Pressure injuries in Indonesian community-dwelling older adults

Pressure Injuries in Indonesian Community-Dwelling Older Adults

Prevalence, prevention and treatment by the (in)formal support system

Sheizi Prista Sari

The research presented in this dissertation was conducted at the Care and Public Health Research Institute (CAPHRI), Department of Health Services Research, Maastricht University. CAPHRI participates in the Netherlands School of Public Health and Care Research (CaRe), which has been acknowledged by the Royal Netherlands Academy of Arts and Sciences (KNAW). This research was conducted in the Living Lab in Ageing and Long-Term Care (AWO-L). This research was funded by the Indonesia Endowment Fund for Education (LPDP) and the Ministry of Research, Technology and Higher Education (KEMENRISTEK DIKTI) of the Republic of Indonesia (BUDI-LN Scholarship). The studies in this dissertation were conducted in close collaboration with Universitas Padjadjaran, the Department of Health of Bandung city, and the Municipality of Bandung city, Indonesia.

ISBN: 978-94-6458-557-5
Cover concept: Sheizi Prista Sari
Design cover and layout: Gilang Anggita, Arsil Hamid
Printed by: Ridderprint | www.ridderprint.nl.

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DISSERTATION

to obtain the degree of Doctor at the Maastricht University,
on the authority of the Rector Magnificus,
Prof.dr. Pamela Habibović
in accordance with the decision of the Board of Deans,
to be defended in public
on Monday 17 October 2022 at 13.00 hours

by

Sheizi Prista Sari

Supervisors

Prof. dr. Jos M.G.A. Schols

Prof. dr. Christa Lohrmann, Medical University of Graz, Austria

Co-supervisors

Dr. Irma H.J. Everink

Dr. Yufitriana Amir, Universitas Riau, Indonesia

Assessment Committe

Prof. dr. Sandra Zwakhalen (Chair)

Prof. dr. Rob A. de Bie

Dr. Hartiah Haroen, Universitas Padjadjaran, Indonesia

Prof. dr. Jan Kottner, Charité-Universitätsmedizin, Berlin

Prof. dr. Milena Pavlova

Being the best is not the goal
Giving the best is the most important

CONTENTS

Caring for older adults requires knowledge and skills rather than only the willingness to care for them

CHAPTER 1

General introduction

GENERAL INTRODUCTION

Meet a 75 year old man, Mr Hendra. Two years ago, his wife passed away and ever since his daughter, Amelia (32 years old), with her family, Johan (Amelia's husband, 35 years old) and their 3 year old kid, Diana, moved into his house to live with him. At first, this decision was triggered by Amalia's concern about her father's psychological condition. She simply didn't want him to feel lonely. But then, Mr Hendra got a stroke attack and lost his capacity to live independently. He had to be hospitalised for a month with paralysis of his right body side. Once Mr Hendra was out of the hospital, Amalia took over the full care for her father. She quit her job to become the primary caregiver and to support her father's daily needs. She rejected an option to leave her father in a nursing home because it contradicted her spiritual beliefs. She felt better taking care of her father by herself, even though it was not always easy because she also had to take care of her husband and daughter at the same time. Amelia loved her father very much. She tried to give the best care she could. She thought it was good enough to provide healthy food and drinks for her father. She also tried not to disturb him too much by letting him rest as long as needed. Honestly, Amelia didn't know how to best care for people with a stroke history like her father. Sometimes she provided a soft massage to her father's paralyzed arm and leg. Amelia didn't have any medical check-up timeline for her father on her calendar as she did not know this was needed. All she knew was that a pack of medicaments her father got from the hospital should be taken regularly.

One morning, a community nurse, Mawar, visited Mr Hendra. Mawar was informed by a cadre (a volunteer in the community) that Mr Hendra, an older adult in her supervising area, got a stroke attack and was taken care of by her daughter. Mawar assessed Mr Hendra's physical condition. As usual, Mr Hendra was lying in bed. Unfortunately, the nurse saw redness and an open wound on Mr Hendra's lower back skin. She recognized the wound as pressure injury grade 2.

Sadly, Amelia never realized that her father could suffer from these injuries and that there was a need for preventive wound care in this condition. While

on her way home, the community nurse felt unsettled as well. She had big concerns as she did not perform any wound treatment on Mr Hendra as well. The reason for this was that she was insecure if she was capable to properly treat the wounds Mr Hendra suffered from, and in fact, she neither brought any wound care equipment.

This description above shows a common situation in Indonesia with regards to taking care of parents. Cultural and spiritual values make children devote themselves to looking after their parents, even if they have to sacrifice their personal lives.[1] However, caring for older adults requires knowledge and skills rather than only the willingness to care for them. Older adults are commonly experiencing one or more chronic medical conditions leading to frailty, dependence, disability, and death.[2-4] Inappropriate care for this vulnerable population could lead to adverse events such as pressure injuries (PIs). The example of Mr Hendra's living situation is a real example of why PIs may occur rather easy among frail Indonesian community-dwelling older adults. In addition, Indonesian people sometimes assume that having wounds such as PIs for paralyzed older adults is rather normal, instead of that they should be prevented. This dissertation describes the problem of PIs among older adults living at home in the region of Bandung city, the capital city of the most populous province in Indonesia (West Java).[5] This first chapter introduces the topic of this dissertation, the aims and its outline.

Older adults in Indonesia

Indonesia is a country in Southeast Asia crossing the equator. With about 17000 islands, Indonesia is the largest island country in the world. Its tropical climate, beautiful beaches, excellent nature and friendly people invite international tourists to enjoy their holidays in this country. Bali, Lombok, and Toba Lake are only some of Indonesia's most popular tourist destinations.[6]

As many countries, Indonesia is experiencing an ageing population.[7] Around 9.8% (26 million) of its people are older adults.[8-10] Based on the Indonesian regulations, people who are 60 years of age or older are considered older adults.[9, 10] The majority (90%) of older adults in this middle-income country is living together with their family members. One-third of these older adults (35%) live with three generations in the same

house (e.g., they live with their children and grandchildren or with their children and their parents). Another 30% live with their children, 23% only live with their partners, and a few (less than 2%) live in nursing homes.[8]

Nursing homes in Indonesia are arranged by social departments aiming to facilitate neglected older adults to live appropriately in society.[10, 11] Private nursing homes exist as alternative senior living arrangements, but the number of people living there is insignificant compared to the number of Indonesian older adults.[12] Also, leaving parents in nursing homes is, in general, still a taboo for Indonesian people.[1] This is also the case for Mr Hendra's daughter: she prefers to care for her father even though she has to lose her job.

An Indonesian national survey in 2021 shows that 50% of people over 60 years old are working as they are still responsible for the daily needs of their household, irrespective of their old age.[8] The absence of a non-labour income, such as pension insurance or social support from the government, requires older adults to still work approximately 32 hours per week. The average income attached to these 32 hours per week is Rp. 1.340.000,00 (€ 85) per month. Therefore, the majority of older adults have a low economic status.[8] Even though 82% of Indonesian older adults are literate, most of them (63%) only followed elementary school or lower. On average, older adults attended school for 5.1 years, and around 13% never attended school.[8]

The prevalence of chronic diseases (i.e. hypertension, arthritis, diabetes and stroke) among Indonesian older people significantly increased in the last ten years.[13] According to a national survey in 2021, the morbidity rate in this group was 22.5%, and only 5% of older adults had been hospitalized in the last year. [8] Compared to other Southeast Asian countries, these numbers are relatively low.[14, 15] However, an iceberg phenomenon could be the case, as Indonesian older adults often do not access formal care.[8, 16, 17] Reasons vary: they prefer to self-medicate (60%), think that they do not need - or have no clue when to access - formal health services (33%).[17] Another 2% of the older adults do not access health care services for other reasons, such as the costs of treatment or transportation, having nobody to accompany them, and the long waiting time for the services. Consequently, these older adults only receive care provided by their family members or only rely on informal health care services even though the majority of them (78.8%) have health insurance.[16, 18-20]

Health care services for older adults in Indonesia

As a response to the ageing population, the Indonesian government issued some regulations regarding the health and welfare of older adults.[9, 10, 21] The rules regulate the type of services that can be accessed by the older people at the Public Health Centres (named Puskesmas) [9] and geriatric clinics and inpatient in hospitals,[21] as well as the referral system between these health care settings.

Public Health Centres (PHCs) provide two main services for older adults in the community, which are individual health efforts (UKPs) and community health efforts (UKMs).[9] UKPs mainly focus on care activities inside the primary health care building, such as providing care to older adults with health complaints and referring them to a hospital if they need further assessment or treatment. In comparison, UKMs consist of public health activities for this population in the community, including health promotion activities and disease prevention (named Posbindu). PHCs are responsible for providing care to one to four subdistricts of their supervising area. Nurses in any educational background represent the largest proportion of staff in PHCs and have the most significant responsibility of providing these services for older adults within their working area.[22]

In hospitals, geriatric services have been categorized into four levels: 1) simple, 2) complete, 3) perfect, and 4) plenary. The categorization is based on the type of service, facilities and infrastructure, equipment and human resources in every hospital at the city or provincial levels.[21] In hospitals with the simple level, geriatric services consist of outpatient and home care. No geriatric wards are specifically available in hospitals with this level. Complete-level hospitals provide outpatient care, inpatient acute care, and home care. An afternoon care clinic, which is an outpatient clinic that provides rehabilitation, curative and psychosocial care, should be available in the perfect-level hospitals. Finally, hospitals with the plenary level consist of outpatient, afternoon care clinics, inpatient acute care, inpatient chronic care, inpatient psychogeriatric care, respite care, home care, and hospice care.[21] The higher the level of services, the more health professionals are involved. An Internist leads the multidisciplinary team. In the plenary level hospitals, the internist is supposed to have a subspecialty as a geriatric consultant.

However, the geriatric services explained in the regulations describe desired services more than the current care delivery. Health care professionals, both in the

PHCs and hospitals, face various challenges in implementing the services. These challenges are related to challenges in the continuity of care, coordination between settings, financial regulations, shortage of staff, knowledge and skills, or insufficient health-seeking behaviour of patients.[23-29] As a consequence, older adults might experience discontinuation of care or lack of attention from professional caregivers. [27]

This is also the case for Mr Hendra: after being discharged from the hospital, he experienced discontinuity of care. Even though home care services are mentioned in the regulations, Mr Hendra, in fact, only received informal care from his daughter at home.

Pressure injuries and a population at high risk

A pressure injury (PI) is a localised damage to the skin and or underlying tissue, usually occurring over a bony prominence due to prolonged pressure or pressure combined with shear.[30] Even though nowadays the term pressure injury is used, the older term 'pressure ulcer' is also used in the literature for the same phenomenon.[30] A pressure injury can be categorised into six categories: category/stage 1 to 4, unstageable and suspected deep tissue injury. Higher categories indicate more severe damage to the skin and/or underlying tissue.[30]

PI incidence/prevalence is generally considered an indicator representing the quality of care of health care services.[31] PIs cause considerable patient suffering due to pain,[32] affect the patient's quality of life emotionally, physically and socially [33, 34] and even put patients at an increased risk of death, especially among frail older adults.[35, 36] In addition, PI treatments lead to an economic burden on healthcare systems.[37, 38]

Many studies have investigated factors contributing to pressure injuries.[39-50] The last comprehensive clinical guidance published by the European Pressure Ulcer Advisory Panel (EPUAP), National Pressure Injury Advisory Panel (NPIAP), and Pan Pacific Pressure Injury Alliance (PPPIA),[30, 51] describe a framework of 'relevant risk factors'. This framework classifies the risk factors into two major groups, namely a) exposure to damaging mechanical boundary conditions and b) susceptibility and tolerance of the individual. Based on these risk factors, individuals can be at high risk of pressure injuries due to their age, clinical condition, or care setting.[30, 39-41, 43, 44, 47, 49, 50, 52-60]

A specific population at risk of pressure injuries and considered in many studies worldwide involves the group of older adults.[30, 61] Older people may be at high risk of

PIs because the ageing process may lead to physical impairments and associated immobility, and the ageing skin can be more vulnerable to damage.[62, 63] A meta-analysis based on 39 studies of PI prevalence and incidence rates in hospitalized patients worldwide (n=2,579,049) found an average PI prevalence and incidence of both 10%, and the number was higher in older people.[46] Furthermore, many studies reported that older adults often suffered from PIs prior to hospital admission, meaning that they had suffered from PIs since in the community (at home, nursing home, or other long-term care facilities).[19, 35, 38, 58, 64] Therefore, community-dwelling older adults are at risk of PIs and need special attention, especially those who are frail or disabled.[19, 35, 38, 58, 64, 65]

International studies exploring the PI problem among community-dwelling older adults have been conducted over three decades,[66] including studies about the risk of PIs, the prevalence, and the effect of interventions. However, only few studies have been performed focusing on older adults living at home. A study executed in New England (US) showed that 70.6% of the patients who already had PIs before hospital admission were living at home before entering the hospital and mostly older adults (mean age 72.7 years).[58] In Sweden and Portuguese, PIs were one of the most common adverse events among older people in home healthcare.[65, 67] In Indonesia, a high prevalence rate of PIs among older adults living at home is expected due to the ageing population, an increase in the predisposing factors,[13, 30] and because people usually only rely on informal health care services.[8] A study by Amir and colleagues shows that almost all patients in Indonesian hospitals who suffered from PIs before hospital admission were older adults who lived at home, and none had received home care services before hospital admission.[19] However, how big the problem is, is still unknown because no study is available regarding PIs involving older adults living at home in Indonesia.

Pressure injury prevention for older adults living at home

Many studies worldwide acknowledge that PIs in any care setting may partly be preventable,[39, 42, 44-46] including PIs in older adults living at home. PI prevention should therefore become a focus of activities for Indonesian community-dwelling older adults. In nursing practice, as identified by Leavell and Clark (1958), prevention is described in three levels: primary prevention, secondary prevention, and tertiary prevention.[68] Primary prevention aims to prevent a problem before it occurs by altering susceptibility

or reducing exposure for susceptible individuals. Secondary prevention relates to early detection and prompt intervention during the period of early disease pathogenesis. Tertiary prevention focuses on limitation of disability and rehabilitation for those who have already experienced disease or injury.

The recommended activities regarding the three levels of PI prevention in community-dwelling older adults could be derived from the clinical practice guideline of prevention and treatment of pressure ulcers/ injuries by EPUAP, NPIAP, PPPIA.[30] The activities include adequate nutrition and hydration support, skin and tissue care, repositioning, and the application of support surfaces. These detailed activities are described in table 1. In Indonesia, community nurses are the primary care professionals to perform those activities for older adults living in their area.[69] Their interventions may be directed towards older adults at high risk of PIs such as older adults with limited mobility, [16, 70, 71] a stroke history,[16, 72] and nutritional problems.[73]

As preventing PIs in older adults living at home is important, in particular among those at high risk of PIs, it is essential that community nurses have adequate knowledge, a positive attitude and sufficient skills to perform preventive activities.[30, 74, 75]

The knowledge, attitude, and practice (KAP) model has been widely used as an approach to assess and solve health problems in the community.[76-82] Former studies proved how knowledge and attitude positively correlate with the practice of PI prevention.[83, 84] Many studies have addressed the knowledge, attitude and skills of professional caregivers[83-89], but no study focused on community nurses' knowledge and attitude towards PI prevention. In the case of Mr Hendra, Mawar as a community nurse might lack knowledge about PI prevention and rarely practices it in her daily tasks, resulting in feelings of insecurity. Therefore, it is essential to perform studies on how Indonesian community nurses address PIs among older people. In addition, their perceptions on needs, barriers and resources must be taken into account when considering how they perform PI prevention.[90-92]

As family caregivers in Indonesia have a large role in taking care of their older relatives, Indonesian community nurses should collaborate with family caregivers in PI prevention and treatment. It is be expected that involving family members in evidence-based prevention of PIs will decrease its prevalence rates.[93-96] To enable these family members in PI prevention, they need education, training and supervising support.[30] Hence, community nurses should integrate health education into their activities to

strengthen the family caregivers' function.[97] Many studies indeed have explained that family members are usually not trained for such tasks[16, 70, 98]. Lastly, even though the majority of Indonesian older adults (78.8%) have health insurance, less than half of them (45.7%) actually seek formal care[8]. Therefore, to increase the accessibility of community-dwelling older adults, Indonesian community nurses are expected to actively come to the community to deliver good quality care and involve family members in preventing and treating PIs.

Aims and outline

We have seen that the size of the PI problem among frail older adults living at home in Indonesia is still unclear. Based on our knowledge, no studies are available on the PI problem among community-dwelling older adults in Indonesia. Moreover, no information is available about the knowledge, attitude and skills of family caregivers and professional caregivers, in particular community nurses, related to PI prevention in Indonesia.

Therefore this dissertation aims to explore the problem of pressure injuries (PIs) in community-dwelling older adults in Indonesia, particularly in the region of Bandung city. More specifically, attention will be paid to:

1. The prevalence of pressure injuries in the general population of community-dwelling older adults in Bandung city (Indonesia), together with the ulcer characteristics, the background characteristics of older people with PIs and their use of formal and informal care. - Chapter 2.
2. The development and psychometrical testing of an instrument to assess knowledge, attitude and practice of family caregivers in Indonesia in preventing PIs. - Chapter 3.
3. The knowledge, attitude and practice of Indonesian family caregivers towards PI prevention. - Chapter 4.
4. The knowledge and attitude of Indonesian community nurses towards PI prevention. - Chapter 5.
5. The perception of community nurses on barriers and potential facilitators of PI prevention among community-dwelling older adults in Indonesia. - Chapter 6

Finally, the overall results, recommendations for clinical practice and further research are discussed in the general discussion in Chapter 7.

Tabel 1.1 The three levels of prevention regarding PI for older adults living at home derived from the last comprehensive clinical guideline EPUAP, NPIAP and PPPIA.[30]

Topic / Level of prevention	Nutrition and hydration	Skin and tissue care	Reposition and support surface
Primary	• Develop and implement an individualized nutrition care plan for older adults with or at risk of PI who are malnourished or at risk of malnutrition • Optimized energy intake, adjust protein intake and provide healthy food • Provide and encourage adequate water/ fluid intake	• Keeping the skin clean and appropriately • Cleansing the skin promptly after episodes of incontinence hydrated • Use high absorbency incontinence products to protect the skin in older adults who have urinary incontinence and use a barrier product if necessary • Consider using textiles with low friction coefficients for bedridden older adults • Avoid positioning the older adults on an area of erythema • Avoiding the use of alkaline soaps and cleansers • Avoid vigorously rubbing skin that is at risk of PIs • If it is possible, a soft silicone multi-layered foam dressing could be used to protect skin for older adults at high risk of PIs.	• Reposition on an individualized schedule, unless contraindicated. • Determine repositioning frequency with consideration to older adults' level of activity and independently reposition. • Establish and document individualized pressure relief schedules that prescribe the frequency and duration of weight shifts • Encourage and educate older adults who can regularly reposition themselves when in bed and seated. Implementing repositioning reminder strategies to promote adherence to repositioning regimen • Use the 30º side lying position in preference to the 90º side lying position when positioning • Keep the head of bed as flat as possible. Investigate alternative to siting in bed. Avoid slouched positions that can increase pressure and shear on the sacrum and coccyx • Avoid extended use of prone positioning

Topic / Level of prevention	Nutrition and hydration	Skin and tissue care	Reposition and support surface
			• Promote seating out of bed in an appropriate chair or wheelchair for limited periods of time. When transferring older adult to seating, select a reclined seated position with the legs elevated and tilt the seat to prevent the individual sliding forward in the chair or wheelchair. • For older adults at risk of heel PIs, elevate the heels using a specifically designed heel suspension device or a pillow/ foam cushion. • Select a support surface that meets the older adult's need for pressure redistribution. • Ensure that the bed surface is sufficiently wide to allow turning of the older adult • For older adults with obesity, select a support surface with enhanced pressure redistribution, shear reduction and microclimate features • Consider using a reactive air mattress or overlay for older adults at risk of PIs
Secondary	• Conduct nutritional screening for older adults at risk of PIs • Conduct a comprehensive nutrition assessment for older adults at risk of PI who are screened to be at risk of malnutrition	• Conduct a comprehensive skin and tissue assessment for older adults at high risk of PIs (e.g. those who experience immobile, diabetes, vascular disease, oedema, smoking, malnutrition, obesity,	• Screening for the older adults at high risk of PI based on their mobility and activity

Topic / Level of prevention	Nutrition and hydration	Skin and tissue care	Reposition and support surface
		incontinence, fever, altered in sensory perception) • Inspect the skin for erythema before repositioning • Assess localized pain and the temperature of skin and soft tissue	
Tertiary	• Continue adequate nutrition and hydration support	• Continue skin care • Conduct a comprehensive pain assessment for older adults with PIs • Use non-pharmacologic pain management strategies as a first line strategy and adjuvant therapy to reduce pain associated with PIs • Use the principles of moist wound healing to reduce PI pain • Administer analgesia regularly to control PI pain • Cleanse the PI and the skin surrounding the PI • Evaluate the PIs for presence of osteomyelitis in the presence of exposed bone • Use topical antiseptics in tissue-appropriate strengths to control microbial burden and to promote healing in PIs that have delayed healing. • For all PIs, select the most appropriate wound dressing based on goals and self-care abilities of older adults and their informal caregivers.	• Implement an early mobilization program for post stroke older adults that increases activity and mobility as rapidly as tolerated • For older adults with a stage III or greater heel PI, elevate the heels using a specifically designed heel suspension device or a pillow/ foam cushion. Offloading the heel completely in such a way as o distribute the weight of the leg along the calf without placing pressure on the Achilles tendon and the popliteal vein. • Continue application of repositioning and special mattresses/cushions

REFERENCES

1. Niehof A. Ageing and the elderly in Indonesia: identifying key issues. Journal of the Humanities and Social Sciences of Southeast Asia. 1995;151(3):422-37.
2. Young Y, Frick KD, Phelan EA. Can successful ageing and chronic illness coexist in the same individual? A multidimensional concept of successful ageing. J Am Med Dir Assoc. 2009;10(2):87-92.
3. Lafortune G, Balestat G. Trends in Severe Disability Among Elderly People: Assessing the evidence in 12 OECD countries and the future implications". OECD Health Working Papers. 2007; No. 26.
4. Jha SR, Ha HSK, Hickman LD, Hannu M, Davidson PM, Macdonald PS, et al. Frailty in advanced heart failure: a systematic review. Heart Failure Reviews. 2015;20(5):553-60.
5. Badan Pusat Statistik – Statistics Indonesia. Hasil sensus penduduk 2020 [Internet]. Jakarta: Badan Pusat statistik;2021[cited 14 January 2022]. Available from: Badan Pusat Statistik (bps.go.id)
6. Kementerian Pariwisata dan Ekonomi Kreatif (Kamenparekraf). Laporan perkembangan kunjungan wisata bulan Januari 2022 [internet]. Jakarta: Kamenparekraf;2022[Cited 20 January 2022]. Available from: https://kemenparekraf.go.id/statistik-wisatawan-mancanegara/statistik-kunjungan-wisatawan-mancanegara-bulan-januari-2022
7. Nikkil Sudharsanan DEB. The demography of ageing in low and middle-income countries: chronological versus functional perspectives. In: Majmundar MK HM, editor. National Academies of Sciences, Engineering, and Medicine; Division of Behavioral and Social Sciences and Education; Committee on Population Future Directions for the Demography of Aging: Proceedings of a Workshop. Washington (DC): National Academies Press (US); 2018.
8. Badan Pusat Statistik – Statistics Indonesia. Statistik penduduk lanjut usia 2021 [Internet]. 2021 [cited 27 December 2021]. Available from: https://www.bps.go.id/publication/2021/12/21/c3fd9f27372f6ddcf7462006/statistik-penduduk-lanjut-usia-2021.html.
9. Pemerintah Negara republik Indonesia. Peraturan Menteri Kesehatan Republik Indonesia nomor 67 Tahun 2015 tentang Penyelenggaraan pelayanan kesehatan lanjut usia. Jakarta; 2015. 7 p.
10. Presiden Republik Indonesia. Undang-Undang No.13 Tahun 1998 tentang Kesejahteraan Lanjut Usia. Jakarta: Menteri Negara Sekretaris Negara Republik Indonesia; 1998.
11. Kementerian Sosial Republik Indonesia. Keputusan Menteri Sosial Republik Indonesia nomor: 4/PRS-3/KPTS/2007 tentang pedoman pelayanan sosial lanjut usia dalam panti. Jakarta: Kementerian Sosial Republik Indonesia; 2007.
12. Badan Pusat Statistik – Statistics Indonesia. Jumlah panti werdha 2018-2020 [Internet]. 2021.
13. Badan Penelitian dan Pengembangan Kesehatan, Kementerian Kesehatan Republik Indonesia. Hasil Utama Riskesdas 2018. Jakarta: Kementerian Kesehatan Republik Indonesia; 2019.
14. Shariff Ghazali S, Seman Z, Zainuddin NH, Omar MA, Sooryanarayana R, Ariaratnam S, et al. Prevalence and factors associated with multimorbidity among older adults in Malaysia: a population-based cross-sectional study. BMJ Open. 2021;11(10):e052126.

