation in CPD. Accumulating skills and experience negatively influenced the perceived need for CPD (Cully et al. 2000; Felstead 2010; Guthrie and Schwoerer 1996). Compared to those aged less than 50 years, older workers perceived a training deficit to be of less consequence in terms of requirements of the job and the enhancement of the prospects of promotion (Felstead 2010). Kyndt et al. (2011) showed that for experienced workers, the feeling they had learned enough caused a barrier for participating in CPD, whereas less-experienced workers were more stimulated by professional and personal development: they wanted to learn and progress in their jobs, and they were curious. On the other hand, work experience was also reported to be helpful in focusing on relevant information, understanding theoretical knowledge, and maintaining and increasing one's learning motivation (Paloniemi 2006). More experienced workers might increasingly recognise the need to learn and develop new skills and knowledge (Maurer and Weiss 2010).

Career stage also seemed to be influential. De Lange et al. (2009) suggested that older workers might have a reduced time perspective, have reached the highest position in the organisation, and do not have options for job transfer, resulting in lower learning-related behaviour.

Life-span Age

Several studies included indicators of life span as a variable, such as care-giving duties due to having children or other care-needing persons at home (De Lange et al. 2009) and marital status (Maurer et al. 2003). Only three studies reported findings on the relationship between family situation and CPD. One study showed that married women with children were less likely to participate in training programmes, but these results were not significant (Thangavelu et al. 2011). In a study on stimulating and prohibiting reasons for participation in learning activities, Kyndt et al. (2011) found that younger workers (<45 years) are discouraged by the required investments (e.g. distance, costs, time) of learning activities. They suggested that younger workers are more likely to have younger children, reducing their amount of spare time (Kyndt et al. 2011).

Conclusions and Discussion

This study reviewed the literature to examine age differences in nurses' CPD. The literature review included 27 empirical studies, demonstrating that research in this field is still limited among nurses as well as among workers in general. In Fig. 3, we summarise the results of this literature review.

The study aimed at examining in what respect CPD differs across age groups. Figure 3 shows that studies reported on age differences in motivation for CPD, participation in CPD, and CPD learning outcomes. In general, workers in late career (older than 50/55 years) seemed less likely to participate in formal CPD activities. For workers in mid career and for non-formal and informal learning activities, age patterns seemed less clear. Also, no clear age patterns were found for motivation and learning outcomes.

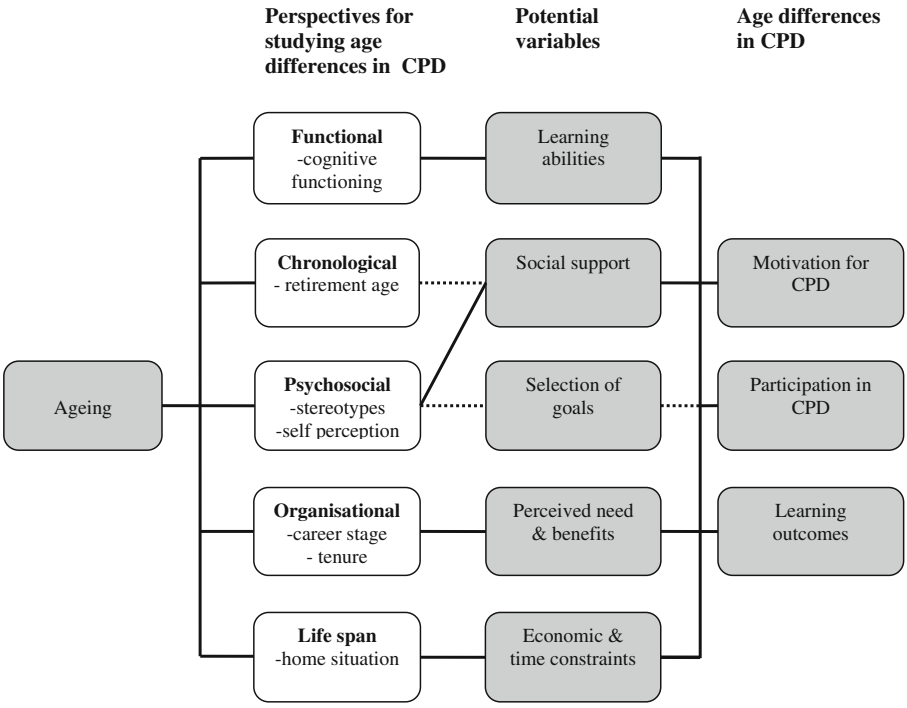

Fig. 3 Five perspectives showing different potential variables influencing age-related differences in CPD