15. Merchant RA, Chen MZ, Tan LWL, Lim MY, Ho HK, van Dam RM. Singapore Healthy Older People Everyday (HOPE) Study: Prevalence of Frailty and Associated Factors in Older Adults. J Am Med Dir Assoc. 2017;18(8):734.e9-.e14.
16. Sari SP, Everink IH, Sari EA, Afriandi I, Amir Y, Lohrmann C, et al. The prevalence of pressure ulcers in community-dwelling older adults: a study in an Indonesian city. International Wound Journal. 2019;16(2):534-41.
17. Badan Pusat Statistik – Statistics Indonesia. Statistik Penduduk Lanjut Usia 2019. ©Badan Pusat Statistik; 2020.
18. Amir Y, Tan FE, Halfens R, Lohrmann C, Schols J. Pressure ulcer prevalence and care in Indonesian hospitals: a multicenter, cross-sectional evaluation using an extended Donabedian model. Ostomy Wound Manage. 2017;63(2):8-23.
19. Amir Y, Lohrmann C, Halfens RJ, Schols JMGA. Pressure ulcers in four Indonesian hospitals: prevalence, patient characteristics, ulcer characteristics, prevention and treatment. International Wound Journal. 2017;14(1):184-93.
20. Amir Y, Halfens RJ, Lohrmann C, Schols JMGA. Pressure ulcer prevalence and quality of care in stroke patients in an Indonesian hospital. J Wound Care. 2013;22(5):254, 6, 8-60.
21. Kementerian Kesehatan Republik Indonesia. Peraturan Menteri Kesehatan Republik Indonesia nomor 79 tahun 2014 tentang penyelenggaraan pelayanan geriatri di rumah sakit. Jakarta: Kementrian Kesehatan Republik Indonesia;2014. 36 p.
22. World Health Organization. Primary health care system (PRIMASYS): Case study from Indonesia [internet]. Geneva: World Health Organization; 2017. Available from https://apps.who.int/iris/handle/10665/341075
23. Abdurahman NH, Kadar KS, Malasari S. Nurses' knowledge and attitudes in providing geriatric care at Ende Hospital of East Nusa Tenggara. Enfermería Clínica. 2021;31:S688-S91.
24. Marwayani, Hadju V, Nursyamsi I. Analysis of integrated health referral systems in the era of regional autonomy in West Sulawesi. Enfermería Clínica. 2020;30:59-62.
25. Fathania D, Rahayuwati L, Yani DI. Factors that Correlate with The Health Services Seeking on Breast Cancer Patients. Jurnal Keperawatan Padjadjaran. 2019;7(1):58-66.
26. Sari YM, Burton E, Lee DCA, Hill KD. Current physiotherapy practice on delivering treatments for older people with dementia in Indonesia: A cross-sectional study. Physiotherapy Research International. 2022;27(1):1-11.
27. Satriya P, Shu-Fang Vivienne W, Chun-Hua C, Khristophorus Heri N. Precision health care strategies for older adults with diabetes in Indonesia: a Delphi consensus study. Medical Journal of Indonesia. 2021;30(3):221-7.
28. Shinichiro N, Hernandez PMR, Kyoko S, Kenzo T, Nam Eun WOO, He C, et al. Service Delivery Reforms for Asian Ageing Societies: A Cross-Country Study Between Japan, South Korea, China, Thailand, Indonesia, and the Philippines. International Journal of Integrated Care (IJIC). 2021;21(2):1-14.
29. He AJ, Tang VFY. Integration of health services for the elderly in Asia: A scoping review of Hong Kong, Singapore, Malaysia, Indonesia. Health Policy. 2021;125(3):351-62.
30. European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, Pan Pacific Pressure Injury Alliance. Prevention and treatment of pressure ulcers/ injuries: clinical practice guide. The International Guideline. Emily Haesler (ed.). EPUAP/NPIAP/PPPIA: 2019. Available from: https://www.epuap.org/pu-guidelines/.
31. Diane Doran BM, Sean C. Towards a National Report Card in Nursing: A Knowledge Synthesis. Nursing Leadership. 2011;24(2):38-57.

32. Briggs M, Collinson M, Wilson L, Rivers C, McGinnis E, Dealey C, et al. The prevalence of pain at pressure areas and pressure ulcers in hospitalised patients. BMC nursing. 2013;12(1):19.
33. Gorecki C, Brown JM, Nelson EA, Briggs M, Schoonhoven L, Dealey C, et al. Impact of pressure ulcers on quality of life in older patients: a systematic review. Journal of the American Geriatrics Society. 2009;57(7):1175-83.
34. Esson L, Spilsbury K, Nelson E, Cullum C. Inpatients felt that pressure ulcers had emotional, mental, physical, and social effects on quality of life because nurses did not adequately treat or manage their pain or discomfort. Evidence-based nursing. 2007;10(4):128.
35. Landi F, Onder G, Russo A, Bernabei R. Pressure ulcer and mortality in frail elderly people living in community. Arch Gerontol Geriatr. 2007;44 Suppl 1:217-23.
36. Jaul E, Calderon-Margalit R. Systemic factors and mortality in elderly patients with pressure ulcers. Int Wound J. 2015;12(3):254-9.
37. Kandilov AMG, Coomer NM, Dalton K. The Impact of Hospital-Acquired Conditions on Medicare Program Payments. Medicare & Medicaid Research Review. 2014;4(4):E1-E23.
38. Russo CA, Steiner C, Spector W. Hospitalizations related to pressure ulcers among adults 18 years and older, 2006: statistical brief# 64. 2006.
39. Fulbrook P, Lovegrove J, Miles S, Isaqi B. Systematic review: Incidence and prevalence of mucous membrane pressure injury in adults admitted to acute hospital settings. International Wound Journal. 2022;19(2):278-93.
40. Coyer F, Cook J-L, Doubrovsky A, Vann A, McNamara G. Exploring medical device-related pressure injuries in a single intensive care setting: A longitudinal point prevalence study. Intensive & Critical Care Nursing. 2022;68:N.PAG-N.PAG.
41. Triantafyllou C, Chorianopoulou E, Kourkouni E, Zaoutis TE, Kourlaba G. Prevalence, incidence, length of stay and cost of healthcare-acquired pressure ulcers in pediatric populations: A systematic review and meta-analysis. International Journal of Nursing Studies. 2021;115:N.PAG-N.PAG.
42. Rodgers K, Sim J, Clifton R. Systematic review of pressure injury prevalence in Australian and New Zealand hospitals. Collegian. 2021;28(3):310-23.
43. Fulbrook P, Mbuzi V, Miles S. Incidence and prevalence of pressure injury in adult cardiac patients admitted to intensive care: A systematic review and meta-analysis. International Journal of Nursing Studies. 2021;114:N.PAG-N.PAG.
44. Anthony D, Alosaimi D, Shiferaw WS, Korsah K, Safari R. Prevalence of pressure ulcers in africa: A systematic review and meta-analysis. Journal of Tissue Viability. 2021;30(1):137-45.
45. Shiferaw WS, Aynalem YA, Akalu TY. Prevalence of pressure ulcers among hospitalized adult patients in Ethiopia: a systematic review and meta-analysis. BMC Dermatology. 2020;20(1):1-10.
46. Li Z, Lin F, Thalib L, Chaboyer W. Global prevalence and incidence of pressure injuries in hospitalised adult patients: A systematic review and meta-analysis. International Journal of Nursing Studies. 2020;105:N.PAG-N.PAG.
47. Hong-Lin C, Ji-Yu C, Lin D, Hong-Wu S, Hai-Rong Y, Yi-Ping S, et al. Incidence of Pressure Injury in Individuals With Spinal Cord Injury: A Systematic Review and Meta-analysis. Journal of Wound, Ostomy & Continence Nursing. 2020;47(3):215-23.

48. Blackburn J, Ousey K, Taylor L, Moore B, Patton D, Moore Z, et al. The relationship between common risk factors and the pathology of pressure ulcer development: a systematic review. Journal of Wound Care. 2020;29(Sup3):S4-S12.
49. Akhkand SS, Seidi J, Ebadi A, Gheshlagh RG. Prevalence of pressure ulcer in Iran's intensive care units: A systematic review and metaanalysis. Nursing Practice Today. 2020;7(1):21-9.
50. Moore Z, Avsar P, Conaty L, Moore DH, Patton D, O'Connor T. The prevalence of pressure ulcers in Europe, what does the European data tell us: a systematic review. Journal of Wound Care. 2019;28(11):710-9.
51. Coleman S, Nixon J, Keen J, Wilson L, McGinnis E, Dealey C, et al. A new pressure ulcer conceptual framework. Journal of Advanced Nursing. 2014;70(10):2222-34.
52. Brophy S, Moore Z, Patton D, O'Connor T, Avsar P. What is the incidence of medical device-related pressure injuries in adults within the acute hospital setting? A systematic review. Journal of Tissue Viability. 2021;30(4):489-98.
53. Barakat-Johnson M, Lai M, Wand T, Li M, White K, Coyer F. The incidence and prevalence of medical device-related pressure ulcers in intensive care: a systematic review. Journal of Wound Care. 2019;28(8):512-21.
54. Marin J, Nixon J, Gorecki C. A systematic review of risk factors for the development and recurrence of pressure ulcers in people with spinal cord injuries. Spinal Cord. 2013;51(7):522-7.
55. Alipoor E, Mehrdadi P, Yaseri M, Hosseinzadeh-Attar MJ. Association of overweight and obesity with the prevalence and incidence of pressure ulcers: A systematic review and meta-analysis. Clinical Nutrition. 2021;40(9):5089-98.
56. August DL, New K, Ray RA, Kandasamy Y. Frequency, location and risk factors of neonatal skin injuries from mechanical forces of pressure, friction, shear and stripping: A systematic literature review. Journal of Neonatal Nursing. 2018;24(4):173-80.
57. Gunningberg L, Stotts NA, Idvall E. Hospital-acquired pressure ulcers in two Swedish County Councils: cross-sectional data as the foundation for future quality improvement. Int Wound J. 2011;8(5):465-73.
58. Corbett LQ, Funk M, Fortunato G, O'Sullivan DM. Pressure injury in a community population: a descriptive study. J Wound Ostomy Continence Nurs. 2017;44(3):221-7.
59. Khor HM, Tan J, Saedon NI, Kamaruzzaman SB, Chin AV, Poi PJ, et al. Determinants of mortality among older adults with pressure ulcers. Arch Gerontol Geriatr. 2014;59(3):536-41.
60. Bogaisky M, Dezieck L. Early Hospital Readmission of Nursing Home Residents and Community-Dwelling Elderly Adults Discharged from the Geriatrics Service of an Urban Teaching Hospital: Patterns and Risk Factors. Journal of the American Geriatrics Society. 2015;63(3):548-52.
61. Latimer S, Chaboyer W, Thalib L, McInnes E, Bucknall T, Gillespie BM. Pressure injury prevalence and predictors among older adults in the first 36 hours of hospitalisation. Journal of Clinical Nursing. 2019;28(21-22):4119-27.
62. Rasero L, Simonetti M, Falciani F, Fabbri C, Collini F, Dal Molin A. Pressure Ulcers in Older Adults: A Prevalence Study. Adv Skin Wound Care. 2015;28(10):461-4.
63. Reichel W, Arenson C. Reichel's care of the elderly : clinical aspects of aging. 6th ed. / ed. Cambridge: Cambridge University Press; 2009.
64. Rodrigues I, Megie MF. Prevalence of chronic wounds in Quebec home care: an exploratory study. Ostomy Wound Manage. 2006;52(5):46-8, 50, 2-7.

65. Schildmeijer KGI, Unbeck M, Ekstedt M, Lindblad M, Nilsson L. Adverse events in patients in home healthcare: a retrospective record review using trigger tool methodology. BMJ open. 2018;8(1):e019267.
66. Agrawal K, Chauhan N. Pressure ulcers: Back to the basics. Indian J Plast Surg. 2012;45(2):244-54.
67. Lopes TS, Videira LMMdS, Saraiva DMRF, Agostinho ES, Bandarra AJF. Multicentre study of pressure ulcer point prevalence in a Portuguese region. Journal of Tissue Viability. 2020;29(1):12-8.
68. Clark DW. Preventive medicine for the doctor in his community: an epidemiologic approach. American Public Health Association; 1958.
69. Brenda L. Bonham Howe MRB. The Gerontology Nurse's Guide to the Community-Based Health Network. New York: Springer Publishing Company; 2014.
70. Tavares BC, Matos E, Cristina I, Maliska A, Benedet SA, Salum NC. Profile of patients diagnosed with chronic ulcer of diverse etiology admitted to an emergency unit. Ciência, Cuidado e Saúde. 2016;15(4):624.
71. Oot-Giromini BA. Pressure ulcer prevalence, incidence and associated risk factors in the community. Decubitus. 1993;6(5):24-32.
72. Fateme K, Fariba Y, Aliakbar K, Hassan A. Investigating the effect of home-based training for family caregivers on the incidence of bedsore in patients with stroke in ali ebne abitaleb hospital, zahedan, iran: a clinical trial study. Medical-Surgical Nursing Journal. 2018;7(3):1-6.
73. Borsting TE, Tvedt CR, Skogestad IJ, Granheim TI, Gay CL, Lerdal A. Prevalence of pressure ulcer and associated risk factors in middle- and older-aged medical inpatients in Norway. J Clin Nurs. 2018;27(3-4):e535-e43.
74. Ajzen I. The theory of planned behaviour: Reactions and reflections. Psychology & Health. 2011;26(9):1113-27.
75. Bandura A. Social foundations of thought and action : a social cognitive theory. Englewood Cliffs, N.J.: Prentice-Hall; 1986.
76. Kwol VS, Eluwole KK, Avci T, Lasisi TT. Another look into the Knowledge Attitude Practice (KAP) model for food control: An investigation of the mediating role of food handlers' attitudes. Food Control. 2020;110:107025.
77. Isoni Auad L, Cortez Ginani V, Stedefeldt E, Yoshio Nakano E, Costa Santos Nunes A, Puppin Zandonadi R. Food Safety Knowledge, Attitudes, and Practices of Brazilian Food Truck Food Handlers. Nutrients. 2019;11(8):1784.
78. Moreira ACA, Silva MJd, Darder JJT, Coutinho JFV, Vasconcelos MIO, Marques MB. Effectiveness of an educational intervention on knowledge-attitude-practice of older adults' caregivers. Revista brasileira de enfermagem. 2018;71(3):1055-62.
79. Wan TT, Rav-Marathe K, Marathe S. A systematic review of KAP-O framework for diabetes. Medical Research Archives. 2016;3(9).
80. Suleiman M, Sahal N, Sodemann M, Elsony A, Aro AR. Tuberculosis awareness in Gezira, Sudan: knowledge, attitude and practice case-control survey. EMHJ-Eastern Mediterranean Health Journal 2014; 20 (2): 120-129. 2014.
81. Khalil A, Abdalrahim M. Knowledge, attitudes, and practices towards prevention and early detection of chronic kidney disease. International nursing review. 2014;61(2):237-45.
82. Badran IG. Knowledge, attitude and practice the three pillars of excellence and wisdom: a place in the medical profession. Eastern Mediterranean Health Journal. 1995;1(1):8-16.

83. Beeckman D, Defloor T, Schoonhoven L, Vanderwee K. Knowledge and Attitudes of Nurses on Pressure Ulcer Prevention: A Cross-Sectional Multicenter Study in Belgian Hospitals. Worldviews on Evidence-Based Nursing. 2011;8(3):166-76.
84. Barakat-Johnson M, Barnett C, Wand T, White K. Knowledge and Attitudes of Nurses Toward Pressure Injury Prevention: A Cross-Sectional Multisite Study. Journal of wound, ostomy, and continence nursing : official publication of The Wound, Ostomy and Continence Nurses Society. 2018;45(3):233-7.
85. Kim JY, Lee YJ. A study on the nursing knowledge, attitude, and performance towards pressure ulcer prevention among nurses in Korea long-term care facilities. International wound journal. 2019;16(Suppl 1):29-35.
86. Charalambous C, Koulouri A, Roupa Z, Vasilopoulos A, Kyriakou M, Vasiliou M. Knowledge and attitudes of nurses in a major public hospital in Cyprus towards pressure ulcer prevention. Journal of Tissue Viability. 2019;28(1):40-5.
87. Strand T, Lindgren M. Knowledge, attitudes and barriers towards prevention of pressure ulcers in intensive care units: a descriptive cross-sectional study. Intensive & critical care nursing. 2010;26(6):335-42.
88. Kallman U, Suserud BO. Knowledge, attitudes and practice among nursing staff concerning pressure ulcer prevention and treatment--a survey in a Swedish healthcare setting. Scand J Caring Sci. 2009;23(2):334-41.
89. Moore Z, Price P. Nurses' attitudes, behaviours and perceived barriers towards pressure ulcer prevention. Journal of Clinical Nursing. 2004;13(8):942-51.
90. Green LW, Kreuter MW. Health promotion planning : an educational and environmental approach. 2nd ed. ed. Mountain View, CA: Mayfield Pub. Co.; 1991.
91. Etafa W, Argaw Z, Gemechu E, Melese B. Nurses' attitude and perceived barriers to pressure ulcer prevention. BMC Nursing. 2018;17(1):14.
92. Taylor C, Mulligan K, McGraw C. Barriers and enablers to the implementation of evidence-based practice in pressure ulcer prevention and management in an integrated community care setting: A qualitative study informed by the theoretical domains framework. Health & Social Care in the Community. 2021;29(3):766-79.
93. Coe NB, Guo J, Konetzka RT, Van Houtven CH. What is the marginal benefit of payment-induced family care? impact on medicaid spending and health of care recipients. Health Economics. 2019;28(5):678-92.
94. Eisenberger A, Zeleznik J. Pressure ulcer prevention and treatment in hospices: a qualitative analysis. Journal of Palliative Care. 2003;19(1):9-14.
95. Martins Pereira S, Maria Soares Hl. Pressure ulcers: relatives' perceptions of emotional impact and non-material costs. Revista de Enfermagem Referência. 2012(7):139-48.
96. Nuriyanto A, Rahayuwati L. Family Nursing as an Improvement Strategy of Family Health Index in Indonesia: A Literature Review. Asian Community Health Nursing Research. 2019;1(3):7-16.
97. Nies MA, McEwen M. Community/Public Health Nursing-E-Book: Promoting the Health of Populations: Elsevier Health Sciences; 2018.
98. Jan McCulloch B. Family health care nursing: theory, practice and research. Journal of Family Theory & Review. 2012;4(1):67-70.

CHAPTER 2

The prevalence of pressure ulcers in community-dwelling older adults: a study in an Indonesian city

This chapter was published as:
Sari SP, Everink IHJ, Sari EA, Afriandi I, Amir Y, Lohrmann C, Halfens RJG, Schols JMGA. The prevalence of pressure ulcers in community-dwelling older adults: A study in an Indonesian city. International Wound Journal. 2019;16(2):534-41

ABSTRACT

Background: Pressure injuries (PIs) do not develop only in hospitals: in many cases, PIs have already developed prior to hospital admission. The occurrence of PIs and their burden in community-dwelling older adults is a serious issue, one that also exists in Indonesia, which has around 23 million older adults (people aged 60 years or older). No research has been conducted on the prevalence of PIs in community-dwelling older adults in Indonesia, nor is there evidence on whether community-dwelling older people with PIs receive formal or informal PU care.Therefore, the objectives of this study were to investigate the prevalence and the characteristics of pressure injuries (PIs) in community-dwelling older adults in Indonesia, including specific characteristics of the PI patients and their use of formal and informal care.

Methods: A cross-sectional design was used for the study, with 325 participants aged 60 years or older, randomly chosen from the general community.

Results: The overall PI prevalence and the PI prevalence excluding category 1 were 10.8% (95% Confidence Interval (CI), 5.8-15.8) and 5.2% (95% CI 0.2-10.2) respectively. Category 1 PIs were mostly (34.3%) located on knees and toes, while category 2 and higher PIs were mostly (70.4%) located on the shoulder, sacrum and hip.

Conclusions: The main factors that contributed strongly to PIs among older adults in the community were the degree of physical activity, problems with sensory perception and having a history of stroke. None of the participants with a PI received wound care or information about PIs from formal caregivers and only 11.4% received wound care from family caregivers. This study shows that pressure injuries in community-dwelling older adults in Indonesia is a relevant and largely unaddressed problem. Developing an intervention program to manage the PI problem in the community is recommended.

BACKGROUND

Pressure ulcers (PUs) are a serious problem in health care settings globally. A pressure ulcer is 'a localized injury to the skin and/or the underlying tissue, usually over a bony prominence, as a result of pressure or pressure in combination with shear'.[1] PUs cause considerable patient suffering from pain,[2] affect the patient's quality of life emotionally, physically and socially[3, 4] and even put patients at increased risk of death.[5, 6] In addition, PUs lead to an economic burden on healthcare systems.[7, 8]

In the last decades, many studies on PU prevalence and PU care have been published internationally. Systematic review studies show a wide range of PU prevalence rates among hospitalized patients: 3.1%-30.0% in the United States (US), 1%-54% in Europe, 6% in Australia and 2.7%-16.8% in Asia.[9, 10] To reduce the prevalence of PUs, various preventive measures and treatments have been implemented in hospitals all over the world.[11, 12]

However, PUs do not develop only in hospitals: in many cases, PUs have already developed prior to hospital admission. Studies have shown that the prevalence of community-acquired PUs, i.e. those present at hospital admission, ranged from 3.3% to 11.1%.[13-15] A study executed in New England (US) showed that 70.6% of the patients who already had pressure ulcers before hospital admission were living at home before entering hospital, were mostly older adults (mean age 72.7 years) and only 21.4% of them had received home care services prior to admission.[14]

The occurrence of PUs and their burden in community-dwelling older adults is a serious issue,[5, 8, 14, 16, 17] one that also exists in Indonesia, which has around 23 million older adults (people aged 60 years or older).[18, 19] One study found that 44% of all PU patients in Indonesian hospitals already suffered from their PUs before hospital admission. Furthermore, almost all of them were older adults who lived at home and none had received home care services before hospital admission.[16] However, the magnitude of the PU problem among older adults living at home in Indonesia is still unclear. Furthermore, it is difficult to measure the prevalence of PUs, because not all Indonesian older adults who suffer from serious illnesses receive care in the hospital; they prefer to stay at home and receive care from their families, with or without formal care supervision.[18] No research has been conducted on the prevalence of PUs in

community-dwelling older adults in Indonesia, nor is there evidence on whether community-dwelling older people with PUs receive formal or informal PU care.

Consequently, this study aims to report on the prevalence of PUs in the general population of community-dwelling older adults in a city in Indonesia. Furthermore, the ulcer characteristics, the specific characteristics of PU participants and their use of formal and informal care are explored.

METHODS

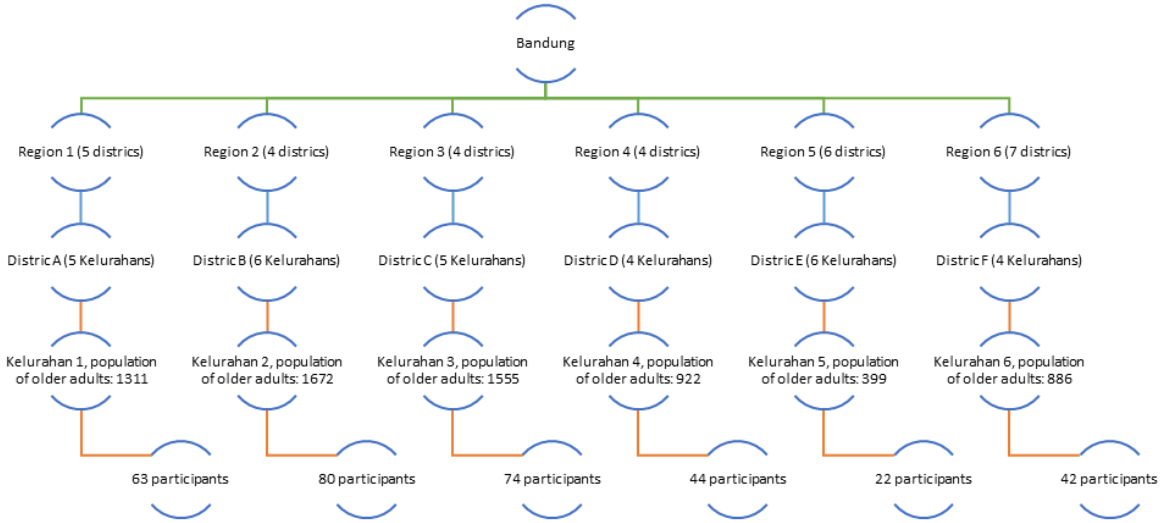
Design and setting

The study used a cross-sectional design and was conducted in Bandung, the capital city of West Java province. There are 30 districts in Bandung, making up the six regions of the city. Every district has smaller municipalities, called “Kelurahan”. One Kelurahan was randomly selected from each of the six regions. If a selected Kelurahan agreed to share the list of its residents older than 60 years, the Kelurahan was included in this study (Figure 1).

Participants

Based on the definition used by the Indonesian Ministry of Health, people who are 60 years of age or older are considered to be older adults.[19] Of the 6,745 older adults in the six selected Kelurahan, three hundred and twenty-five (325) participants were randomly selected to participate in this study. The sample size was calculated using the formula of $n = \frac{Z^2 P (1-P)}{d^2}$ where n = sample size, Z = Z statistic for a level of confidence, P = expected prevalence or proportion and d = precision.[20] In our study, we used an expected prevalence (*P*) of 30% (based on the results of previous studies)[5, 16, 21] and precision (*d*) of 5%. The number of participants in each Kelurahan was calculated based on the ratio of its older adults within the total population in the six Kelurahan (Figure 1). With the exception of people with unstable blood pressure and/or respiration rates, who were excluded from the study, all older adults who agreed to participate were included, irrespective of whether they suffered from health problems and/or had utilized healthcare services in the last month.

Figure 2.1Sample Selection Process



Measurement instruments

After being adapted to the community setting, the validated Indonesian version of the International Prevalence Measurement of Care Quality (LPZ-International) questionnaire was used in this study.[22, 23] PUs were assessed by skin inspection. The characteristics (PU category and PU location) of the ulcers were assessed according to NPUAP-EPUAP-PPPIA guidelines[1] including the following categories: category 1, 'non-blanchable erythema'; category 2, 'partial thickness'; category 3, 'full thickness skin loss'; category 4, 'full thickness tissue loss'; category unstageable, category 'depth unknown'; and category suspected deep tissue injury, 'depth unknown'.[1] As PU category 1 is difficult to establish, all ulcers were assessed using a transparent strip. The following participant characteristics were measured: age, gender, cohabitation (alone vs with spouse or children and other relatives), skin color (white, light brown, brown and dark brown), types of reported diseases (participant's self-reported diseases), body mass index, PU risk (measured with Braden scale item scores) and level of care dependency (measured with the Care Dependency Scale). Last, access to and use of formal care (the extent to which participants had active healthcare insurance, had been in contact with a healthcare provider in the last month, had received PU care treatment and received information about PU care) were measured, as was access to informal PU care (whether or not participants received wound care treatment from family caregivers.)

To assess a participants' risk of PUs, the Braden scale was used.[24, 25] This scale has been used in several Asian countries as a screening instrument for PU risk,[16, 26, 27] both in the hospital and in the community setting.[14, 26, 28] The validity and reliability of the Indonesian version of the Braden Scale have been confirmed.[22] The Braden scale measures six items: sensory perception, moisture, activity, mobility, nutrition and friction/shear. Each item can be scored on a scale of 1-4 or, in the case of friction/shear, 1-3.[25] A score ≤18 on the Braden scale score was used to categorize people as being at-risk.[29]

The Care Dependency Scale (CDS) measures the degree of physical and psychosocial care dependency and covers 15 items: eating and drinking, continence, body posture, mobility, day and night pattern, dressing and undressing, body temperature, hygiene, avoidance of danger, communication, contact with others, sense of rules and values, daily activities, recreational activities and learning ability.[30, 31] Each item has five Likert-type categories ranging from 1 (completely dependent) to 5 (almost independent). A patient's total score ranges from 15 to 75, and the lower the total score, the more care dependent a patient is.[31] The cross-cultural psychometric test of the CDS has been published[32] and can be used in different countries. The Indonesian version of this instrument has been validated.[22]

Data collection procedure

Six alumni of the faculty of Nursing Universitas Padjadjaran who had passed the national competency assessment as registered nurses were independently recruited as enumerators, and were divided into three teams of two persons. All enumerators received 7-8 hours of training from the first two authors (SPS and EAS) on using the adopted validated Indonesian version of the LPZ-International questionnaire. Data collection took place in the home of each participant. If there was information that could not be collected from the selected participant due to an inability to communicate (for instance because of cognitive impairment), their families or informal caregivers were allowed to provide the necessary information. All PUs found were documented through photographs and discussed later among the enumerators to categorize the PU, based on NPUAP-EPUAP-PPPIA guidelines.[1]

Ethical considerations

Two governmental institutions which have responsibilities in health care and community protection approved the research project before it was undertaken (the Indonesian Health Care Agency #070/13472-Dinkes and the National Unity Agency, Politics and Protection of the Regional People #070/3177/Bakesbangpol). The enumerators first had to inform the participants and collect written consent from them or their family. Participants were not obligated to participate and could refuse participation before and during the assessment procedure.

Statistics

Data was analyzed using IBM SPSS Statistics 25. PU prevalence was defined as the proportion of all participants who suffered from one or more PUs on the day of assessment. The PU prevalence was calculated both with and excluding category 1. In cases where a participant had more than one PU, only the highest PU grade was used in the prevalence calculation. The characteristics of PU participants as well as their ulcer characteristics were described using percentages for categorical variables and means with standard deviation for continuous variables. Bivariate comparison analyses were conducted using either the Mann-Whitney U-test (age, Braden Scale items, CDS sum score and body mass index) or the chi-square test (gender, cohabitation, education, skin color, and number/ group of diseases reported) to test whether the characteristics of participants with a PU and participants without a PU were significantly different ($p<0.05$). The characteristics on which the two groups were significantly different were further analyzed using a logistic regression analysis (backward Likelihood Ratio method).

RESULTS

Data collection was performed in October and November 2017. All participants selected (n=325) agreed to participate. The mean age of the participants was 72.1 years and 67.7% of the participants were women. More than half (67.7%) of the participants were living together with a spouse, children and/or other relatives.

PU prevalence

The overall prevalence of PU categories 1-4, and unstageable and suspected deep tissue injury 'deep unknown' was 10.8% (95% Confidence Interval (CI), 5.8-15.8). The prevalence of PUs excluding of category 1 was 5.2% (95% CI 0.2-10.2).

The characteristics of PUs

Table 1 shows detailed characteristics of the PUs. As shown in this table, there were a total of 35 participants with a PU, with an overall total of 70 wounds. Half of the participants (51.4%) suffered from PUs within category 1. The PUs in categories 2, 3 and suspected deep tissue injury "depth unknown" were accounted to be 17.1%, 15.7% and 5.7%, respectively. No PUs in categories 4 and unstageable "depth unknown" were found in this study. The dominant places of PU category 1 were on knees (21.4%) and toes (12.9%), while the dominant places of PUs excluding category 1 were the sacrum (25.9%), shoulder (25.9%) and hip (22.2%). All PUs found were community-acquired pressure ulcers; none of the PU participants had a history of hospital-acquired pressure ulcers.

Table 2.1 Pressure ulcer characteristics of community-dwelling older adult PU participants

Characteristics of PUs	Cat 1 PU n (%)	Cat 2 PU n (%)	Cat 3 PU n (%)	Cat 4 PU n (%)	Unstageable n (%)	Susp. Deep Tissue n (%)
The highest PU category per subject (n = 35 older adults)	18 (51.4)	5 (14.3)	9 (25.7)	0 (0.0)	0 (0.0)	3 (8.6)
Number of PU wounds per category (n = 70 wounds)	43 (61.4)	12 (17.1)	11 (15.7)	0 (0.0)	0 (0.0)	4 (5.7)
Locations of PU wounds (n = 70 wounds)						
Knees	15 (21.4)	-	-	-	-	-
Hip	4 (5.7)	2 (2.9)	3 (4.3)	-	-	1 (1.4)
Toes	9 (12.9)	-	-	-	-	-
Sacrum	1 (1.4)	4 (5.7)	3 (4.3)	-	-	-
Elbow	8 (11.4)	-	-	-	-	-
Shoulder	0 (0.0)	4 (5.7)	3 (4.3)	-	-	-
Heel	2 (2.9)	1 (1.4)	-	-	-	3 (4.3)
Ankle	4 (5.7)	-	-	-	-	-
Buttock	0 (0.0)	1 (1.4)	2 (2.9)	-	-	-

Characteristics of PU participants

Table 2 shows the characteristics of non-PU participants and PU participants. It appears that participants with a PU were significantly older, reported more stroke history, were more care-dependent, more at risk of PUs and had lower scores on the five Braden scale items (sensory perception, moisture, activity, mobility and friction/shear) in comparison with participants without a PU.

The nine variables which were significantly different between the two groups (age, the number of participants with a history of stroke, total CDS score, PU risk and Braden scale items sensory perception, moisture, activity, mobility and friction/shear) were included for further multivariate comparison analysis. This logistic regression analysis showed that the variables which are related to PU prevalence among older adults in the community were the Braden scale item ‘activity’ (OR 0.6; 95% CI .385 - .947), having had a stroke (OR 0.3; 95% CI .123 - .743) and the Braden scale item ‘sensory perception’ (OR 0.3; 95% CI .158 - .571).

Table 2.2 Characteristics of participating community-dwelling older adults

Participant characteristics (N = 325)	Non PU (n=290)	PU (n=35)	Total (N = 325)	Bivariate analysis	Multivariate analysis	
				p-value	p-value	Exp B (95% CI)
Mean age (SD)	71.8 (7.9)	74.8 (7.8)	72.1 (8)	**.026**	NS	
Female, n (%)	200 (69)	20 (57.1)	220 (67.7)	.158		
Cohabitation, n (%)						
a. Alone	33 (11)	3 (9)	36 (11.1)	.715		
b. Spouse	23 (8)	4 (11)	27 (8.3)			
c. Spouse and/or Children	26 (9)	6 (17)	32 (9.8)			
d. Spouse and/or children and other relative(s)	198 (68)	22 (63)	220 (67.7)			
Skin color						
a. White	12 (4.1)	1 (2.9)	13 (4)	.151		
b. Light brown	232 (80)	26 (74.3)	258 (79.4)			
c. Brown	41 (14.1)	7 (20)	48 (14.8)			
d. Dark brown	5 (1.7)	1 (2.9)	6 (1.8)			
Diseases						
Reported at least one health problem, n (%)	223 (76.9)	31 (11.4)	254 (78.2)	.114		
Health problem reported						
Hypertension, n (%)	90 (40.4)	6 (19.4)	96 (37.8)	.089		
Stroke, n (%)	35 (15.7)	17 (54.8)	52 (20.5)	**.001**	.009	0.3 (.123-.743)
Digestive problem, n (%)	26 (11.7)	5 (16.1)	31 (12.2)	.311		
Respiratory problem, n (%)	29 (13)	0 (0)	29 (11.4)	.050		
Coronary heart disease, n (%)	25 (11.2)	1 (3.2)	26 (10.2)	.235		
Rheumatoid Arthritis, n (%)	24 (10.8)	0 (0)	24 (9.4)	.077		
Diabetes, n (%)	17 (7.6)	4 (12.9)	21 (8.3)	.206		
Immobility and injury, n (%)	12 (5.4)	4 (12.9)	16 (6.3)	.060		
Genitourinary problem, n (%)	7 (3.1)	1 (3.2)	8 (3.1)	.873		
Others, n (%)	54 (24.2)	7 (22.6)	61 (24)	.844		
Sum score Care Dependency Scale (range 15 – 75), mean (SD)	64 (13.4)	44.1 (20)	61.8 (15.5)	.000	NS	
Braden scale item, mean (SD)						
a. Sensory perception	3.8 (0.4)	3.1 (0.8)	3.8 (0.5)	**.000**	.000	0.3 (.158-.571)
b. Moisture	3.3 (0.8)	3 (0.6)	3.3 (0.8)	**.002**	NS	
c. Activity	3.5 (0.8)	2.4 (1)	3.4 (0.9)	**.000**	.028	0.6 (.385-.947)
d. Mobility	3.5 (0.7)	2.6 (1.1)	3.4 (0.8)	**.000**	NS	
e. Nutrition	3.5 (0.7)	3.4 (0.8)	3.5 (0.7)	.459		
f. Friction and shear	2.9 (0.4)	2.4 (0.8)	2.8 (0.5)	**.000**	NS	
Participant at risk (Braden scale score ≤ 18), n (%)	49 (16.9)	18 (51.4)	67 (20.6)	**.000**	NS	
Body Mass Index, mean (SD)	24.7 (5.5)	26.2 (7.1)	24.8 (5.6)	.216		

Access and use of formal and informal care

Table 3 describes the extent to which the participants had healthcare insurance and used formal care. The use of formal care was measured by asking participants whether they had visited primary healthcare services in the previous month, consulted a private doctor, visited a hospital as an outpatient, or were hospitalized and/or

received a home visit from a formal caregiver. Results show no significant differences between PU and non-PU participants with regard to their access to and use of formal care. The majority of participants in both groups (78.8%) had healthcare insurance and 56.3% of the participants had made use of formal care in the previous month. Almost all PU participants had healthcare insurance, but less than half of them (45.7%) had actually used formal care in the previous month, and only 2.9% had received a visit from a formal caregiver. However, none of the participants with a PU received formal PU care or wound treatment at home, in a healthcare clinic or at the hospital. This means that the formal care they received was focused on something other than their PUs. With regard to informal care, only four of 35 PU participants had received wound treatment from a family caregiver. Finally, none of the participants or their family members had received any information about PUs or PU care from formal healthcare providers.

Table 2.3 The health insurance and access of formal and informal care services by PU participants

Access and use of health care	Non PU (n=290)	PU (n=35)	Total (N = 325)	P value
Participant is covered by health insurance	224 (77.2)	32 (91.4)	256 (78.8)	.151
Participant accessed a healthcare service in the previous month (e.g. primary health care/ private doctor/ outpatient hospital visit)	126 (43.4)	16 (45.7)	183 (56.3)	.798
Participant was hospitalized in the previous month	7 (2.4)	0 (0)	7 (2.2)	.353
Participant received home visit by formal healthcare provider in the last month	4 (1.4)	1 (2.9)	5 (1.5)	.502
Participant received information about PU from any formal health care providers	0 (0)	0 (0)	0 (0)	
PU participant received wound care treatment from any formal health care provider (n = 35 participants)	Not available	0 (0)	Not available	
PU participant received wound care treatment from family (n = 35 participants)	Not available	4 (11.4)	Not available	

DISCUSSION

This study provides a first insight into the prevalence and care of PUs among community-dwelling older adults in a city in Indonesia. The results show that the prevalence rate of all PUs including category 1 and the prevalence rate of PUs

excluding category 1 were 10.8% and 5.2%, respectively. The factors that strongly relate to PUs among older adults in the community were the degree of physical activity, a problem in sensory perception (assessed with the Braden Scale) and having a history of stroke. Although most participants with PUs had healthcare insurance, none of them had received formal wound care and/or any information about PU (care) from their formal healthcare providers. Last, for the most participants, family members did not provide PU care at home.

The PU prevalence among older adults in the general population in Bandung could be said to be high. Based on these numbers and considering the number of inhabitants in Bandung, it is expected that around 11,000 to 32,000 people aged 60 years or older living at home suffer from PUs.[20] However, no other studies presently report on the prevalence of PUs among community-dwelling older adults in the general population. Some studies have reported on the prevalence of community-acquired PUs among hospitalized older adults; these studies show prevalence rates of 3.3% in Sweden, 3.5% in Indonesia, 7.4% in New England (US) and 11.1% in Malaysia. Although these studies report on community-acquired PUs, the participants were all hospitalized. This means that community-dwelling older adults who were not hospitalized were not included in these studies. Therefore, it is difficult to compare these results with those found in our study. If our results are compared with the prevalence rate of PUs developed in four hospitals in Indonesia (8.0%),[16] the PU problem is relevant in community-dwelling older adults in Indonesia.

More than half (61.4%) of the PUs found in our population were classified as being within category 1. Interestingly, PUs in category 1 were mostly found on the toes and knees; PUs in these locations are found only rarely in other studies.[13, 14, 16, 21, 33-37] A possible reason for this may be related to the Indonesian habits of praying and sitting in a position with pressure on one's knees or toes (called "sujud (prostrated)" and "bersila (sit on knees)") repeatedly and for longer periods of time. These habits were also found among Bangladeshi immigrants in Greece, where almost 17% of diabetic patients had dermatologic changes (called "prayer marks") on the lower region of their left foot because of pressure.[38] It is likely that this prevalence will decrease if people are better informed about the prevention and treatment of category 1 PUs.[1] Older adults could, for instance, select a support surface (e.g. thick layer) while sitting and praying, or use a chair while perfoming such activities. Therefore, it's necessary to

improve self-care among older adults in the community to prevent the development of more severe PU categories.

Most of the PUs in categories 2 and 3 were located on the hip, sacrum and shoulder. These body parts usually show PUs when patients sleep in lying postures for a long time without regular repositioning; this may be due to many factors.[1] In our study, many participants who suffered from these PUs were immobile, suffered from sensory perception problems and had a history of stroke. These three factors might be the most important risk factors for developing a PU in this target group. Although our analyses adjusted for the effect of various confounders, it seems likely that these three risk factors are interrelated: having a stroke is associated with activity limitation[39] and activity limitation is a risk factor for developing PUs.[40] Also, our results show that stroke had been reported by more than half (54.8) of PU participants, while only 20.5% of the participants without a PU had a stroke history. Therefore, a special focus on stroke care might decrease the prevalence of PUs in the community.

This study also shows that the availability of health insurance did not ensure the use of formal care, illustrated by the fact that almost all (91.4%) of the PU participants were insured, but only 45.7% had accessed healthcare services in the previous month. Furthermore, even though some of the PU participants used formal care, none of them had received formal care focused on PU treatment from hospital nurses, community nurses or a home/wound care agency. Further research should focus on the reasons why older adults barely make use of formal healthcare, and on the reasons why formal caregivers give little attention to the provision of PU care.

Almost none of the PU participants received PU care from family members, even though the majority (63%) of them were living with family and other relatives. As the family can be a good support system for preventing the development of PU problems at home,[41] this is a missed opportunity. However, it is unknown what knowledge and skills family members have regarding PUs and PU care and how they cope with the PU problem at home. Further research focused on exploring family knowledge, attitude and skills regarding PU problems is recommended, especially in Indonesia where taking care of parents to the end of their lives is common.

Study limitations

This study has limitations. First, considering the large area of Indonesia, the results of this study cannot be generalised to all Indonesian urban areas. However, the results do give a clear overview of the prevalence of PUs in the community in the region of Bandung. Second, the measurement of PU category 1 could be biased, as participants might have had marks looking similar to PUs but which were actually caused by praying postures. However, the PUs were assessed by two nurses, recorded in photographs, and the results were discussed among all the enumerators to confirm that those wounds met the criteria of PU category 1[1]. In addition, most participants had light brown skin, which made it easy to assess PU category 1 using a transparent strip.

CONCLUSION

This study shows that PUs are a relevant problem in community-dwelling older people in an urban area in Indonesia, with an overall prevalence rate including category 1 of 10.8% and a prevalence rate excluding category 1 of 5.2%. Although most people had healthcare insurance, they did not receive any formal care for PU treatment. Therefore, more attention must be given to PU care in general, including the prevention and treatment of PUs by formal caregivers. Due to the fact that in Indonesia family is a very important source of informal care, the education and instruction of family caregivers regarding the prevention and treatment of PUs calls for serious attention.