The study showed that at least three age groups and different types of CPD activities should be distinguished when examining age differences in CPD. Studies examining more formal CPD (Felstead 2010; Thangavelu et al. 2011) found a negative relationship between age and participation in CPD, whereas others examining primarily non-formal and informal learning activities (Berg and Chyung 2008; Lammintakanen and Kivinen 2012) found a positive correlation with age. These differences probably reflect differences in the ways in which younger and older workers learn (Luger and Mulder 2010). These findings are consistent with other research, which showed that novice nurses prefer other learning activities than expert nurses do (Daley 1999) and that the purpose of CPD can be different for younger and older nurses (Pool et al. 2013). When examining age differences in CPD, different learning activities and purposes should be taken into account. Distinguishing at least three age groups makes it possible to examine whether nurses participate in different CPD activities, with different purposes, when they make transitions from early to mid career, and from mid career to late career.

Another aim of the study was to disclose factors contributing to age differences in CPD. It used a framework with five perspectives on age (Kooij et al. 2008; Sterns and Doverspike 1989) in an attempt to identify these factors. The framework was useful as it showed that age differences in CPD are studied from different perspectives. Some studies examined the direct relationship between chronological age and participation in CPD (Wray et al. 2009) or learning outcomes (Ng and Feldman 2008). Most studies searched for explanations by using one or more of the five perspectives on age. Explanations were searched from psychosocial and organisational perspectives, whereas

functional, chronological and life-span perspectives were used less. Figure 3 illustrates the age-related factors that were studied using these five perspectives.

(1) Functional perspective. Research on learning abilities in CPD is still limited. The results showed that older workers sometimes perceived themselves as less able to learn than younger workers, but this seemed to depend on the type of learning activities. It might be assumed that age effects on learning abilities depend on the type and content of the learning activity.
(2) Chronological perspective. Calendar age is often used to divide participants in age groups. However, research using a chronological perspective to explain age differences identified is scarce. Chronological age, when operationalised as "time till retirement", is likely to have a negative impact on social support for CPD. However, this assumption was not clearly supported in the empirical studies. Therefore, we illustrated this in Fig. 3 with a dotted line.
(3) Psychosocial perspective. Negative stereotypes can influence managerial support, thereby limiting possibilities for CPD. The results showed no clear age pattern. Some studies found less social support for older workers, some found less of the same for younger workers, and others found no age differences. These contradictory results may be explained by cultural differences between countries. Social perceptions of older workers are culturally influenced, and CPD opportunities for older workers in Northern European countries might be better than those in other industrialised countries (Billett et al. 2011), resulting in contradicting study results. It also might be that the middle-aged workers get more social support than do younger workers who just started and older workers who are near retirement. In addition to social support, self-perception might change with ageing, thereby influencing workers' motivation for CPD. It seems reasonable to assume that a change in time orientation and the attempt to protect one's self-concept influence workers' selection of goals (Carstensen et al. 1999; Kooij et al. 2008). However, this assumption was not clearly addressed and supported in the empirical studies, and is illustrated in Fig. 3 with a dotted line.
(4) Organisational perspective. Tenure and career phase have an ambiguous effect on the perceived need for and benefits of CPD. More years of experience leads to a lower perceived need for CPD, but can also be helpful in recognising what still needs to be learned. Results did not specify whether the perceived need for all types of learning activities diminished. In nursing, this probably accounts more for formal than informal learning activities, as older nurses still want to learn but prefer practice-based learning (Daley 1999) and perceive a ceiling in relevant courses (Gould et al. 2007; Pool et al. 2013). Preferences for formal modes of learning might decrease in late career when job transfer becomes less of an option for nurses.
(5) Life-span perspective. The results suggest that nurses' situations at home can influence their participation in CPD, particularly with respect to nurses with young children. Nurses perceive economic and time constraints as a barrier to participation in CPD (Gould et al. 2007). Results, however, did not specify whether the home situation affects participation in all types of learning activities. It might be assumed that learning activities that take place in one's own time are more affected than learning activities that take place during work time.