REFERENCES

1. National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel, Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers: Quick Reference Guide. Emily Haesler (ed). Cambridge Media: Perth, Australia; 2014.
2. Briggs M, Collinson M, Wilson L, Rivers C, McGinnis E, Dealey C, et al. The prevalence of pain at pressure areas and pressure ulcers in hospitalised patients. BMC nursing. 2013;12(1):19.
3. Gorecki C, Brown JM, Nelson EA, Briggs M, Schoonhoven L, Dealey C, Brown J, Coleman S, Stubbs N, Stevenson R, Nelson EA and Nixon J. Impact of pressure ulcers on quality of life in older patients: a systematic review. Journal of the American Geriatrics Society. 2009;57(7):1175-83.
4. Esson L, Spilsbury K, Nelson E, Cullum C. Inpatients felt that pressure ulcers had emotional, mental, physical, and social effects on quality of life because nurses did not adequately treat or manage their pain or discomfort. Evidence-based nursing. 2007;10(4):128.
5. Landi F, Onder G, Russo A, Bernabei R. Pressure ulcer and mortality in frail elderly people living in community. Arch Gerontol Geriatr. 2007;44 Suppl 1:217-23.
6. Jaul E, Calderon-Margalit R. Systemic factors and mortality in elderly patients with pressure ulcers. Int Wound J. 2015;12(3):254-9.
7. Kandilov AMG, Coomer NM, Dalton K. The Impact of Hospital-Acquired Conditions on Medicare Program Payments. Medicare & Medicaid Research Review. 2014;4(4):E1-E23.
8. Russo CA, Steiner C, Spector W. Hospitalizations related to pressure ulcers among adults 18 years and older, 2006: statistical brief# 64. 2006.
9. Tubaishat A, Papanikolaou P, Anthony D, Habiballah L. Pressure ulcers prevalence in the acute care setting: a systematic review, 2000-2015. Clinical nursing research. 2017:1054773817705541.
10. Hahnel E, Lichterfeld A, Blume-Peytavi U, Kottner J. The epidemiology of skin conditions in the aged: A systematic review. Journal of Tissue Viability. 2017;26(1):20-8.
11. Van Leen MW, Schols JM, Hovius SE, Halfens RJ. A Secondary Analysis of Longitudinal Prevalence Data to Determine the Use of Pressure Ulcer Preventive Measures in Dutch Nursing Homes, 2005-2014. Ostomy Wound Manage. 2017;63(9):10-20.
12. Spilsbury K, Nelson A, Cullum N, Iglesias C, Nixon J, Mason S. Pressure ulcers and their treatment and effects on quality of life: hospital inpatient perspectives. Journal of Advanced Nursing. 2007;57(5):494-504.
13. Gunningberg L, Stotts NA, Idvall E. Hospital-acquired pressure ulcers in two Swedish County Councils: cross-sectional data as the foundation for future quality improvement. Int Wound J. 2011;8(5):465-73.
14. Corbett LQ, Funk M, Fortunato G, O'Sullivan DM. Pressure injury in a community population: a descriptive study. J Wound Ostomy Continence Nurs. 2017;44(3):221-7.
15. Khor HM, Tan J, Saedon NI, Kamaruzzaman SB, Chin AV, Poi PJ, Tan MP. Determinants of mortality among older adults with pressure ulcers. Arch Gerontol Geriatr. 2014;59(3):536-41.
16. Amir Y, Lohrmann C, Halfens RJ, Schols JMGA. Pressure ulcers in four Indonesian hospitals: prevalence, patient characteristics, ulcer characteristics, prevention and treatment. International Wound Journal. 2017;14(1):184-93.

17. Rodrigues I, Megie MF. Prevalence of chronic wounds in Quebec home care: an exploratory study. Ostomy Wound Manage. 2006;52(5):46-8, 50, 2-7.
18. Ministry of Health Republic of Indonesia. Analisis Lansia di Indonesia 2017. In: Menistry of Health, editor. Jakarta: Center for Data and Information; 2017.
19. Pemerintah Negara Republik Indonesia. Peraturan Menteri Kesehatan Republik Indonesia nomor 67 Tahun 2015 tentang Penyelenggaraan pelayanan kesehatan lanjut usia, (2015).
20. L. Naing TW, B.N. Rusli. Practical Issues in Calculating the Sample Size for Prevalence Studies. Orofacial Sciences 2006;1:9-14.
21. Beerens HC, Sutcliffe C, Renom-Guiteras A, Soto ME, Suhonen R, Zabalegui A, et al. Quality of life and quality of care for people with dementia receiving long term institutional care or professional home care: the European RightTimePlaceCare study. Journal of the American Medical Directors Association. 2014;15(1):54-61.
22. Amir Y, Kottner J, Schols JM, Lohrmann C, Halfens RJ. Psychometric properties of the Dutch National Prevalence Measurement of Care Problems used to measure quality of pressure ulcer care in Indonesian hospitals. Adv Skin Wound Care. 2014;27(8):363-70.
23. Halfens RJ, Meesterberends E, van Nie-Visser NC, Lohrmann C, Schonherr S, Meijers JM, et al. International prevalence measurement of care problems: results. J Adv Nurs. 2013;69(9):e5-17.
24. Braden BJ, Bergstrom N. Clinical utility of the Braden scale for Predicting Pressure Sore Risk. Decubitus. 1989;2(3):44-6, 50-1.
25. Braden BJ. The Braden scale for predicting pressure sore risk: reflections after 25 years. Advances in Skin & Wound Care. 2012;25(2):61.
26. Kaur S, Singh A, Tewari MK, Kaur T. Comparison of Two Intervention Strategies on Prevention of Bedsores among the Bedridden Patients: A Quasi Experimental Community-based Trial. Indian J Palliat Care. 2018;24(1):28-34.
27. Sanada H, Nakagami G, Koyano Y, Iizaka S, Sugama J. Incidence of skin tears in the extremities among elderly patients at a long-term medical facility in Japan: A prospective cohort study. Geriatr Gerontol Int. 2015;15(8):1058-63.
28. Bates-Jensen BM, McCreath HE, Nakagami G, Patlan A. Subepidermal moisture detection of heel pressure injury: The pressure ulcer detection study outcomes. Int Wound J. 2018;15(2):297-309.
29. Wilchesky M, Lungu O. Predictive and concurrent validity of the Braden scale in long-term care: A meta-analysis. Wound Repair and Regeneration. 2015;23(1):44-56.
30. Dijkstra A, Buist G, Moorer P, Dassen T. A reliability and utility study of the care dependency scale. Scand J Caring Sci. 2000;14(3):155-61.
31. Dijkstra A, Brown L, Havens B, Romeren TI, Zanotti R, Dassen T, et al. An international psychometric testing of the care dependency scale. J Adv Nurs. 2000;31(4):944-52.
32. Dijkstra A, Coleman M, Tomas C, Valimaki M, Dassen T. Cross-cultural psychometric testing of the Care Dependency Scale with data. J Adv Nurs. 2003;43(2):181-7.
33. Chang SC, Shiu MN, Chen HT, Ng YY, Lin LC, Wu SC. Evaluation of care quality for disabled older patients living at home and in institutions. J Clin Nurs. 2015;24(23-24):3469-80.
34. Meesterberends E, Halfens RJ, Spreeuwenberg MD, Ambergen TA, Lohrmann C, Neyens JC, et al. Do patients in Dutch nursing homes have more pressure ulcers than patients in German nursing homes? A prospective multicenter cohort study. Journal of the American Medical Directors Association. 2013;14(8):605-10.

35. Schussler S, Dassen T, Lohrmann C. Care dependency and nursing care problems in nursing home residents with and without dementia: a cross-sectional study. Aging Clin Exp Res. 2016;28(5):973-82.
36. Carryer J, Weststrate J, Yeung P, Rodgers V, Towers A, Jones M. Prevalence of key care indicators of pressure injuries, incontinence, malnutrition, and falls among older adults living in nursing homes in New Zealand. Res Nurs Health. 2017;40(6):555-63.
37. Kwong EW, Pang SM, Aboo GH, Law SS. Pressure ulcer development in older residents in nursing homes: influencing factors. J Adv Nurs. 2009;65(12):2608-20.
38. Papadakis G, Zampelis T, Michalopoulou M, Konstantopoulos K, Rosenberg T, Chatzipanagiotou S. Prayer Marks in Immigrants from Bangladesh with Diabetes Who Live in Greece. J Immigr Minor Health. 2016;18(1):274-6.
39. van der Vorst A, Zijlstra GA, Witte N, Duppen D, Stuck AE, Kempen GI, et al. Limitations in Activities of Daily Living in Community-Dwelling People Aged 75 and Over: A Systematic Literature Review of Risk and Protective Factors. PLoS One. 2016;11(10):e0165127.
40. Coleman S, Gorecki C, Nelson EA, Closs SJ, Defloor T, Halfens R, et al. Patient risk factors for pressure ulcer development: systematic review. International journal of nursing studies. 2013;50(7):974-1003.
41. Kim J, Choi Y, Shin J, Jang S-Y, Cho KH, Nam JY, et al. Incidence of Pressure Ulcers During Home and Institutional Care Among Long-Term Care Insurance Beneficiaries With Dementia Using the Korean Elderly Cohort. Journal of the American Medical Directors Association. 2017;18(7):638. e1-. e5.

CHAPTER 3

Development and psychometric evaluation of an instrument to assess Knowledge, Attitude and Practice of Family Caregivers at Preventing Pressure Injuries (KAP-PI) in Indonesian community-dwelling older adults

This chapter was published as:
Sari SP, Everink IHJ, Lohrmann C, Amir Y, Sari EA, Halfens RJG, Beeckman D, Schols JMGA. Development and psychometric evaluation of an instrument to assess Knowledge, Attitude and Practice of Family Caregivers at Preventing Pressure Injuries (KAP-PI) in Indonesian community-dwelling older adults. BMC Nursing. 2022;21(1):222.

ABSTRACT

Background: The prevalence of pressure injuries among community-dwelling older adults in countries worldwide is still a serious problem. In Indonesia, older adults mostly rely on family members for (medical) care. Therefore, involving family members in the prevention and treatment of pressure injuries (PIs) could potentially decrease its prevalence rates. However, family members are usually not trained for such tasks. Hence, it is essential to first get more insight into the current state of affairs on family members' knowledge, attitude and actual practice of preventing PIs. Due to the lack of an existing instrument to measure knowledge, attitude and practice of family caregivers in preventing PIs, this study focuses on the development and evaluation of psychometric properties of such an instrument.

Methods: Three phases of instrument development and evaluation were used, including item generation, instrument construction and psychometric testing of the instrument. A total of 372 family caregivers of community-dwelling older adults who randomly selected participated in this study. Principal factor analysis, confirmatory factor analysis and Cronbach's alpha were performed to evaluate factor structure and internal consistency of the Knowledge, Attitude and Practice of Family Caregivers at Preventing Pressure Injuries (KAP-PI) instrument.

Results: The final version of the KAP-PI-instrument consists of a 12-item knowledge domain, a 9-item attitude domain, and a 12-item practice domain with Cronbach's Alpha values of 0.83, 0.93 and 0.89, respectively. The instrument appeared to be both reliable and valid.

Conclusions: The KAP-PI instrument can be used in family nursing or community nursing practice, education, and research to assess knowledge, attitude and practice of pressure injury prevention of family caregivers.

INTRODUCTION

Research has shown that the prevalence of pressure injuries (PIs) among community-dwelling older adults in countries around the world is still a serious problem.[1-3] The European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel and Pan Pacific Pressure Injury Alliance (2019) defined that "A pressure injury is a localized damage to the skin and or underlying tissue, which usually occurs over a bony prominence due to pressure or pressure combined with shear".[1] A study in the United States found that patients who had a PI on admission to the hospital were dominated (70.6%) by older adults (mean age 72.7 years) living at home.[2] Another study in the United States noted that PI were associated with greater number of older adult living at home re-admissions to the hospital.[3] Similarly, a study in United Kingdom reported numbers of community-dwelling older adults with pressure injuries per 1000 were 1.64 for those aged 65 – 74 and 5.75 for aged ≥ 74.[4]

Indonesia is a country that is also facing challenges related to PIs, due to its ageing population.[5] Indonesia has a population of 273.5 million people,[6, 7] of which almost 10% are older adults (60+) and the majority of these older adults live at home with their families [8]. Nursing homes or other long-term care institutions do exist, but are in minimal number.[8, 9] Also, leaving parents in nursing homes is still taboo for Indonesian people.[10] Older adults who live at home can also receive community care, but it appears that this formal care option is also not being used very often.[5, 8] Therefore, family members are often the ones taking care of older adults with care dependency. They not only take care of activities of daily living their relatives need, such as washing and dressing, but also of more complex (medically-oriented) tasks. However, the result of a national survey from Statistics Indonesia (Badan Pusat Statistik) shows that about 40% of older adults and family caregivers in Indonesia treat their older relatives with non-prescribed or traditional medicine, or do not treat diseases at all.[11] Even though the majority of older adults (78.8%) had health insurance, less than half of them (45.7%) actually seeks formal care.[11] Sometimes, community health volunteers help older adults and their family caregivers and/ or motivate them to seek formal care.

However, community nurses in Indonesia are usually primarily responsible for public health in their work area. They are expected to actively come to the community to increase the accessibility of older adults living in the community to proper care and further involve family members in preventing and treating PIs. Involving family

members in the prevention and treatment of PIs could potentially decrease its prevalence rates,[12-15] especially among older adults living at home with a high risk of developing PIs. These are mainly older adults with limited mobility,[5, 16, 17] a stroke history,[5, 18] and nutritional problems.[19] However, little is known about what family members actually know about PI.

Preventing and treating PIs is a complex task, and family members are usually not trained for such tasks.[5, 16, 20] Besides the fact that not much is known about the knowledge family members have about PIs, less is also known about the attitude of family caregivers towards PI prevention and treatment. Knowledge and attitude appear to be positively associated with the actual practice of preventing illnesses.[21-24]

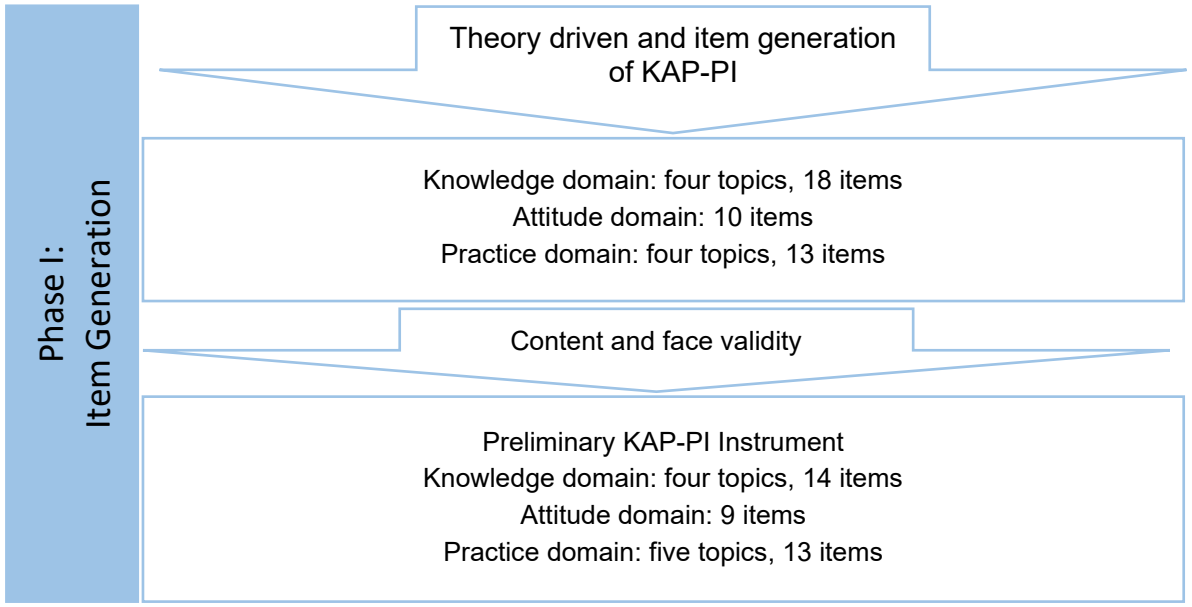
To decrease prevalence of PIs in Indonesian community-dwelling older adults, it seems that a strategy focused on their family caregivers could be beneficial. However, to develop a targeted strategy, it is essential to first get more insight into the current state of affairs on family members' knowledge, attitude and actual practice of preventing PIs. To assess this, a valid and reliable instrument is needed. After a literature search focused on finding a standardized or published instrument that measures family caregivers' knowledge, attitude, and practice on PI prevention, it appeared that hardly any information was available. Only one study was found that reported on the psychometric properties of an instrument measuring knowledge on PI prevention.[25]

Due to the lack of an existing instrument to measure knowledge, attitude and practice of family caregivers in preventing PIs, the objective of this study was to develop such an instrument and to describe its psychometric properties. In this study, the steps that were taken to develop and test the instrument are described, as well as the content of the final version of instrument for use in a population of community-dwelling older adults in Indonesia.

METHODS

Three phases of instrument development and evaluation described by Boateng et al. (2018) were used, including 1) item generation; 2) instrument construction, and 3) psychometric testing of the instrument.[26] Figure 1 describes the entire process of developing and psychometric evaluation of KAPI-PI instrument.

Figure 3.1 The process of developing and psychometric evaluation of KAPI-PI instrument



Phase II: Instrument Construction

Preliminary of KAP-PI: survey administration to 120 of family caregivers

Domain	Analyses	Item tested	Item reduction	Factor extraction	Cronbach's Alpha
Knowledge	Pearson Correlation Product Moment	14 items	Deleted 2 items	1 factor extracted	0.82
Attitude	Principal Component Analyses (PCA)	9 item	No item deleted	1 factor extracted	0.92
Practice	Principal Component Analyses (PCA)	13 items	Deleted 1 item	3 factors extracted	0.87

Phase III: Psychometric testing of the instrument

Pre final of KAP-PI: survey administration to 240 of family caregivers

Domain	Analyses	Item tested	Tests of dimensionality	Test of validity	Cronbach's Alpha
Knowledge	CFA and Cronbach's Alpha	12 items	Multivocal model (3 factors confirmed	The 12 items were valid	0.83 F1 : 0.77 F2 : 0.78 F 3: 0.74
Attitude	CFA and Cronbach's Alpha	9 item	Univocal model (1 factor confirmed)	The 9 items were valid	0.93
Practice	CFA and Cronbach's Alpha	12 items	Multivocal model (3 factors confirmed	The 12 items were valid	0.89 F1 : 0.80 F2 : 0.73 F 3: 0.87

3.1 Phase I: Item Generation

First, we specified the three domains we wanted to measure: knowledge (K), attitude (A), and practice (P) of family caregivers in preventing PIs among community-dwelling older adults in Indonesia. To develop items covering the three domains, authors SPS and EAS conducted a literature search. They independently identified relevant topics for measuring family caregivers' knowledge, attitudes, and practices for preventing PIs in community-dwelling older adults. The literature review was conducted using the following questions: 1) What is the necessary information about PI prevention that family caregivers should know; 2) What attitude toward PI prevention should family caregivers have; and 3) What should family caregivers actually do to prevent their older relative from getting a PI? After a detailed review of the international PI guideline developed by the National Pressure Ulcer Advisory Panel (NPUAP), The European Pressure Ulcer Advisory Panel (UPUAP) and Pan Pacific Pressure Injury Alliance (PPPIA),[27] the two authors compared and merged their findings. Considering that the guideline is written primarily for health professionals in clinical practice, a review of family nursing books[28-30] was also conducted to narrow the findings in the family care function, resulting in the themes per domain shown in Figure 1.

After determining the topics in the three domains, the authors proceeded to generating questions per topic. The design of the questions followed the questionnaire design guide explained by Bourke et al.[31] For the items in the knowledge domain, multiple-choice questions with only one correct answer were developed.[32] For the items in the attitude domain, statements were developed with response options on a Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree).[33] Statements were also developed in the practice domain. An example is "I help the older relative to move when he is bedridden". The statements in the practice domain also include a response option on a Likert scale including the answer options ‘never’ (the activity has never been done), ‘sometimes’ (the activity is done 1 to 3 days per week), ‘often’ (the activity is done 4 to 6 days per week), and ‘always’ (the activity is done every day). The original version of KAP-PI instrument was written in Bahasa Indonesia using the standard vocabulary and structures of the Indonesian national language.

Content and Face Validity Assessment

Two nurses and one physician from Indonesia who have experience in the field of pressure injuries and community care were asked to evaluate the content of the instrument. Experts received the draft instrument via email and were asked to rate 1) the clarity of wording per item and 2) the relevance of each item per domain (knowledge, attitude, and practice) to the population under consideration (family caregivers caring for community-dwelling older adults).They were asked to rate the items on a 4-point Likert scale as follows:

1. How do you assess the relevance of topics and items in the three domains for the population under consideration? Answer options included 1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, 4 = highly relevant.
2. How do you assess the clarity of wording of this item? Answer categories were: 1 = drop item entirely, 2 = make major revisions to the item, 3 = make minor revision to the item, 4 = retain the item exactly as worded.

If experts felt that the wording was not clear or the item was not relevant, they were asked to suggest for improvements. In addition, the experts were allowed to add topics or points which, in their opinion, were still missing in the instrument. The item content validity index (I-CVI) was calculated to evaluate the individual items in the instrument. The I-CVI is computed as the number of experts giving a rating of either 3 (quite relevant) or 4 (highly relevant), divided by the number of experts.[34] When there are five or fewer experts, the I-CVI must be 1.00.[35] Therefore, only if the I-CVI was 1.00, meaning that all experts gave a rating 3 (quite relevant) or 4 (highly relevant) on an item, the item was left in the instrument. This meant that the Instrument content validity index (S-CVI), calculated as the proportion of items from the original instrument rated as ‘quite relevant’ or ‘highly relevant’ by the experts was also 1 (reflecting excellent content validity).[34]

Next, face validity was assessed in the target population by including 12 family caregivers of community-dwelling older adults. This process aimed to confirm that family caregivers understood the questions as the researchers intended. They were first asked to fill out the instrument. Then, in a short interview, family caregivers were asked whether they recognized every word used on the questionnaire and understood the meaning of the question or not. Correction of sentences and word choices were made based on their feedback.

The content and face validity process resulted in a preliminary KAP-PI instrument.

3.2 Phase II: Instrument Construction

Phase II aimed to transform the preliminary KAP-PI instrument into a statistically acceptable construct.[26] At this stage, data were collected using a self-administration paper-based instrument and used to determine: 1) which items should be deleted; and 2) the optimal number of factors that fit a set of items.[26]

Participants

For phase II, family caregivers were required to complete the preliminary version of the KAP-PI. For this, family caregivers of community-dwelling older adults in all regions in Bandung, Indonesia, were randomly selected from data provided by the municipalities. The data included information on the number, names, and addresses of families of all older adults in each area. Those data could be accessed after getting permission from two governmental institutions that have responsibilities in health care and community protection, namely the Health Departement and the National Unity Agency, Politics and Protection of the Regional People (Bakesbangpol). The number of family caregivers to be included in each community was determined by the ratio of older adult families to the total number of older adult families in all regions. A table of random numbers was used for selection. To be included in the study, family members (spouses, children, or other relatives of older adults) had to be living with or caring for people aged 60 years or older (considered older adults in Indonesia. Each family member completed one instrument from each selected family, regardless of the number of older adults in their household. The number of participants needed for the statistical analysis purposes was determined by 10 participants per survey item or 200 – 300 participants.[26]

Data collection

Selected family caregivers were visited in their home by enumerators, who were independently recruited as research assistants. If they met the inclusion criteria and agreed to participate, data collection immediately took place in the participant's home. Participants received an informed consent form and the Preliminary KAP-PI paper-based instrument consisting of demographic data, questions and instructions. The

enumerators first explained the study's objectives, the procedure, the anonymized use of data and the right to stop participation at any moment. Participants completed the self-administration of preliminary KAP-PI instrument in front of the enumerators. The completed instruments were collected by the enumerators and given to the authors.

Data analysis

Knowledge domain

The answers to the questions, which consisted of multiple-choice questions, were recorded in dichotomous correct-incorrect variables. Correct answers were assigned the value 1, incorrect answers the value 0. Instrument construction of the knowledge domain was based on an evaluation described by Haladyna,[32] which includes the evaluation of 1) the item difficulty; 2) the discriminating index (D value); and 3) the quality of response alternatives. The decision to delete some items was based on these ratings as explained below:

The item difficulty is the percentage of participants who answer the item correctly.[32] Items with a lower item difficulty are relatively easier to answer compared to items with a higher difficulty score. In this study, items answered correctly by less than 10% of the participants were considered too difficult and item answered correctly by more than 90% of the participants were considered too easy. Hence, items with a difficulty index lower than 0.10 or higher than 0.90 were removed

The discriminating index (D value) describes an item's ability to differentiate between participants who know and do not know the information being asked. A statistical method of Item-total correlation (point-biserial) was used to evaluate the discrimination index of each item. Further, Cronbach's Alpha was checked. Items with item-total correlation being much lower than those of the other items and not contributing to internal consistency (i.e. alpha if item deleted > alpha with item in the scale) were deleted.[32]

Finally, the quality of the response alternatives (that is, the distractors/wrong answers) was assessed by the proportion or percentage of participants who chose these distractors (range 0 - 1) (33). The distractors with a value of 0 were defined as 'not attractive', and those with a value of 1 as 'too attractive'. Response alternatives less than 0.10 or higher than .90 were modified or deleted.

A study of dimensionality from the valid items in the knowledge domain was performed using a Principal Factor Analysis (PFA) with oblique rotation method with Kaiser Normalization.

Attitude and practice domains

In the attitude and practice domains, the answers to the questions were scored according to each answer's value, which ranged from 1 to 4. A Principal Factor Analysis (PFA) with oblique rotation method with Kaiser Normalization was run separately for the two domains. This was done to check the relationship between the items and to check how many factors were generated from the items.[36, 37]

Before performing the factor analysis, all requirements for performing PFA were checked, including 1) value of Kaiser-Meyer-Olkin Measure from Sampling Adequacy (KMO MSA) should be 0.50; 2) Bartletts Test of sphericity (Sig.) should be 0.05.[38] The number of factors in the attitude and practice domains were extracted using Eigenvalues > 1 and the total variance explained by the factors.[38] A factor loading cutoff value of 0.4 was used to indicate the acceptable construct validity of each item: items with a value of 0.4 and higher were retained in the instrument.[36]

All analyses in phase II were done using IBM SPSS Statistics 26.

3.3 Phase III: Psychometric testing of the instrument

Participants and procedure

Phase III tested the final KAP-PI instrument to different family caregivers in the same population with phase II. The inclusion criteria and handling of the data collection procedure for phase III were the same as phase II. The number of participants needed was determined by 10 participants per survey item or 200 – 300 participants.[26]

Data analysis

In the knowledge domain, data analysis aimed to confirm the dimensionality of items. All the valid items were expected to form a unidimensional construct. In the attitude and practice domains, data analysis aimed to confirm number of factors constructed from phase II. A confirmatory factor analysis (CFA) was performed using the statistical computing R package **lavaan** from the Comprehensive R Archive

Network (CRAN).[39, 40] The R package **lavaan** generates “fit indices” including Tucker-Lewis Index/ TLI (the higher the value, the better the model), Root Mean Square Error of Approximation/ RMSEA (is expected to be small to indicate reasonable model fit), and Comparative Fit Index/ CFI (value above 0.90 is considered good).[41] When the indices are fits, the correct model has been specified.[41]

Lastly, the instrument's reliability (internal consistency) in each domain and per item subset were analyzed using Cronbach’s alpha inter-item correlation. A general guideline for the use of Cronbach's alpha to assess a newly developed instrument is that values should be ≥0.70.[42]

Ethics approval and consent to participate

All methods were performed in accordance with the relevant guidelines and regulations of the Declaration of Helsinki, a statement of ethical principles which directs research involving human subjects. This study received ethical approval from The Research Ethics Committee Universitas Padjadjaran Bandung (No. 138 / UN6.KEP/EC/2020). Furthermore, two governmental institutions that have responsibilities in health care and community protection approved the research project before undertaken (the Indonesian Health Care Agency #070/13472-Dinkes and the National Unity Agency, Politics and Protection of the Regional People #070/3177/Bakesbangpol). Participants received information about the study and signed consent if they agreed to participate. Participants were not obligated to participate and could refuse participation before and during the data collection.

RESULTS

Characteristics of Participants

Table 1 shows the participant characteristics. A total of 372 family caregivers participated in the study (12 participants in Phase I to investigate face validity, 120 participants in Phase II for instrument development, and 240 participants in Phase III for psychometric testing). Of all participating family caregivers, 89.0% (n = 331) were female, and 69.1% (n = 257) were >30 years old. Most participants (n = 307; 82.5%) had a low educational background (below upper secondary school education), and

38.9% (n = 144) were unemployed. More than half (n = 266; 71.5%) of the caregivers were children of older adults.

Table 3.1 Characteristics of Participants

Characteristics of Participants	Participants (%)			
	Face validity (n=12)	Phase II (n=120)	Phase III (n=240)	Total (n=372)
Gender				
Male	3 (20.0)	15 (12.5)	23 (9.6)	41 (11.0)
Female	9 (80.0)	105 (87.5)	217 (90.4)	331(89.0)
Age category				
< 20 years	0 (0.0)	7 (5.8)	14 (5.8)	21 (5.6)
20 – 30 years	3 (20.0)	28 (23.3)	63 (26.3)	94 (25.3)
31 – 40 years	6 (60.0)	33 (27.5)	54 (22.5)	93 (25.0)
> 40 years	3 (20.0)	52 (43.3)	109 (45.4)	164 (44.1)
Education				
Primary education	3 (30.0)	82 (68.3)	147 (61.3)	232 (62.4)
Lower secondary education	2 (10.0)	15 (12.5)	58 (24.2)	75 (20.2)
Upper secondary education	7 (60.0)	16 (13.3)	27 (11.3)	50 (13.4)
Diploma	0 (0.0)	7 (5.8)	8 (3.3)	15 (4.0)
Occupation				
Unemployed	4 (40.0)	48 (40.0)	92 (38.3)	144 (38.7)
Student	0 (0.0)	2 (1.7)	3 (1.3)	5 (1.3)
Employee	2 (20.0)	38 (31.7)	84 (35.0)	124 (33.3)
Self-employed	6(40.0)	32 (26.7)	61 (25.4)	99 (26.6)
Relationship with older adult				
Spouse	0 (0.0)	17 (14.2)	28 (11.7)	45 (12.1)
Children	6 (50.0)	63 (52.5)	170 (70.8)	239 (64.2)
Other relatives	6 (50.0)	40 (33.3)	42 (17.5)	88 (23.7)

Knowledge domain

Table 2 shows the topics and items generated in the knowledge domain and their statistical analysis results at each stage. In the process of item development, four topics and 18 items were generated (items no. 1 - 18). In the process of content validation, of these 18 items, five items (item no. 2, 5, 9, 12, and 18) were deleted due to a Content Validity Index (CVI) of <1 each, while one item was added to the supporting interface (item no. 19). Thus, 14 items remained content valid and therefore, were tested for construct validity in phase II.

In the data analysis of phase II, two items (items no.1 and no.10) were identified who had item-total correlation much lower than those of the other items. These two items did not contributed to the Cronbach's alpha; means that if these two items were deleted, the Cronbach's alpha was higher. Item no.10 also had a difficulty index < 0.10. As a result, item no.1 and 10 were removed from the instrument, leaving 12 items with a good difficulty index (mean = 0.57), good discriminating index (mean = 0.59) and

good distractors of the multiple-choice alternatives. The dimensionality of all 12 items were tested using Principal Factor Analysis (PFA), generating three factors for the Eigenvalue greater than 1 (as shown in Figure 2). Factor 1 represented topic about PI prevention (item no.6,7,8,9,10), factor 2 was about cause and consequences of PIs (item no.7 and 8), and factor 3 related to characteristic of older adults and PI (item no.1,2,3). These three factors together explained 64.4% of total variance. Factor loading of these 12 items ranged from 0.40-0.92.

A Confirmatory Factor Analysis with three factor was run for these 12 items in phase III among 240 family caregivers. The results showed that a model of three factor was accepted (CFI = 0.87; TLI = ; 0.82 and RMSEA = 0.04). The internal consistency of Cronbach's alpha was 0.83. All these results show that the KAP-PI instrument in the knowledge domain with 12 items can be used as an instrument to measure family caregivers' knowledge prevention among community-dwelling older adults.

Table 3.2 Knowledge domain

No	Domain and item generation	Phase I		Phase II					Phase III	
		I-CVI	Conclusion	Item difficulty	Discriminating index	Quality of response alternatives	Conclusion	Factor loading	"fit indices" of CFA	Cronbach's Alpha
Topic: Definition and characteristic of older adult										
1	Older adults in Indonesia is defined as: a. People aged ≥ 50 years b. People aged ≥ 60 years* c. People aged ≥ 70 years	**1**	Retained	0.40	**0.09**[c] Cronbach's Alpha if item deleted = 0.85	Options: a = 0.25 c = 0.35	**Deleted**	Item deleted/ not tested	Multifocal model with three factors. CFI = 0.87 TLI = 0.82 RMSEA = 0.04	Overall : 0.83 F1 : 0.77 F2 : 0.78 F 3: 0.74
2	What is characteristic of older adults: a. Have limited regenerative abilities* b. Have limited activity daily living c. Have limited interaction with people	**<1**	Deleted	Item deleted/ not tested	Item deleted/ not tested	Item deleted/ not tested	Item deleted/ not tested	Item deleted/ not tested		
3	The normal changes that occur in the older adult's skin are: a. The skin becomes wrinkled and moist b. The skin becomes wrinkled and gets wet easily c. The skin becomes wrinkled and dries easily*	**1**	Retained	0.72	0.63 Cronbach's Alpha if item deleted = 0.81	Options: a = 0.19 b = 0.17	Retained	**0.58 (factor 3)**		
Topic: Definition of PI and symptoms associated with PIs										
4	A Pressure injury is: a. An injury that occurs due to the use of diapers b. An injury on the skin which usually occurs over a bony prominence as a result of pressure* c. An injury that occurs due to pressed by tight clothes	**1**	Retained	0.30	0.50 Cronbach's Alpha if item deleted = 0.82	Options: a = 0.50 c = 0.20	Retained	**0.47 (factor 3)**		
5	A pressure injury can also be defined as: a. An injury on the skin over a bony prominence as a result of shear b. An injury on the skin because of heat c. An injury on the skin because of diabetic	**<1**	Deleted	Item deleted/ not tested	Item deleted/ not tested	Item deleted/ not tested	Item deleted/ not tested	Item deleted/ not tested		
6	Symptom(s) of pressure injuries are: a. The skin looks reddish b. There is visible skin damage/wounds c. Options A and B are correct*	**1**	Retained	0.72	0.68 Cronbach's Alpha if item deleted = 0.80	Options: a = 0.18 b = 0.10	Retained	**0.42 (factor 3)**		

No	Domain and item generation	Phase I		Phase II				Phase III		
		I-CVI	Conclusion	Item difficulty	Discriminating index	Quality of response alternatives	Conclusion	Factor loading	"fit indices" of CFA	Cronbach's Alpha
Topic: Cause and consequences of PIs										
7	The cause of a pressure injury is: a. Continuous pressure and shear against the skin* b. Squeezed objects falling on the body c. The pressure of clothes attached to the body	**1**	Retained	0.53	0.54 Cronbach's Alpha if item deleted = 0.81	Options: b = 0.13 c = 0.34		**0.67 (factor 2)**		
8	Pressure injuries in older adults can cause: a. Pain and infection* b. Nausea and vomiting c. Urinary incontinence	**1**	Retained	0.67	0.62 Cronbach's Alpha if item deleted = 0.81	Options: b = 0.14 c = 0.19	Retained	**0.48 (factor 2)**		
9	Pressure injuries in older adults can make them: a. Difficult to mobile* b. Difficult to urinate c. Difficult to concentrate	**<1**	Deleted	Item deleted/ not tested	Item deleted/ not tested	Item deleted/ not tested	Item deleted/ not tested	Item deleted/ not tested		
10	What will happen if redness in the skin of older adults is left untreated? a. It will develop into deep pressure ulcers* b. It becomes blackish and then heals. c. It will heal itself when the skin is dry.	**1**	Retained	**0.08[b]**	**0.36[c]** Cronbach's Alpha if item deleted = 0.83	Options: b = 0.32 c = 0.60	**Deleted**	Item deleted/ not tested		
Topic: Preventive strategies that family caregivers can perform to prevent PIs										
11	What to do to prevent pressure injuries in older adults? a. Wear loose clothes b. Use footwear when leaving the house. c. Prevent prolonged pressure on the skin*	**1**	Retained	0.38	0.49 Cronbach's Alpha if item deleted = 0.82	Options: a = 0.42 b = 0.20	Retained	**0.44 (factor 1)**		
12	What to do to prevent redness on older adult's skin? a. Prevent shear on the skin b. Prevent applying lotion on the skin c. Prevent using hard mattress	**<1**	Deleted	Item deleted/ not tested	Item deleted/ not tested	Item deleted/ not tested	Item deleted/ not tested	Item deleted/ not tested		
13	Pressure ulcers in older adults can also be prevented by: a. Adequate feeding and drinking* b. Sunbathing c. Prevent stress on older adults	**1**	Retained	0.66	0.62 Cronbach's Alpha if item deleted = 0.81	Options: b = 0.13 c = 0.21	Retained	**0.92 (factor 1)**		

No	Domain and item generation	Phase I		Phase II				Phase III		
		I-CVI	Conclusion	Item difficulty	Discriminating index	Quality of response alternatives	Conclusion	Factor loading	"fit indices" of CFA	Cronbach's Alpha
14	For immobile/ bedridden older adults, what should be done to prevent pressure injuries? a. Mobilization to the left and right sleeping position* b. Positioning the older adults always sleeps on their back without any wedge c. Let older adults sleep without being disturbed.	**1**	Retained	0.49	0.58 Cronbach's Alpha if item deleted = 0.81	Options: b = 0.31 c = 0.20	Retained	**0.95 (factor 1)**		
15	A thing that should be done on older persons' dry skin to avoid pressure injuries is: a. Apply powder to keep the skin dry b. Moisturizes dry skin* c. Cover the dry skin with a bandage	**1**	Retained	0.53	0.60 Cronbach's Alpha if item deleted = 0.81	Options: a = 0.23 c = 0.24	Retained	**0.44 (factor 1)**		
16	A thing that should be done when an older persons' skin turns red is: a. Let it dry itself b. Release pressure and shear* c. Give betadine or iodine.	**1**	Retained	0.75	0.70 Cronbach's Alpha if item deleted = 0.81	Options: a = 0.15 c = 0.10	Retained	**0.45 (factor 1)**		
17	A thing that should be done if the skin of an older adult shows deep pressure injury is: a. Take the older adults to health care services* b. Treat using honey c. Let it open	**1**	Retained	0.71	0.59 Cronbach's Alpha if item deleted = 0.81	Options: b = 0.17 c = 0.12	Retained	**0.95 (factor 1)**		
18	What to do to prevent deep pressure injuries in older adults: a. Consult the injuries to health care provider* b. Apply a traditional medicine like honey or coffee c. I do not know the answer	**<1**	Deleted	Item deleted/ not tested	Item deleted/ not tested	Item deleted/ not tested	Item deleted/ not tested	Item deleted/ not tested		
19	Using a special mattress for older adults can prevent pressure injuries. This statement is: a. True* b. False c. I do not know	**1**	Added	0.49	0.58 Cronbach's Alpha if item deleted = 0.81	Options: b = 0.36 c = 0.15	Retained	**0.92 (factor 1)**		

Note :
* correct answers

[a] Value of person correlation (r-value) smaller than r-table
[b] Value of item difficulty smaller than 0.10 or larger than 0.90
[c] Value of discriminant index (D value) smaller than 0.40

Attitude domain

Table 3 shows the items generated in the item development and psychometric evaluation of the items in the attitude domain. At the beginning, ten items (items no.1-10) were generated. Based on the content validity, two (items no.2 and 6) of these items were deleted due to the CVI < 1 of each, while one item was added to the supporting interface (item no.11), leaving nine items to be included in phase II.

A Principal Factor Analysis (PFA) with oblique rotation was run for phase II. All requirements for performing PFA were met (KMO MSA = 0.89; Bartletts Test of sphericity (Sig.) = 0.00). All nine items tested had factor loading > 0.40 of each (0.64 – 0.87), which means that no items had to be deleted. As shown in Figure. 3, these nine items constructed one factor for the Eigenvalue greater than 1 and explained 62.13% of the total variability, which is higher than the required 60%.[43]

In phase III, all nine items were tested among 240 family caregivers. A Confirmatory Factor Analysis was run resulting in “fit indices” including Tucker-Lewis Index/ TLI of 0.83; Comparative Fit Index/ CFI of 0.87; and RMSEA of 0.02. These three “fit indices” indicated that the unidimensional model which resulted from the PCA in phase II, was confirmed as the model fit. The internal consistency of the final versions of the KAP-PI instrument in the attitude domain had a Cronbach's alpha of 0.93, indicating high reliability. In conclusion, all validity and reliability test results indicate that the nine items can be trusted as a means of measuring family caregivers' attitudes toward pressure injury prevention in community-dwelling older adults.

Table 3.3 Attitude domain

No	Domain and item generation	Phase I	Phase II		Phase III		
			PFA (n=120) Factor Loading	Reliability (Cronbach's Alpha)	CFA (n=240) Factor Loading	Reliability (Cronbach's Alpha)	"fit indices" of CFA
1.	I am responsible for the health of the older relative in my house	Retained (I-CVI =1)	0.69	0.92	0.66	0.93	Tucker-Lewis Index/ TLI = 0.83
2.	I am responsible for pressure injury problems in the older relative in my house	Deleted (I-CVI < 1)	Item deleted/ not tested		Item deleted/ not tested		Comparative Fit Index/ CFI = 0.87
3.	The personal hygiene of the older relative in my house must be cared for carefully	Retained (I-CVI =1)	0.71		0.68		RMSEA = 0.02.
4.	I have to pay attention to the skin moisture and hygiene of the older relative in my house.	Retained (I-CVI =1)	0.79		0.75		
5.	It is important to pay attention to the food and drink of the older relative in my house	Retained (I-CVI =1)	0.88		0.83		
6.	I am responsible for the nutritional problem in the older relative in my house	Deleted (I-CVI < 1)	Item deleted/ not tested		Item deleted/ not tested		
7.	Pressure injuries on the older relative in my house should be prevented	Retained (I-CVI =1)	0.87		0.86		
8.	Helping the older relative in my house in their activities and movements is my responsibility	Retained (I-CVI =1)	0.79		0.81		
9.	Immobile older relative in my house need to be helped in movement and positioning	Retained (I-CVI =1)	0.77		0.77		
10.	The older relative in my house who experience pressure injuries need to be checked to health care service	Retained (I-CVI =1)	0.80		0.80		
11.	The older relative in my house who are at risk of getting pressure injuries need a special mattress to prevent pressure injuries	Added (I-CVI =1)	0.78		0.75		

Practice domain

Table 4 shows the items generated in the practice domain and its psychometric evaluation. Four topics and 13 items (items no.1-13) were developed in phase I. Of the 13 items, one item (item no.13) was deleted were deleted due to the CVI < 1 of each, while one item was added to the supporting interface (item no.14), leaving 13 items to be tested for phase II. A PFA with oblique rotation was run in phase II. All requirements for performing PFA were met (KMO MSA = 0.85; Bartletts Test of sphericity (Sig.) = 0.00). When looking to the factor loading of each item, item no.12 had a factor loading < 0.40 (0.14), indicating the item should be deleted from the instrument. After deleting item no.12, the PFA with oblique rotation was re-run and this second PFA resulted in a factor loading > 0.40 of each item (0.41 – 0.82). As shown in Figure 4, all 12 items constructed three factors for the Eigenvalue greater than 1, i.e. factor 1 (item no. 6, 7, 8,and 9), factor 2 (item no.1, 2, 10, 11, and 12), and factor 3 (item no. 3, 4, and 5). These three factors explained 66.11% of the total variability (required not less than 60%[43]).

In phase III, all 12 items were tested among 240 family caregivers. A Confirmatory Factor Analysis was run to check whether the three factors resulted by Principal Factor Analysis (PFA) was a good model or not. The CFA resulted in “fit indices”, i.e. Tucker-Lewis Index/ TLI of 0.83; Comparative Fit Index/ CFI of 0.87; and RMSEA of 0.06. These three “fit indices” indicated that the three factor model resulting from the PCA in phase II, was confirmed as the model fit for practice domain. The correlations between factors were >0.60. The internal consistency a Cronbach's alpha of factor 1, 2 and 3 were 0.80, 0.73, and 0.87 respectively. The overall internal consistency of the final version of the KAP-PI instrument in the practice domain had a Cronbach's alpha of 0.89, indicating high reliability. In conclusion, all validity and reliability test results indicate that the 12 items can be trusted as a means of measuring family caregivers' practice toward pressure injury prevention in community-dwelling older adults.