Strengths and Limitations

Four limitations should be considered. First, the number of empirical studies was limited and study populations were diverse. This diversity limits the opportunity to apply the findings to the nursing workforce. Several situational factors affect the relationship between age and CPD, such as type of job, educational level and gender (Pillay et al. 2006; Tones and Pillay 2008). For instance, the relevance of a study on college-educated men (Greller 2006) might be limited for the nursing workforce, with a predominance of women atypical of the general population (Hill 2011). Besides, findings might be difficult to apply to all nurses, as learning in nursing can differ substantially due to workplace characteristics (Skår 2010) and occupational roles.

Second, the studies gathered data on CPD in different ways. Some examined CPD by asking open questions, giving participants the opportunity to refer to all the learning activities they had undertaken. Others examined specific learning activities, which had been listed in their questionnaires. These differences in data collection and the focus on different types of learning activities complicate a comparison of the findings.

Third, the framework used has its shortcomings. The overlap between some of the perspectives complicated the analysis and description of the results. In particular, the chronological perspective, when operationalised as calendar age, did not seem an independent perspective, as all studies used calendar age to divide participants in age groups. However, when chronological age was operationalised as "time till retirement", it gave a different perspective on age differences in CPD. The latter operationalisation resembles the career stage from the organizational perspective.

Finally, as we were interested in age differences, we examined group-level differences between workers at one age and workers at another age. We did not study the ageing process, that is, intra-individual changes occurring over time. Therefore, it is not possible to disentangle cohort effects from age differences. The age differences in CPD found presently may not exist in the future. The gap between younger and older workers is shown to have become smaller over the years (Cully et al. 2000; Felstead 2010). Increasing attention to lifelong learning skills in education, growing attention to CPD by workers and employers, and the shifting of the retirement age might have influenced the study results in the period between 1996 and 2012, and it might reduce this gap even more in the future.

Despite these limitations, the strength of this study is that it is the first review of age differences in nurses' CPD. By using different perspectives of age, a comprehensive overview of age-related issues in CPD is given, and gaps in current research are identified. This gives input for a research agenda for future studies on age differences in CPD.

Suggestions for Further Research

Further research on CPD in the nursing field is needed. We found only a limited number of relevant studies on age differences in nurses' CPD. Although it will be difficult not to recognise the relevance of studies on other workers, more research in the nursing field is needed to better adapt CPD approaches to the needs of different age groups.

Furthermore, additional attention should be given to whether the type of learning activities workers undertake changes as they grow older and gain more experience.

Our results suggest that older workers (older than 50/55 years) in general participate less in formal CPD activities than their younger colleagues. Several studies on older workers, however, found that older workers continue to learn but have particular approaches to and participation in learning (Fenwick 2012; Fuller and Unwin 2005). Research should examine if and how these approaches differ from those of younger workers. In addition, research using a longitudinal design seems necessary. This will give more insight into intra-individual differences: does the motivation for, participation in, and learning outcomes of CPD change as nurses grow older? The present studies only suggest that there are differences, but these could be attributed to cohort effects as well as the ageing process.

More research is also needed on learning outcomes. Only five studies focused on this issues; the specific topics examined varied from workers' satisfaction with CPD to performance in CPD. Research on age differences in learning performance seems to be limited to experimental or laboratory designs where workers do not learn real-work tasks. Assessing learning outcomes in the professional context of workers might give a more accurate view on whether older nurses learn as much as younger nurses in CPD activities. Along these lines, additional attention should be given to the effects of cognitive ageing on CPD.

Finally, additional studies are needed on the effects of the home situation on workers' participation in CPD. Only three studies used indicators from a life-span perspective. Particularly for nurses, of which the majority are women and might have care duties at home, the home situation might influence participation in CPD.

When studying age differences in CPD, at least three age groups should be used. Younger workers, middle-aged workers, and older workers should be distinguished (Ng and Feldman 2008; Simpson et al. 2002). In accordance with other authors (De Lange et al. 2009; Sterns and Doverspike 1989), we find life-span theoretical perspectives particularly useful to guide further research on age differences in CPD. These theories recognise both inner changes (e.g. biological and psychological) as well as the effects of external forces on individuals and groups (e.g. sociological changes for cohorts) (Kanfer and Ackerman 2004). They emphasise individual differences in ageing. A relevant theory seems to be the socioemotional selectivity theory (Carstensen et al. 1999), which posits that the changing perception of time influences the selection of social goals. Also relevant is the selection, optimisation, and compensation (SOC) theory (Baltes et al. 1999), which underlines differences in the way people allocate resources to various goals of development across the life span. According to these theories, workers may have different motives in different phases of their lives. Knowing these motives might help the concerned authorities to better support workers in their learning and development during different phases of their lives and careers.

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