Table 3.4 Practice domain

No	Domain and item generation	Phase I	Phase II PFA (n=120) Factor Loading			Reliability (Cronbach's Alpha)	Phase III CFA (n=240) Factor Loading			Reliability (Cronbach's Alpha)	Fit indices of CFA
			Factor 1	Factor 2	Factor 3		Factor 1	Factor 2	Factor 3		
	Topic: Activities performed to support older adults to meet their nutritional and fluid needs					**0.87**				**Overall: 0.89**	Tucker-Lewis Index/ TLI = 0.83
1.	Provide healthy food for the older relative in my house	Retained (I-CVI =1)		0.74				0.51		**Factor 1:** 0.80	Comparative Fit Index/ CFI = 0.87
2.	Provide mineral water for the older relative in my house at least 8 glasses in a day	Retained (I-CVI =1)		0.53				0.55		Factor 2: 0.73	RMSEA = 0.06.
	Topic: Activities performed to support older adults in mobilization and repositioning									Factor 3: 0.87	
3.	Helping the older relative in my house to do activities if they cannot do it him/herself	Retained (I-CVI =1)			0.86				0.87		
4.	Helping for the older relative in my house to move if they cannot do it him/herself	Retained (I-CVI =1)			0.78				0.82		
5.	Helping the bedridden older relative in my house to change their position (positioning) regularly if they cannot do it him/herself	Retained (I-CVI =1)			0.61				0.87		
	Topic: Activities performed to support older adults in skin hygiene and moisture care										
6.	Prevent the older relative in my house from using damp and wet clothes, including changing diapers regularly (if they use diapers)	Retained (I-CVI =1)	0.75				0.64				
7.	Prevent long pressure on the body of the older relative in my house	Retained (I-CVI =1)	0.85				0.87				
8.	Moisturizing the skin of the older relative in my house by giving lotions/oils	Retained (I-CVI =1)	0.76				0.85				
9.	Check the entire skin of the older relative in my house for redness	Retained (I-CVI =1)	0.71				0.67				
	Topic: Activities performed to support older adults to maintain their health and ensure access to health care services										
10.	Maintain the environmental hygiene of for the older relative in my house	Retained (I-CVI =1)		0.68				0.67			
11.	Took the older relative in my house to health services if they suffer from wounds	Retained (I-CVI =1)		0.61				0.74			
12.	Took the older adult to health services if they had a health problem	Retained (I-CVI =1)	MSA = 0.45 (< 0.50) Item was not included in PCA.					Item deleted/ not tested			
13.	Contact health care provider to get their suggestion according to condition of the older relative	Deleted (I-CVI < 1)	Item deleted/ not tested					Item deleted/ not tested			
	Topic: Support older adult to have a special mattress										
14.	Provide a special mattress for a bedridden elderly relative in my house	Added (I-CVI =1)			0.64			0.49			

Only the highest factor loading is shown.

DISCUSSION

In this study, following a guideline described by Boateng et al.,[26] an instrument to measure knowledge, attitude, and practice of family caregivers to prevent PIs among community-dwelling older adults (KAP-PI) in Indonesia was developed and psychometrically tested. The results demonstrate that the final version of the KAP-PI was valid and had Cronbach's Alpha values of 0.83, 0.93 and 0.89 in the respective knowledge, attitude and practice domains. This also indicates high reliability.

Background characteristics of the sample show heterogeneity with regard to gender, age group, educational level, employment and relationship to the community-dwelling older adult. This sample is a good representation of the targeted population of family caregivers in Indonesia who mostly care for their parents or relative at home (extended family). Irrespective of the fact that the group was highly heterogeneous, the KAP-PI instrument showed good performance in the statistic analysis.[32]

In the final version of the KAP-PI instrument, the knowledge domain consists of 12 items. To assess the validity of the items, item difficulty, discriminating index, and quality of response alternatives were measured. These measurements are commonly used in studies focused on developing knowledge questionnaires, such as described by Beeckman et al. (2010) and Manderlier et al. (2017), who developed an instrument to measure nurse's knowledge about PI prevention that had been used in many studies.[44-47] Even though our target group, family caregivers, is different from those described in these studies (nurses), it is important that family caregivers know definition, symptoms, and consequences of PIs prior to knowledge about activities needed to prevent PI.[20, 29] These topics were not covered in a prior study by Bellon and Pancarbo,[25] who also developed and tested a questionnaire to assess family caregiver's knowledge about PI prevention. Additional topics about definition, symptoms, and consequences of PIs were included in the KAP-PI instrument. However, study by Bellon and Pancarbo and our study covered almost the same points of knowledge about activities of PI prevention. Furthermore, construct evaluation of the knowledge domain of the KAP-PI instrument generated three factors. Hence, when using the KAP-PI instrument in a real survey, the results should be analyzed for each factor.

When looking at the attitude domain, the nine items are highly correlated, constructing the unidimensionality of the attitude domain of the KAP-PI instrument. Attitude is an affective aspect of a person that causes him or her to take a certain action.[48] Measuring attitude is essential if a specific behavior or practice is an outcome of the intervention; for example, when looking at health education as an intervention you hope to see different behavior afterwards.[24, 49] In this study, the attitude domain reflects the beliefs and values of family caregivers towards PI prevention. The most important aspect of attitude is the willingness of family caregivers to support older adults in preventing PIs. The willingness to help others is an essential factor for family caregivers and any informal caregivers before being involved in an education or empowerment program.[50-53] In family nursing practice, affection is a binding domain that should be considered when planning and performing a family nursing intervention.[28] Several studies have developed instruments in affective or emotional domains to assess family functioning among patients with different conditions. For example, the Iceland-Expressive Family Functioning Questionnaire (ICE-EFFQ) measuring expressive family functioning when experiencing acute or chronic illnesses.[54] The ICE-EFFQ was psychometrically tested using the same data analysis techniques (EFA followed by CFA) as used in our study. The KAP-PI instrument measures the affective aspect of family caregivers in PI prevention. This current study added inventory family affective assessment tools to prior published instruments such as Family functioning, Health, and Social Support (FAFHES) used for a family of an adult cardiac patient[55] and Family Assessment Device (FAD) measuring family functioning in general.[56, 57]

In the practice domain, three topics emerged and were validated: basic support, reposition and mobilization support, and skin hygiene and moisture support. The Likert scale was used to assess family caregiver activities about PI prevention for their older relatives. Nurses working with families, which in Indonesia usually performed by community nurses, can use the KAP-PI instrument to get insight to what extent family caregivers actually perform the essential activities to prevent PIs in their relatives. Nurses should consider the nature of family caregivers' support for their older relatives.[58] By assessing family caregiver's knowledge, attitude, and practice using the KAP-PI instrument, nurses can arrange a training program to increase families' competencies in their authority as informal caregivers to prevent PI in their older relatives. Considering that the knowledge and practice domain consists of three sub-

variables when interpreting the results, nurses can critically analyze which sub-variable the family caregiver has the lower score on and then prioritize their intervention based on the results. Although test-retest reliability was not established, the current study obtained high values for Cronbach's alpha in both studies (phases 2 and 3), meaning that the KAP-PI instrument can be used directly either in practice or research purposes.

Limitations

One limitation of this study could be that the content validity was based on only three experts. To account for the limited number of included experts, only the items rated quite relevant or highly relevant by all experts were retained in the instrument. Also, a thorough statistical analysis was done in phase 2 and 3 to ensure validity and reliability of the instrument. Another limitation is that test-retest reliability was not determined. However, validity and reliability were derived from two independent samples from two different data collection procedures, including relatively large sample size (120 participants in phase II and 240 participants in phase III), obtaining high values for Cronbach's alpha in both studies . Therefore, we believe the instrument was thoroughly developed and is good to use among our intended population.

CONCLUSION

An instrument to assess knowledge, attitude and practice of Family Caregiver on Preventing Pressure Injuries (KAP-PI) among community-dwelling older adults in Indonesia was developed and validated. A 12-item knowledge domain, a 9-item attitude domain, and a 12-item practice domain were designed based on a guided construction process. The validity and reliability of the instrument were statistically acceptable. The instrument can be used directly in family nursing practice, education, and research to assess the function of family caregivers in preventing pressure injuries among community-dwelling older people in Indonesia.

Apendix 3.1 Abbreviation

CFA	: Confirmatory factor analysis
KAP_PI	: Knowledge, attitude and practice of family caregivers in preventing pressure injuries among community-dwelling older adults in Indonesia
I-CVI	: Item content validity index
NPUAP	: National pressure ulcer advisory panel
PFA	: Principal factor analysis
PI	: Pressure injury
PPPIA	: Pan pacific pressure injury alliance
S-CVI	: Instrument content validity index
EPUAP	: European pressure ulcer advisory panel

Appendix 3.2 Scree plots resulted from principal factor analysis (PFA)

Figure 1. Scree plot resulted from principal factor analysis (PFA) in knowledge domain

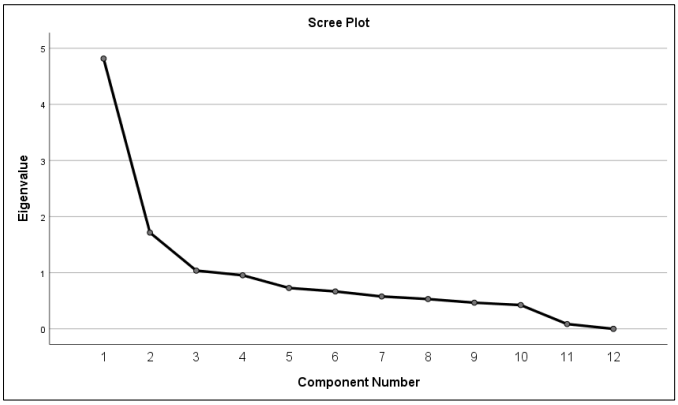


Figure 2. Scree plot resulted from principal factor analysis (PFA) in practice domain

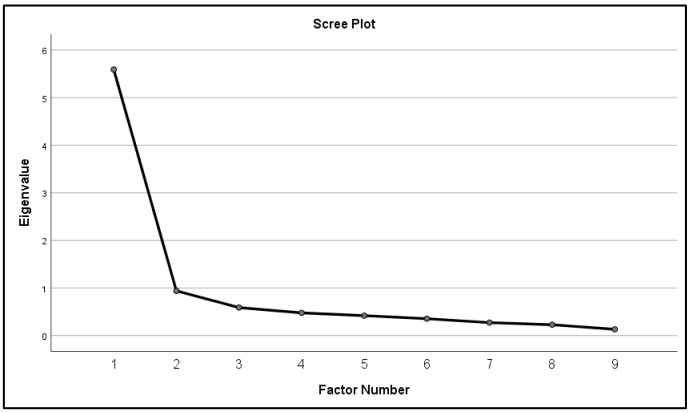
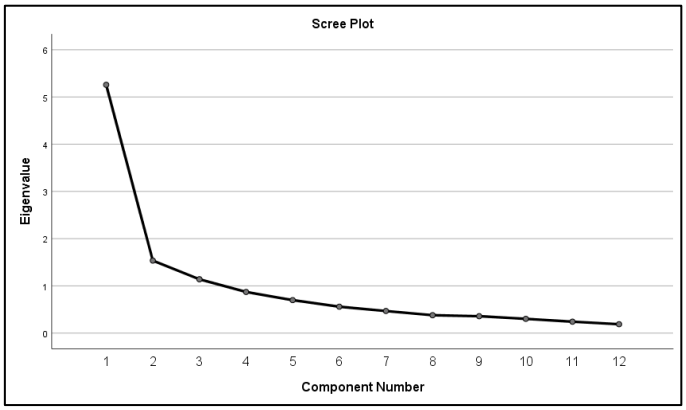


Figure 3. Scree plot resulted from principal factor analysis (PFA) in knowledge domain



REFERENCES

1. European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and treatment of pressure ulcers/injuries: clinical practice guideline. The international guideline. Emily Haesler (Ed.). EPUAP/NPIAP/PPPIA: 2019. Available from: https:// www. epuap. org/ pu-guide lines/.
2. Corbett LQ, Funk M, Fortunato G, O'Sullivan DM. Pressure injury in a community population: a descriptive study. J Wound Ostomy Continence Nurs. 2017;44(3):221-7.
3. Bogaisky M, Dezieck L. Early Hospital Readmission of Nursing Home Residents and Community-Dwelling Elderly Adults Discharged from the Geriatrics Service of an Urban Teaching Hospital: Patterns and Risk Factors. Journal of the American Geriatrics Society. 2015;63(3):548-52.
4. Stevenson R, Collinson M, Henderson V, Wilson L, Dealey C, McGinnis E, et al. The prevalence of pressure ulcers in community settings: an observational study. Int J Nurs Stud. 2013;50(11):1550-7.
5. Sari SP, Everink IH, Sari EA, Afriandi I, Amir Y, Lohrmann C, et al. The prevalence of pressure ulcers in community-dwelling older adults: a study in an Indonesian city. International Wound Journal. 2019;16(2):534-41.
6. Worldometers. World Population [Internet]. Worldometers; 2022 [cited 20 January 2022]. Available from: World Population Clock: 7.9 Billion People (2022) - Worldometer (worldometers.info)
7. United Nations. UN Data: A world of information [Internet]. 2021 [cited 19 January 2021]. Available from: http://data.un.org/en/iso/id.html
8. Badan Pusat Statistik-Statistics Indonesia. Statistik Penduduk Lanjut Usia 2019 [Internet]. ©Badan Pusat Statistik; 2020:106. Available from: https:// www. bps. go. id/ publi cation/ downl oad. html? nrbvfeve= YWIxN 2U3NW RiZTYzMGUw NTExM GFlNT Ni& xzmn= aHR0c HM6Ly 93d3c uYnBz LmdvL mlkL3 B1Ymx pY2F0 aW9uL zIwMTkvMTIvMjAv YWIxN 2U3NW RiZTYzMGUw NTExM GFlNT NiL3N 0YXRp c3Rpay1wZW 5kdWR 1ay1s YW5qd XQtdX NpYS0 yMDE5 Lmh0b Ww% 3D& twoad fnoar feauf= MjAyM S0wMS 0xOSA xNTox NDo0NQ% 3D% 3D.
9. Arifin EN, Braun KL, Hogervorst E. Three pillars of active ageing in Indonesia. Asian Population Studies. 2012;8(2):207-30.
10. Niehof A. Ageing and the elderly in Indonesia; Identifying key issues. Bijdragen tot de taal-, land-en volkenkunde/Journal of the Humanities and Social Sciences of Southeast Asia. 1995;151(3):422-37.
11. Badan Pusat Statistik-Statistics Indonesia. Statistik penduduk lanjut usia 2021 [Internet]. Badan Pusat Statistik; 2021 [cited 27 December 2021]. Available from: https://www.bps.go.id/publication/2021/12/21/c3fd9f27372f6ddcf7462006/statistik-penduduk-lanjut-usia-2021.html.
12. Coe NB, Guo J, Konetzka RT, Van Houtven CH. What is the marginal benefit of payment-induced family care? impact on medicaid spending and health of care recipients. Health Economics. 2019;28(5):678-92.
13. Eisenberger A, Zeleznik J. Pressure ulcer prevention and treatment in hospices: a qualitative analysis. Journal of Palliative Care. 2003;19(1):9-14.
14. Martins Pereira S, Maria Soares Hl. Pressure ulcers: relatives' perceptions of emotional impact and non-material costs. Revista de Enfermagem Referência. 2012(7):139-48.

15. Nuriyanto A, Rahayuwati L. Family Nursing as an Improvement Strategy of Family Health Index in Indonesia: A Literature Review. Asian Community Health Nursing Research. 2019;1(3):7-16.
16. Tavares BC, Matos E, Cristina I, Maliska A, Benedet SA, Salum NC. Profile of patients diagnosed with chronic ulcer of diverse etiology admitted to an emergency unit. Ciência, Cuidado e Saúde. 2016;15(4):624.
17. Oot-Giromini BA. Pressure ulcer prevalence, incidence and associated risk factors in the community. Decubitus. 1993;6(5):24-32.
18. Fateme K, Fariba Y, Aliakbar K, Hassan A. Investigating the effect of home-based training for family caregivers on the incidence of bedsore in patients with stroke in ali ebne abitaleb hospital, zahedan, iran: a clinical trial study. Medical-Surgical Nursing Journal. 2018;7(3):1-6.
19. Borsting TE, Tvedt CR, Skogestad IJ, Granheim TI, Gay CL, Lerdal A. Prevalence of pressure ulcer and associated risk factors in middle- and older-aged medical inpatients in Norway. J Clin Nurs. 2018;27(3-4):e535-e43.
20. Jan McCulloch B. Family health care nursing: theory, practice and research. Journal of Family Theory & Review. 2012;4(1):67-70.
21. Suleiman M, Sahal N, Sodemann M, Elsony A, Aro AR. Tuberculosis awareness in Gezira, Sudan: knowledge, attitude and practice case-control survey. EMHJ-Eastern Mediterranean Health Journal 2014; 20(2): 120-9.
22. Khalil A, Abdalrahim M. Knowledge, attitudes, and practices towards prevention and early detection of chronic kidney disease. International nursing review. 2014;61(2):237-45.
23. Wan TT, Rav-Marathe K, Marathe S. A systematic review of KAP-O framework for diabetes. Medical Research Archives. 2016;3(9).
24. Badran IG. Knowledge, attitude and practice the three pillars of excellence and wisdom: a place in the medical profession. Eastern Mediterranean Health Journal. 1995;1(1):8-16.
25. Bellón JA, Pancorbo-Hidalgo PL. family caregivers about prevention of pressure ulcer and dependence-related skin lesions: development and validation. Gerokomos. 2016;27(2):73-9.
26. Boateng GO, Neilands TB, Frongillo EA, Melgar-Quiñonez HR, Young SL. Best practices for developing and validating scales for health, social, and behavioral research: a primer. Frontiers in Public Health. 2018;6(149).
27. National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers: Quick Reference Guide. Emily Haesler (Ed.). Perth: Cambridge Media; 2014. p. 14-56.
28. Wright LM, Leahey M. Nurses and families : a guide to family assessment and intervention. 5th ed. Philadelphia: F.A. Davis; 2009.
29. Friedman MM, Bowden VR, Jones E. Family nursing: Research, theory & practice: Prentice Hall Upper Saddle River, NJ; 2003.
30. Friedman MM. Family nursing : theory & assessment. New York: Appleton-Century-Crofts; 1981.
31. Bourke J, Kirby A, Doran J. SURVEY & QUESTIONNAIRE DESIGN : Collecting Primary Data to Answer Research Questions. Ireland: NuBooks; 2016.
32. Haladyna TM. Developing and Validating Multiple-choice Test Items. Mahwah, N.J.: Routledge; 2004.
33. Peer Wv, Hakemulder Jm, Zyngier S. Scientific Methods for the Humanities. Amsterdam, Netherlands: John Benjamins Publishing Company; 2012.

34. Polit DF, Beck CT, Owen SV. Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. Res Nurs Health. 2007;30(4):459-67.
35. Lynn MR. Determination and quantification of content validity. Nursing research. 1986;35(6):382-5.
36. Taherdoost H. Validity and Reliability of the Research Instrument; How to Test the Validation of a Questionnaire/Survey in a Research. SSRN Electronic Journal. 2016.
37. Iantovics LB, Rotar C, Morar F. Survey on establishing the optimal number of factors in exploratory factor analysis applied to data mining. WIREs Data Mining and Knowledge Discovery. 2019;9(2):e1294.
38. Thompson B. Exploratory and confirmatory factor analysis : understanding concepts and applications. Washington, DC: American Psychological Association; 2004. Available from: http://search.ebscohost.com/direct.asp?db=pzh&jid=%22200413115%22&scope=site
39. Rosseel Y. lavaan: An R Package for Structural Equation Modeling. 2012. 2012;48(2):36.
40. Institute for Statistics and Mathematics Vienna University. Comprehensive R Archive Network (CRAN) [internet]. The R foundation; 2020. Available from: https://cran.r-project.org/
41. Thompson B. Confirmatory factor analysis decision sequence. Exploratory and confirmatory factor analysis: Understanding concepts and applications. Washington, DC: American Psychological Association; 2004. p. 109-32.
42. Fitzpatrick J . Encyclopedia of Nursing Research. 4th ed. New York: Springer Publishing Company; 2018.
43. Holland SM. Principal components analysis (PCA). Department of Geology, University of Georgia, Athens, GA. 2008:30602-2501.
44. Beeckman D, Vanderwee K, Demarré L, Paquay L, Van Hecke A, Defloor T. Pressure ulcer prevention: Development and psychometric validation of a knowledge assessment instrument. International Journal of Nursing Studies. 2010;47(4):399-410.
45. Manderlier B, Van Damme N, Vanderwee K, Verhaeghe S, Van Hecke A, Beeckman D. Development and psychometric validation of PUKAT 2·0, a knowledge assessment tool for pressure ulcer prevention. International Wound Journal. 2017;14(6):1041-51.
46. De Meyer D, Verhaeghe S, Van Hecke A, Beeckman D. Knowledge of nurses and nursing assistants about pressure ulcer prevention: A survey in 16 Belgian hospitals using the PUKAT 2.0 tool. Journal of Tissue Viability. 2019;28(2):59-69.
47. Sari SP, Everink IHJ, Amir Y, Lohrmann C, Halfens RJG, Moore Z, et al. Knowledge and Attitude of Community Nurses on Pressure Injury Prevention: A Cross-sectional Study in an Indonesian City. Int Wound J. 2021;18(4):422–31.
48. Stephen WL, Karen AF. Encyclopedia of Communication Theory. Thousand Oaks, Calif: SAGE Publications, Inc; 2009.
49. World Health Organization. Regional Office for the Eastern M. Health education: theoretical concepts, effective strategies and core competencies: a foundation document to guide capacity development of health educators. Regional Office for the Eastern Mediterranean. 2012. p. 5-21.
50. Lukman M, Ibrahim K, Yani DI, Sari SP, Juniarti N. Exploring strategies to improve the performance of community health volunteers for tuberculosis care and prevention: A qualitative study. International Journal of Community Based Nursing and Midwifery. 2019;7(4):270-8.
51. Chang Y-P, Schneider JK, Sessanna L. Decisional conflict among Chinese family caregivers regarding nursing home placement of older adults with dementia. Journal of Aging Studies. 2011;25(4):436-44.

52. Miriam B, Jim O, Judith, Phillips, Chris P. Family and Community Life of Older People: Social Networks and Social Support in Three Urban Areas [Book]. London: Routledge; 2001. Available from: http:// login. ezproxy. ub. unima as. nl/ login? url= https:// search. ebsco host. com/ login. aspx? direct= true& db= nlebk & AN= 72160 & site= ehost- live& scope= site.
53. Esandi N, Nolan M, Canga-Armayor N, Pardavila-Belio MI, Canga-Armayor A. Family Dynamics and the Alzheimer's Disease Experience. Journal of Family Nursing. 2021;27(2):124-35.
54. Sveinbjarnardottir EK, Svavarsdottir EK, Hrafnkelsson B. Psychometric Development of the Iceland-Expressive Family Functioning Questionnaire (ICE-EFFQ). Journal of Family Nursing. 2012;18(3):353-77.
55. Åstedt-Kurki P, Tarkka M-T, Rikala M-R, Lehti K, Paavilainen E. Further testing of a family nursing instrument (FAFHES). International Journal of Nursing Studies. 2009;46(3):350-9.
56. Ridenour TA, Daley JG, Reich W. Factor analyses of the family assessment device. Family process. 1999;38(4):497-510.
57. Duckett S. Family assessment device. Archives of physical medicine and rehabilitation. 1997;78(2):234.
58. Hagedoorn EI, Paans W, Jaarsma T, Keers JC, van der Schans C, Luttik ML. Aspects of family caregiving as addressed in planned discussions between nurses, patients with chronic diseases and family caregivers: a qualitative content analysis. BMC Nursing. 2017;16(1):37.

CHAPTER 4

Knowledge, attitude and practice on pressure injury prevention: a cross-sectional study among family caregivers of community-dwelling older adults in Bandung, Indonesia

Submitted
Sari SP, Everink IHJ, Lohrmann C, Amir Y, Sari EA, Halfens RJG, Schols JMGA.

CHAPTER 5

Knowledge and attitude of community nurses on pressure injury prevention: a cross-sectional study in an Indonesian city

This chapter was published as:

Sari SP, Everink IHJ, Amir Y, Lohrmann C, Halfens RJG, Moore Z, Beeckman D, Schols JMGA. Knowledge and attitude of community nurses on pressure injury prevention: a cross-sectional study in an Indonesian city. International Wound Journal. 2021;18(4):422-31.

ABSTRACT

Background: In the community, the prevalence and incidence rates of PIs are high in certain populations, such as community-dwelling older adults. In Indonesia, community nurses play an important role in targeting community health problems. PI prevention is also one of their official responsibilities. However, based on our best knowledge, no studies are available focusing on community nurses' knowledge and attitude towards PI prevention. Therefore, the objectives of this study were to examine the knowledge and attitude of Indonesian community nurses regarding Pressure Injury (PI) prevention. A cross-sectional design was used and included the community nurses permanently working in the Public Health Center (Puskemas) in Bandung, West Java Indonesia.

Methods: Knowledge was measured using the Pressure Ulcer Knowledge Assessment Tool (PUKAT 2.0). Attitudes were measured using a predesigned instrument which included eleven statements on a five point Likert scale. All data were collected using paper-based questionnaires.

Results: The response rate was 100%. Respondents (n=235) consisted of 80 community nursing program coordinators (34.0%) and 155 community nurses (66.0%). Regarding knowledge, the percentage of correct answers in the total group of community nurses on the PUKAT 2.0 was 30.7%. The theme 'Prevention' had the lowest percentage of correct answers (20.8%). Community nurses who had additional PI or wound care training had a higher knowledge score compared to community nurses who did not have additional PI training (33.7% vs. 30.3%; Z = -1.995; p = 0.046). The median attitude score was 44 (maximum score 55; range 28-55), demonstrating a positive attitude among participants towards PI prevention. Further, the higher the education status of participants, the more positive the attitudes (H = 11.773; p = 0.003).

Conclusions: This study shows that community nurses need to improve their basic knowledge of PI prevention. Furthermore, research should be performed to explore what community nurses need to strengthen their role in PI prevention.

BACKGROUND

Pressure Injuries (PIs) are a global health care problem. A pressure injury (PI) is a localized damage to the skin and/ or underlying tissue which usually occurs over a bony prominence, as a result of pressure or pressure in combination with shear.[1] A PI may also be caused by a (medical) device.[1] It affects people's quality of life emotionally, physically and socially,[2-4] and even poses a higher risk of dying.[5, 6] A PI can be categorized into six categories: category/ stage 1 to 4, unstageable and suspected deep tissue injury. Higher categories indicate deeper damage to the skin and/ or underlying tissue.[1]

In the community, the prevalence and incidence rates of PIs are high in certain populations, such as community-dwelling older adults.[1] A study in the United States reported that most patients (70.6%) who had a PI on admission to the hospital were older adults living at home (mean age 72.7 years).[7] Another study in the United States noted that having a PI was an important reason for re-admission to the hospital among older adults living at home.[8] Furthermore, an Indonesian study which focused on the prevalence of PIs among Indonesian older adults living at home concluded a PI prevalence rate of 11% of which 52% suffered from a PI category 1,[9] a category which might have been preventable and important to be considered as a sign for increased vulnerability and risk and PI development.[1] Of concern in this study was that even though some of the PI patients used formal care in the last months, none of them received formal PI prevention or treatment from health care professionals.[9]

To deliver evidence based PI prevention and/ or treatment, health professionals need adequate knowledge.[1] Furthermore, understanding staff attitudes towards PI prevention is important because a positive attitude is considered to be a precursor to behaviour.[10] The European Pressure Ulcer Advisory Panel (EPUAP), National Pressure Injury Advisory Panel (NPIAP) and Pan Pacific Pressure Injury Alliance (PPPIA) recommend regularly assessing knowledge and attitude of health care professionals on pressure injury care.[1] In addition, former studies showed that knowledge and attitude correlate positively with the practice of PI prevention.[11, 12]

In Indonesia, community nurses play an important role in targeting community health problems.[13-17] They perform a range of activities, including health promotion, disease management, and public health activities, such as community empowerment.[13] PI prevention is also one of their official responsibilities. However,

based on our best knowledge, no studies are available focusing on community nurses' knowledge and attitude towards PI prevention. Various studies have evaluated the knowledge about and attitude of nurses towards PI prevention[11, 12, 18-29] but most of these studies focused on nurses working in hospitals or nursing homes. One study in Australia focusing on knowledge and attitudes of nurses towards PI prevention recruited nurses from the hospital and a community health centre, but did not describe the results separately for the two groups.[12] Therefore, this study aims to fill this knowledge gap by examining Indonesian community nurses' knowledge of and attitude towards PI prevention.

METHODS

Design

The study used a cross-sectional survey design.

Participants

Participants eligible for this study were community nurses permanently working in the Public Health Center (Puskemas) in Bandung, West Java Indonesia. To be included in this study, participants needed to have at least a vocational nursing degree (three years of nursing education).

Measurement instruments

The instrument used in this study was a paper-based questionnaire including questions pertaining to demographic characteristics, knowledge of and attitude towards PI prevention.

Demographic characteristics

The demographic characteristics addressed in the questionnaire were gender, age, years of working experience as a community nurse, type of education and additional training in pressure injury or wound care.

Knowledge

Knowledge was measured using the Pressure Ulcer Knowledge Assessment Tool (PUKAT 2.0). The PUKAT 2.0 has been created according to evidence-based guidelines for PI prevention and validated by Manderlier et al.[30] This instrument has excellent psychometric properties (average of item difficulty = 0.56; a-value = 0.16; ICC = 0.69) and can be used internationally.[30] The instrument is a questionnaire consisting of 28 items including six themes: (1) 'Aetiology' (7 items); (2) 'Classification and observation' (4 items); (3) 'Risk assessment' (2 items); (4) 'Nutrition' (3 items); (5) 'Prevention of PI (8 items) and (6) 'Specific patient groups' (4 items). All items have five multiple-choice answers including the response option 'I do not know the answer". The items were developed taking into account different cognitive levels (following the revised version of Bloom's taxonomy [31]), i.e. level 1 'remembering'; level 2 'understanding'; level 4 'analysing'; and level 5 'evaluating'. An example item in the level of remembering is "What is a cause of pressure ulcers?" with the multiple-choice answer options: a) Diabetes; b) The use of corticosteroids; c) Hypertension; d) Tissue oxygenation; and e) I don't know the answer. A complete English version of the instrument can be found in the publication of De Meyer et al.[18]

Attitude

Attitudes towards PI prevention were measured using a questionnaire developed by Moore and Price.[32] This questionnaire consists of eleven statements on PI prevention, such as 'All patients are at potential risk of developing pressure injuries'. Participants have to indicate to what extent they agree with the statements on a five point Likert scale, ranging from 'strongly agree' to 'strongly disagree'. [32] The questionnaire showed a satisfactory internal validity (Cronbach a = 0.91).[20]

Face validity and content validity of the translated questionnaire

Both the PUKAT 2.0 and the attitude questionnaire were translated from English into the Indonesian language using the method of translation / back-translation.[33] Permission for using and translating the instruments were obtained via email from the questionnaire developers. Two bilingual nurses performed the English to Indonesian translation, and a certified translator undertook the back translation. Then, two other bilingual nurses who have experience in PI studies checked the concordance of the English and Indonesian versions of the questionnaire. As this study was the first to use

the questionnaires for community nurses instead of nurses working in the hospital or nursing home, the Indonesian version of questionnaires were also reviewed for face and content validity by 22 experts from the Indonesian Community Nursing Association and Indonesian Wound Ostomy and Continence Nursing Association. They both received the English and Indonesian versions of the PUKAT 2.0 and the attitudes questionnaire and were asked to assess the clarity of wording in the questionnaires, as well as the relevance of each item for community nurses specifically. For each item in each questionnaire, experts were asked to assess the item using a four-point Likert scale with the options 1) not relevant for community nurses/remove question; 2) somewhat relevant for community nurses/major revisions to the item needed; 3) quite relevant for community nurses/minor revisions to the item needed; and 4) highly relevant for community nurses /maintain the item. In general, the experts did not have any problems with the wording (Item content validity index/ I-CVI = 0.90) and agreed that both questionnaires are relevant to be used for community nurses (Scale content validity index/S-CVIs = 1.00).

Data collection procedure

All data were collected by the first author SPS in February 2020 using paper-based questionnaires. Recruitment of participants took place in collaboration with the Health Department of Bandung city. First, the Health Department invited all coordinators of the community nursing program from all Public Health Centers in Bandung to a meeting. These coordinators are located in different public health care centers in the community and coordinate community care in the area of their center. During this meeting, the coordinators received information on the objectives of this study by author SPS and were asked to participate. If they agreed to be participants and signed the informed consent form, they immediately filled in the questionnaire. Afterwards, the coordinators received a number of blank questionnaires to be distributed to community nurses of their own Public Health Centers. The community nurses from these Public Health Centers were informed about the objectives of the research by the coordinators in their own place. If they agreed on participation, they signed the informed consent form and completed the questionnaires. The completed questionnaires were sent to the Health Department for then collected by the author SPS.

Ethical considerations

This study received ethical approval from The Research Ethics Committee Universitas Padjadjaran Bandung (No. 138 / UN6.KEP/EC/2020). Furthermore, two governmental institutions which have responsibilities in health care and community protection approved the research project before it was undertaken (the Indonesian Health Care Agency #070/3210-Dinkes and the National Unity Agency, Politics and Protection of the Regional People #070/167/I-2020/BKBP). Participants were not obligated to participate and could refuse participation before and during the assessment procedure.

Data analysis

Data were analyzed using IBM SPSS Statistics 26 (IBM Corp, Armonk, NY). The answers on the PUKAT 2.0 were recoded as correct (‘1’) or wrong (‘0’). Items scored as ‘I don't know the answer’, as well as multiple answers to one question were coded as wrong (‘0’). Hence, sum scores were calculated to obtain a total score which was presented as a percentage of the maximum possible score.

Regarding the attitude questionnaire, the sum score on the questionnaire ranges from a minimum of 11 to a maximum of 55. Due to non-normal distribution of data, data are presented using medians and range. A higher sum score indicates a more positive attitude towards PI prevention.

Bivariate comparison analyses were conducted using independent sample t-test and ANOVA tests with Post-Hoc Befferoni analysis when the Levene's test was non-significant. Mann-Whitney U-tests and Kruskal-Wallis tests were used in case of a significant Levene's test. A significance level of 0.05 was used.

RESULTS

Participant characteristics

In total, 235 community nurses were asked to participate in this study. The response rate was 100%, meaning that all community nurses in Bandung who met the inclusion criteria completed the questionnaires. This group of 235 participants consisted of 80 community nursing program coordinators (34.0%) and 155 community nurses (66.0%). The majority of participants were female (77.9%; n=183). More than

half of the participants (67%; n=158) were over 35 years and had more than five years of working experience (80%; n=188) as a community nurse. A total of 65.0% (n=152) of participants graduated from vocational nursing education. A minority of the participants (11.9%; n=28) received PI or wound care training. The demographic data of all participants are shown in table 1.

Table 5.1 Characteristic of Participants

Characteristics of Participants	Participants (n = 235) n (%)
Gender	
Male	52 (22.1)
Female	183 (77.9)
Age category	
< 25 years	10 (4.3)
25 – 34 years	67 (28.5)
35 – 50 years	91 (38.7)
> 50 years	67 (28.5)
Working experience as a community nurse	
< 2 years	16 (6.8)
3 – 5 years	31 (13.2)
6 – 10 years	45 (19.1)
11 – 20 years	61 (26.0)
> 20 years	82(34.9)
Education	
Vocational degree	152 (64.7)
Bachelor Degree	80 (34)
Master Degree	3 (1.3)
Additional training in PI/Wound care (not specific training)	
Yes	28 (11.9)

Knowledge of participants

Table 2 shows the percentage of correct answers on the PUKAT 2.0 for the total group, per subgroup and for each subtheme. The percentage of correct answers in the entire group of community nurses on the PUKAT 2.0 was 30.7%. This means that 69.3% of the questions were answered incorrectly. The theme ‘Prevention’ had the lowest percentage of correct answers (20.8%) followed by the themes ‘Specific patient group’ (24.6%) and ‘Risk assessment’ (27.6%), respectively. The highest overall score was found in the theme ‘Nutrition’ (54.0%).

There were no statistical differences in total scores between community nurses regardless of their background characteristics, except in the aspect of the additional training in PI or wound care. Community nurses who had additional PI training had a higher knowledge score compared to community nurses who did not have additional PI training (33.7% vs. 30.3%; Z = -1.995; p = 0.046).

There were no differences in theme scores between community nurses when looking at age categories and educational levels. When comparing theme scores of nurses with different years of working experience as a community nurse, significant differences were found in the subthemes ‘Aetiology’ ($F = 4.501$; $p = 0.002$) and ‘Nutrition’ ($F = 3.497$; $p = 0.009$) with the highest score in the groups 6 – 20 years and 6 – 10 years working experience, respectively. Results for the information of the knowledge scores in total and per theme are presented in table 2.

Table 5.2 Results on the PUKAT 2.0 in total and per subtheme

Participants (n = 235)	Total Score		Aetiology		Classification & observation		Risk Assessment		Nutrition		Prevention of PI		Specific Patient Group	
	mean % (SD)	Difference	mean % (SD)	Difference	mean % (SD)	Difference	mean % (SD)	Difference	mean % (SD)	Difference	mean % (SD)	Difference	mean % (SD)	Difference
Overall	30.7 (8.6)		33.5 (16.0)		35.8 (24.8)		27.6 (29.6)		54.0 (29.2)		20.8 (13.2)		24.6 (21.8)	
Gender														
Male	29.7 (9.6)	t = -.926 P = .356[a]	28.9 (16.1)	**t = -2.392 P = .018[a]** **	37.5 (26.0)	t = .543 P = .588[a]	32.7 (29.5)	t = 1.392 P = .165[a]	57.1 (29.0)	t = .842 P = .401[a]	18.8 (12.5)	t = -1.261 P = .209[a]	23.6 (20.7)	t = -.380 P = .704[a]
Female	31.0 (8.3)		34.8 (15.8)		35.4 (24.5)		26.2 (29.6)		53.2 (29.2)		21.4 (13.5)		24.9 (22.2)	
Age Category														
< 25 years	27.5 (7.1)	F = .573 P = .633[b]	24.3 (19.1)	F = 2.519 P = .059[b]	35.0 (17.5)	F = 1.673 P = .174[b]	20 (25.8)	F = .775 P = .509[b]	56.7 (27.4)	F = .172 P = .915[b]	20.0 (10.5)	F = .085 P = .968[b]	22.5 (24.9)	F = .044 P = .988[b]
25 – 34 years	30.8 (8.0)		31.6 (14.4)		40.0 (26.1)		28.3 (27.8)		54.7 (29.4)		20.7 (14.2)		24.3 (19.9)	
30 – 50 years	31.1 (9.3)		36.4 (17.0)		36.8 (24.3)		25.3 (31.1)		52.4 (29.5)		20.5 (13.1)		24.7 (22.5)	
> 50 years	30.4 (8.6)		32.9 (15.1)		30.6 (24.5)		31.3 (29.9)		55.2 (29.3)		21.5 (13.2)		25.0 (22.6)	
Working experience														
< 2 years	26.3 (7.5)	F = 2.316 P = .058[b]	27.7 (14.2)	**F = 4.501 P = .002[b]** **	40.6 (27.2)	F = .677 P = .608[b]	28.1 (25.6)	F = 378 P = .824[b]	37.5 (26.9)	**F = 3.497 P = .009[b]****	18.0 (11.2)	F = .749 P = .560[b]	17.2 (19.8)	F = .628 P = .643[b]
3 – 5 years	29.0 (6.4)		25.4 (14.1)		38.7 (23.1)		25.8 (28.5)		57.0 (27.5)		20.2 (13.6)		24.2 (20.9)	
6 – 10 years	33.2 (8.2)		38.1 (15.2)		38.9 (26.4)		27.8 (29.3)		65.9 (29.3)		20.3 (13.7)		23.3 (20.9)	
11 – 20 years	30.5 (9.6)		37.0 (17.4)		33.6 (25.4)		24.6 (32.4)		49.7 (28.9)		19.7 (14.3)		26.2 (22.1)	
> 20 years	31.0 (8.7)		32.6 (15.1)		33.8 (23.7)		30.5 (29.1)		53.3 (28.6)		22.7 (12.6)		25.6 (22.9)	
Education														
Vocational	30.5 (9.0)	F = .109 P = .896[b]	32.4 (15.4)	F = 1.248 P = .289[b]	33.6 (23.9)	F = 1.984 P = .140[b]	28.0 (29.1)	H = 2.626 P = .269[d]	54.6 (29.9)	F = .419 P = .658[b]	21.8 (13.3)	F = 2.142 P = .120[b]	25.0 (22.1)	F = .864 P = .423[b]
Bachelor Degree	31.0 (8.1)		35.7 (16.7)		40.3 (26.2)		26.2 (30.7)		52.5 (28.0)		18.6 (13.2)		24.4 (21.4)	
Master Degree	32.2 (6.2)		28.6 (28.5)		33.3 (14.4)		50 (0.0)		66.7 (33.3)		29.2 (7.2)		8.3 (14.4)	
Additional PI/Wound care training														
Yes	33.7	Z = -1.995 P = 0.046[c]**	33.7 (14.7)	t = .062 P = .950[a]	34.9 (25.3)	Z = -1.792 P = .073[c]	35.7 (26.7)	Z = -1.757 P = .079[c]	64.2 (23.9)	Z = .057 P = .057[c]	23.7 (16.1)	t = 1.216 P = .225[a]	20.5 (16.7)	Z = .898 P = .369[c]
No	30.3		33.5 (16.2)		42.9 (19.1)		26.5 (29.9)		52.7 (30.0)		20.4 (12.9)		25.1 (22.4)	

[a] Independent sample t-test [b] ANOVA test [c] Mann-Whitney U-test [d] Kuskal-wallis test
** significant difference

Attitude of participants toward PI prevention

Table 3 shows the results on the attitudes questionnaire in total and per subgroup of participants. As shown in the table, the median score was 44 (range 28-55), demonstrating a positive attitude among community nurses towards PI prevention. Subgroup analyses showed a significant difference in attitude towards PI prevention based on educational level: the higher the education, the more positive the attitude (H = 11.773; p = 0.003).

When considering the individual items of the attitude scale, it appeared that the majority of community nurses (80%) agreed that “all patients (irrespective of the patient’s characteristics) are at risk of developing a PI”. Similarly, the majority of community nurses agreed that they needed to concern themselves with PI prevention in their practice (91%), that most PIs can be avoided (96%) and that continuous (96%) and regular (95%) nursing assessment of PI risk will have benefits in PI prevention. Lastly, the community nurses believed that PI prevention is a greater priority than PI treatment (90%). An overview of the community nurses’ attitude towards PI prevention is shown in table 4.

Table 5.3 Participant’s Attitudes Towards Pressure Injury Prevention for each subgroup

Participants	Total Score	
	Median (range)	**Difference**
Overall	44 (28-55)	
Gender		
Male	44 (28-53)	Z = .450
Female	44 (30-55)	P = .652[a]
Age Category		
< 25 years	44 (39-46)	H = 2.890
25 – 34 years	44 (30-51)	P = .409[b]
30 – 50 years	44 (28-53)	
> 50 years	44 (32-55)	
Working experience as a community nurse		
< 2 years	43.5 (38-50)	H = 4.127
3 – 5 years	44 (37-51)	P = .389[b]
6 – 10 years	43 (30-52)	
11 – 20 years	44 (28-53)	
> 20 years	44 (32-55)	
Education		
Vocational	43 (28-53)	**H = 11.773**
Bachelor Degree	45 (30-55)	**P = .003[b]**
Master Degree	45 (44-51)	
Additional training in PI/Wound care		
Yes	44 (37-50)	Z = .403
No	44 (28-55)	P = .687[a]

[a] Mann-Whitney U-test [b] Kuskal-wallis test

Table 5.4 Participant's Attitudes Towards Pressure Ulcer Prevention per Statements

Statements	Strongly Agree N (%)	Agree N (%)	Neither Agree Nor Disagree N (%)	Disagree N (%)	Strongly Disagree N (%)
All patients are at potential risk of developing pressure injuries	42 (17.9)	140 (59.6)	13 (5.5)	35 (14.9)	5 (2.1)
Pressure injury prevention is time consuming for me to carry out	0 (0.0)	13 (5.5)	16 (6.8)	151 (64.3)	55 (23.4)
In my opinion patients tend not to get as many pressure injuries nowadays	3 (1.3)	44 (18.7)	63 (26.8)	111 (47.2)	14 (6.0)
I do not need to concern myself with pressure injury prevention in my practice	3 (1.3)	8 (3.4)	9 (3.8)	120 (51.1)	95 (40.4)
Pressure injuries treatment is a greater priority than pressure injury prevention	1 (0.4)	10 (4.3)	13 (5.5)	131 (55.7)	80 (34.0)
Continuous nursing assessment of patients will give an accurate account of their pressure injury risk	83 (35.3)	143 (60.9)	6 (2.6)	1 (0.4)	2 (0.9)
Most pressure injuries can be avoided	108 (46.0)	119 (50.6)	7 (3.0)	0 (0.0)	1 (0.4)
I am less interested in injury prevention than other aspects of nursing care	4 (1.7)	7 (3.0)	48 (20.4)	157 (66.8)	19 (8.1)
My clinical judgement is better than any pressure injury risk assessment tool available to me	1 (0.4)	40 (17.0)	84 (35.7)	103 (43.8)	7 (3.0)
In comparison with other areas of nursing care, pressure injury prevention is a low priority for me	2 (0.9)	17 (7.2)	38 (16.2)	159 (67.7)	19 (8.1)
Pressure injury risk assessment should be regularly carried out on all patients during their stay in hospital	102 (43.4)	123 (52.3)	6 (2.6)	3 (1.3)	1 (0.4)

DISCUSSION

The objective of this study was to measure knowledge and attitudes of community nurses about PI prevention, in the capital city of West Java, a province with the highest population in Indonesia. The results showed that the nurses had considerable deficiencies in knowledge (only 30.7% of all questions were answered correctly) but, conversely, had a positive attitude towards PI prevention (median = 44; range 28-55). Many studies have reported similar results regarding knowledge deficits about PI prevention among nurses in hospitals and nursing homes.[11, 18-21, 25-27, 29] A previous study from De Meyer et al. (2019), using the same instrument to assess knowledge about PI prevention, reported inadequate knowledge (only 50.7% of all questions were answered correctly) among nurses and nursing assistants in 16 Belgian hospitals.[18] Correspondingly, Kim and Lee[19] and Beeckman et al.[11] who used the earlier version of PUKAT 2.0 in their respective studies, also reported knowledge deficits among nurses in long term care facilities in Korean and Belgian hospitals with the total correct answer 60.1% and 49.7%, respectively.[11, 19] In addition, studies from Charalambous et al. in Cyprus,[20] Fulbrook in Australia,[21] Claudia et al. in Canada,[25] Chianca in Brazil,[26] Saleh in Jordania[27] and Meesterberends et al. in Netherlands and Germany,[29] all found knowledge deficits on PI prevention among nurses in hospital or nursing homes, irrespective of the type of instrument used to measure knowledge.

In our study, the lowest knowledge score was found in the theme ‘prevention’ a similar finding to the study of De Meyer et al.[18] Only three (1%) nurses in our study could answer the question ‘How should bed linen be used to prevent pressure ulcers?’ correctly. Also, almost all nurses (96%; n=226) had an incorrect understanding of the role of ring cushions (donuts); they thought that 'donuts' were effective in preventing pressure ulcers when patients are seated. But, these ring cushions are not recommended because they make the contact surface between the patient's skin and the surface smaller; thus the pressure will be higher.[1] This finding echoes that of Fulbrook et al. [21] and Charalambos,[20] suggesting a persistent confusion among nurses regarding PI prevention in the seated individual. This is reiterated in the fact that just 14% (n=34) of respondents understood how repositioning prevents pressure ulcers.

Thus, even though the respondents in this study were knowledgeable in some items, e.g. in the theme ‘nutrition’, which reached the highest score, the overall results show that they need to increase the fundamental understanding of PI prevention. This

is borne out by the fact that among individuals who had attended additional training about pressure injuries or wound care, in general, this resulted in a significant higher total knowledge score, but only at borderline value (Z = -1.995, p = 0.046). However, in our study we did not ask which training the community nurses received so there might be large differences in length of training. De Meyer et al. also found a correlation between attending additional training with higher total knowledge score.[18] For this reason, carrying out training for these community nurses might be of value in increasing their knowledge of PI prevention.

In terms of attitude towards PI prevention, nurses demonstrated a positive attitude, in line with previous studies on this topic.[11, 12, 19, 20, 24, 32, 34] Moore et al., who originally developed the questionnaire used,[32] found that more than 90% of hospital nurses agreed that they needed to concern themselves with PI prevention in their practice. This finding was similar in our study and in three other studies that used the same questionnaire.[12, 22, 24] Nurses in these studies believed that PIs could be avoided and they agreed that continuously and regularly assessment of PI risk will have benefits in PI prevention.[12, 22, 24, 32] Almost all community nurses believed that PI prevention is a greater priority than PI treatment, which is in line with the fact that prevention is indeed a priority in community health services.[35, 36] We found that the attitude levels towards PI prevention was correlated with a higher basic education (H = 11.773; p = 0.003). However, this positive attitude was not correlated with either gender, age, working experience or whether or not the nurses attended additional training in PI or wound care.

In this study, it seems that despite a positive attitude towards pressure ulcer prevention, actual PI practice may not benefit because of a lack of knowledge on the important elements of PI prevention. Further, given the consistent findings of positive attitude within the literature,[37] it seems prudent that a greater focus be given on providing nurses with the knowledge and skills needed to translate the positive attitude into effective prevention behaviours in practice.

Study limitations

Some study limitations should be mentioned. First, considering the fact that Indonesia is a large country, it is unknown if the results of this study can be generalised to all Indonesian community nurses due to the different characteristics of urban and

rural areas. However, the internal validity of our results is high, as the participation rate in this study was 100%, meaning that all eligible nurses invited (235 community nurses from 80 Primary Health Care in Bandung) completed the questionnaire. Further, normality test showed normal distribution of knowledge score. Another limitation of this study could be that some items in the attitude questionnaire focused on hospital patients. However, despite this, all items were evaluated by the 22 experts as relevant for community nurses. Therefore, the scores on the attitudes questionnaire give a good indication of the attitude towards PI prevention among community nurses. An important strenght of this study is that this study is unique because, based on our best knowledge, this is the first study focusing on PI prevention among community nurses.

CONCLUSIONS

This study shows that community nurses in a large city in Indonesia had considerable knowledge deficiencies but a positive attitude towards PI prevention. Therefore, increasing fundamental understanding on PI prevention calls for serious attention for all the community nurses and further research should focus on what nurses need to increase their knowledge on PI prevention. Furthermore, this study reports a positive attitude among nurses towards PI prevention. This is valuable for increasing their role in PI prevention among community-dwelling older adults. However, research should be conduct to explore further what community nurses need to strengthen their role in PI prevention.

REFERENCES

1. European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and treatment of pressure ulcers/injuries: clinical practice guideline. The international guideline. Emily Haesler (Ed.). EPUAP/NPIAP/PPPIA: 2019. Available from: https:// www. epuap. org/ pu-guide lines/.
2. Gorecki C, Brown JM, Nelson EA, Briggs M, Schoonhoven L, Dealey C, et al. Impact of pressure ulcers on quality of life in older patients: a systematic review. Journal of the American Geriatrics Society. 2009;57(7):1175-83.
3. Esson L, Spilsbury K, Nelson E, Cullum C. Inpatients felt that pressure ulcers had emotional, mental, physical, and social effects on quality of life because nurses did not adequately treat or manage their pain or discomfort. Evidence-based nursing. 2007;10(4):128.
4. Jackson DE, Durrant LA, Hutchinson M, Ballard CA, Neville S, Usher K. Living with multiple losses: Insights from patients living with pressure injury. Collegian. 2018;25(4):409-14.
5. Landi F, Onder G, Russo A, Bernabei R. Pressure ulcer and mortality in frail elderly people living in community. Arch Gerontol Geriatr. 2007;44 Suppl 1:217-23.
6. Jaul E, Calderon-Margalit R. Systemic factors and mortality in elderly patients with pressure ulcers. Int Wound J. 2015;12(3):254-9.
7. Corbett LQ, Funk M, Fortunato G, O'Sullivan DM. Pressure injury in a community population: a descriptive study. J Wound Ostomy Continence Nurs. 2017;44(3):221-7.
8. Bogaisky M, Dezieck L. Early Hospital Readmission of Nursing Home Residents and Community-Dwelling Elderly Adults Discharged from the Geriatrics Service of an Urban Teaching Hospital: Patterns and Risk Factors. Journal of the American Geriatrics Society. 2015;63(3):548-52.
9. Sari SP, Everink IH, Sari EA, Afriandi I, Amir Y, Lohrmann C, et al. The prevalence of pressure ulcers in community-dwelling older adults: a study in an Indonesian city. International Wound Journal. 2019;16(2):534-41.
10. Ajzen I. The theory of planned behaviour: Reactions and reflections. Psychology & Health. 2011;26(9):1113-27.
11. Beeckman D, Defloor T, Schoonhoven L, Vanderwee K. Knowledge and Attitudes of Nurses on Pressure Ulcer Prevention: A Cross-Sectional Multicenter Study in Belgian Hospitals. Worldviews on Evidence-Based Nursing. 2011;8(3):166-76.
12. Barakat-Johnson M, Barnett C, Wand T, White K. Knowledge and Attitudes of Nurses Toward Pressure Injury Prevention: A Cross-Sectional Multisite Study. Journal of wound, ostomy, and continence nursing : official publication of The Wound, Ostomy and Continence Nurses Society. 2018;45(3):233-7.
13. Pemerintah Republik Indonesia. Peraturan Pelaksanaan Undang-Undang Nomor 38 Tahun 2014 Tentang Keperawatan 26 (2019).
14. Kementerian Kesehatan Republik Indonesia. Keputusan Menteri Kesehatan Republik Indonesia Nomor Hk.01.07/Menkes/425/2020 Tentang Standar Profesi Perawat HK.01.07/MENKES/425/2020 (2020).
15. Kementerian Pendayagunaan Aparatur Negara. Peraturan Menteri Pendayagunaan Aparatur Negara Dan Reformasi Birokrasi Republik Indonesia Nomor 35 Tahun 2019 Tentang Jabatan Fungsional Perawat, Nomor 35 (2019).

16. Kementerian Kesehatan Republik Indonesia. Peraturan Menteri Kesehatan Republik Indonesia Nomor 43 Tahun 2019 Tentang Pusat Kesehatan Masyarakat (2019).
17. Kementerian Kesehatan Republik Indonesia. Peraturan Menteri Kesehatan Republik Indonesia Nomor 40 Tahun 2017 Tentang Pengembangan Jenjang Karir Profesional Perawat Klinis (2017).
18. De Meyer D, Verhaeghe S, Van Hecke A, Beeckman D. Knowledge of nurses and nursing assistants about pressure ulcer prevention: A survey in 16 Belgian hospitals using the PUKAT 2.0 tool. Journal of Tissue Viability. 2019;28(2):59-69.
19. Kim JY, Lee YJ. A study on the nursing knowledge, attitude, and performance towards pressure ulcer prevention among nurses in Korea long-term care facilities. International wound journal. 2019;16(Suppl 1):29-35.
20. Charalambous C, Koulouri A, Roupa Z, Vasilopoulos A, Kyriakou M, Vasiliou M. Knowledge and attitudes of nurses in a major public hospital in Cyprus towards pressure ulcer prevention. Journal of Tissue Viability. 2019;28(1):40-5.
21. Fulbrook P, Lawrence P, Miles S. Australian Nurses' Knowledge of Pressure Injury Prevention and Management: A Cross-sectional Survey. Journal of wound, ostomy, and continence nursing : official publication of The Wound, Ostomy and Continence Nurses Society. 2019;46(2):106-12.
22. Kaddourah B, Abu-Shaheen A, Al-Tannir M. Knowledge and attitudes of health professionals towards pressure ulcers at a rehabilitation hospital: a cross-sectional study. BMC Nursing [Internet]. 2016; 15(1):[1-6 pp.].
23. Iranmanesh S, Rafiei H, Foroogh Ameri G. Critical care nurses' knowledge about pressure ulcer in southeast of Iran. International Wound Journal. 2011;8(5):459-64.
24. Strand T, Lindgren M. Knowledge, attitudes and barriers towards prevention of pressure ulcers in intensive care units: a descriptive cross-sectional study. Intensive & critical care nursing. 2010;26(6):335-42.
25. Claudia G, Diane M, Daphney S-G, Danièle D. Prevention and treatment of pressure ulcers in a university hospital centre: A correlational study examining nurses' knowledge and best practice. International Journal of Nursing Practice. 2010;16(2):183-7.
26. Chianca TC, Rezende JF, Borges EL, Nogueira VL, Caliri MH. Pressure ulcer knowledge among nurses in a Brazilian university hospital. Ostomy/wound management. 2010;56(10):58-64.
27. Saleh MYN, Papanikolaou P, Nassar OS, Shahin A, Anthony D. Nurses' knowledge and practice of pressure ulcer prevention and treatment: An observational study. Journal of tissue viability. 2019;28(4):210-7.
28. Chaudhary S, Singh N. Assessment of knowledge and practice & identification of barriers towards pressure ulcer care and prevention among nursing professional. Annals of Physical and Rehabilitation Medicine. 2018;61(Supplement):e383.
29. Meesterberends E, Wilborn D, Lohrmann C, Schols JMGA, Halfens RJG. Knowledge and use of pressure ulcer preventive measures in nursing homes: a comparison of Dutch and German nursing staff. Journal of Clinical Nursing. 2014;23(13-14):1948-58.
30. Manderlier B, Van Damme N, Vanderwee K, Verhaeghe S, Van Hecke A, Beeckman D. Development and psychometric validation of PUKAT 2·0, a knowledge assessment tool for pressure ulcer prevention. International Wound Journal. 2017;14(6):1041-51.
31. Anderson LW, Krathwohl DR. A taxonomy for learning, teaching, and assessing : a revision of Bloom's taxonomy of educational objectives. Complete ed. ed. New York: Longman; 2001.

32. Moore Z, Price P. Nurses' attitudes, behaviours and perceived barriers towards pressure ulcer prevention. Journal of Clinical Nursing. 2004;13(8):942-51.
33. Tyupa S. A theoretical framework for back-translation as a quality assessment tool. New Voices in Translation Studies. 2011;7(1):35-46.
34. Kallman U, Suserud BO. Knowledge, attitudes and practice among nursing staff concerning pressure ulcer prevention and treatment--a survey in a Swedish healthcare setting. Scand J Caring Sci. 2009;23(2):334-41.
35. Arnott J. Introduction to Community Nursing Practice. Maidenhead, England: McGraw-Hill Education; 2012.
36. Juniarti N, Zannettino L, Fuller J, Grant J. Improving community nursing care services through the academic nursing centre model. Australian Nursing and Midwifery Journal. 2015;23(6):39.
37. Avsar P, Patton D, O'Connor T, Moore Z. Do we still need to assess nurses' attitudes towards pressure ulcer prevention? A systematic review. Journal of wound care. 2019;28(12):795-806.

CHAPTER 6

Barriers and potential facilitators of pressure injury prevention and treatment in older adults living at home: the perspective of Indonesian community nurses

Submitted
Sari SP, Everink IHJ, Lohrmann C, Amir Y, Afiyanti Y, Schols JMGA.

CHAPTER 7

General discussion

INTRODUCTION

This dissertation aimed to describe the magnitude of the problem of pressure injuries (PIs) among older adults living at home in Bandung city, Indonesia. The studies described in this dissertation have three main objectives. The first objective was to report on the prevalence of PIs in the community. The second objective was to examine the family caregivers' knowledge, attitude and practice on PI prevention. The third objective was to examine community nurses' knowledge of, and attitude toward PI prevention among community-dwelling older adults, as well as their perception of barriers and facilitators regarding PI prevention and treatment at home. Various methods were used to meet these objectives.

First, an epidemiological study using a cross-sectional design was conducted to identify the prevalence of PIs among community-dwelling older adults, as well as to assess the injury characteristics, participants' characteristics, and their use of formal and informal health care services. Second, the family caregivers' knowledge, attitude and practice on PI prevention was examined using a survey among family caregivers of older adults living at home. Prior to using this survey instrument, three phases of instrument development and psychometric evaluation were conducted due to the lack of an existing instrument to measure family caregivers' knowledge, attitude, and practice in preventing PIs. Third, community nurses' knowledge of, and attitude towards PI prevention were evaluated with a cross-sectional study using internationally published questionnaires involving community nurses in Bandung city. Lastly, community nurses' perception on barriers and facilitators in providing PI care at home was examined using a mixed-methods design, where the explanatory sequential multistage framework was followed.[1] In this mixed methods study, a quantitative phase (questionnaire) was followed by a qualitative phase (focus group interviews).

This chapter presents and discusses the main findings of this dissertation, together with the strengths and limitations of the studies and implications for clinical practice and future research. This chapter will end with a conclusion.

MAIN FINDINGS

The prevalence of pressure injuries (PIs) in older adults living at home in a city in Indonesia

The first objective of this dissertation was to examine the prevalence of pressure injuries (PIs) in older adults living at home in a city in Indonesia, including the injury severity, participants' characteristics, and their use of formal and informal care (chapter 2). The results show that the prevalence rate of PIs among 325 community-dwelling older adults was 10.8%. More than half of the injuries were PIs category 1, which are preventable. Factors strongly related to PIs among older adults living at home were the degree of physical activity, a problem in sensory perception (assessed with the Braden Scale), and a history of stroke. Although most participants with PIs had healthcare insurance, none of them had received formal wound care and/or any information about PU (care) from their formal healthcare providers. Furthermore, the majority of family members did not provide any form of PI care at home.

Knowledge, attitude, and practice of family caregivers on PI prevention

The second objective was to examine family caregivers' knowledge, attitude and practice on PI prevention. As there was no validated instrument available to measure family caregivers' knowledge, attitude, and practice in preventing PIs, the KAP-PI instrument (Knowledge, Attitude and Practice of family caregivers on PI prevention) was developed, and its psychometric properties were evaluated (chapter 3). The results demonstrate that the final version of the KAP-PI was valid and had Cronbach's Alpha values of 0.83, 0.93 and 0.89 in the respective knowledge, attitude and practice domains - indicating high reliability.

Second, the KAP-PI instrument was used in a cross-sectional survey to examine family caregivers' knowledge, attitude, and practice on PI prevention for older adults living at home (chapter 4). The results showed that among 267 family caregivers, more than half (61.0%) of participants had deficiencies in PI prevention knowledge. Almost all participants (94.4%) had a positive attitude toward PI prevention, and nearly half (41.2%) of participants had inadequate practice in PI prevention. Knowledge and attitude toward PI prevention correlated positively with practice on PI prevention, but no correlation was found between knowledge and attitude.

Community nurses' knowledge and attitude toward PI prevention and their perception of barriers and facilitators related to PI prevention

The third objective of this dissertation was to assess community nurses' knowledge of, and attitude toward PI prevention (chapter 5), and their perception of barriers and facilitators in performing such activities (chapter 6). The study involved community nurses who permanently worked in the Public Health Center (Puskesmas) in Bandung, West Java, Indonesia. The results showed that among 235 participating community nurses, there were considerable deficiencies in knowledge. However, they did have a positive attitude towards PI prevention. The last study of this dissertation looked into community nurse's perception of barriers and facilitators regarding PI prevention at home using a mixed-methods design, whereby the quantitative phase (questionnaire) was followed by a qualitative phase (focus group interview). The results show that Indonesian community nurses were not accustomed to PI prevention practices. They rarely practiced such activities even though the needs for PI prevention and treatments were evident in the community. They experienced the following barriers to PI prevention and treatment among older adults living at home: lack of time, inadequate equipment, lack opportunities for training, inadequate knowledge and skills and lack of data about community-dwelling adults at risk of PIs. Community nurses assumed that sufficient knowledge and skills gained through training, a regulation that makes PI prevention a priority and the availability of data about older adults living at home being at risk of PIs, could facilitate performing adequate preventive practices.

THEORETICAL CONSIDERATIONS

Since the 19th century, pressure injuries (PIs) have become a sensitive quality indicator of care in many care settings,[2] including home healthcare.[3] PIs can occur as an adverse event if adequate preventive measures are not applied, especially to those with a risk of Pis.[4]

The results of our study show that the prevalence rate of all PIs among older adults living at home was 10.8% (chapter 2). If the results are compared with the prevalence rate of PIs developed in four hospitals in Indonesia (8.0%),[5] it appears that more PIs are developed at home than in the hospital. Furthermore, a prevalence rate of 10% in

Bandung means that it is expected that around 11,000 to 32,000 people aged 60 years or older living at home suffer from PIs, which is a high number [6]. Together with an expected increase in chronic diseases as predisposing factors to PIs in Indonesia, such as stroke, hypertension and arthritis,[4, 7] makes the problem even more serious. There are very little international studies reporting on the prevalence or incidence of PIs at home, making a comparison with our results difficult. In Sweden, PIs were identified as one of the most common adverse events in home healthcare [3] and a study executed in New England (US) showed that the majority of patients who already had PIs before hospital admission were older adults living at home.[8] Another study in the United States noted that having a PI was an important reason for re-admission to the hospital among older adults living at home.[9] However, it is difficult to compare these results with those found in our study because these studies reported on the problem of PIs among those who had contact with health care settings (hospitals, home care, or primary care). In our study, older adults in the general population were included, of which only less than half of them (45.7%) had used formal care services.

When looking at factors associated with PIs, we found that the degree of physical activity, a problem in sensory perception and a history of stroke were strongly related to PIs among older adults living at home. These results are in line with various studies reporting on factors related to PIs in older people.[10-13] Furthermore, our study found that more than half of the injuries suffered by older adults living at home were PIs category 1 (chapter 2). It strengthens the evidence that many cases of PIs worldwide are indeed preventable.[14-16] PIs category 1 are preventable if the right preventive measures are taken, such as mobilizing older adults or performing repositioning regularly.[4] Therefore, performing preventive measures among Indonesian community-dwelling older adults is especially important among those with impaired physical activity, sensory perception problems, and a history of stroke.

When diseases or illnesses occur among older people, the supportive environment by the family, community, institutional and policy levels should be adjusted to facilitate their adaptation.[17]

Family-level

Family caregivers can be a strategic support system for preventing PI problems at home (36). This is especially the case in Indonesia, where taking care of parents to the

end of their lives is conventional. However, in chapter 2, our study reported that none of the older adults suffering from PIs received PI prevention and treatment from family members, even though most (63%) of them were living with family and other relatives. Family caregivers in our studies had knowledge deficits related to PI prevention (chapter 4), shown by the fact that 70% of family caregivers did not know the definition and symptoms of PIs. Also, they rarely practised activities to prevent PI among their older relatives, such as repositioning regularly. This, while repositioning is strongly recommended for those at risk of PI, such as bedridden older adults.[4, 18] Similar results were found by Tavares et al. (2016), who also found knowledge deficits on PI care among family caregivers of older adults admitted to the emergency unit in Brazil.[12] An earlier study, performed by Baharestani (1993), already showed limited knowledge on PI prevention and wound treatment among people taking care of their frail spouses at home.[19] As eminently in Indonesia family members can be a good support system to preventing the development of PI problems at home, it is a missed opportunity that nothing is done to increase their knowledge.[20]

Involving family members in the prevention and treatment of PIs could potentially decrease its prevalence rates, especially among those with a high risk of developing Pis,[12, 21-26] and especially among family members who demonstrate a positive attitude towards taking care of their older relative. A previous study showed that Chinese-American caregivers in Seattle and Houston feel strong responsibilities towards their parents and do not change over time, although they experience acculturation.[27] Our study also found that family caregivers generally demonstrated a positive attitude toward PI prevention (chapter 6).

Community-level

The community could be seen as “a group or collection of individuals interacting in social units and sharing common interests, characteristics, values, and goals”.[28] In Indonesia, people appear to be characterized by a general emphasis on sociability, on maintaining friendly relationship with everyone, and on the community rather than individual.[29] These mean that people in Indonesia tend to collaborate and help each other in the community relied on the cultural value (known as ‘gotong royong’). This cultural wisdom applies to every aspect of people’s live.[30] Therefore, it is common to see volunteers in Indonesia, including health care volunteers in the community (named ‘cadres’).

Cadres are health care volunteers in the community, and their roles in Indonesia are discussed in many studies.[31-36] Their collaboration with community nurses can improve family performance in promoting health and preventing diseases.[31-36] Our study shows that not all older adults who suffered from PIs had accessed healthcare services even though they were insured (chapter 2). Therefore, it is a challenge for community nurses to provide health services to people who do not access them (chapter 6). It is impossible to check all older adults at their homes because of the large area and number of people in their supervising area (chapter 6). Therefore, community nurses often gather information from cadres about older adults at home and whether they need to be visited or not by community nurses. Without information from the cadres, community nurses will find it difficult to find older adults in the community who need health services (chapter 6). Therefore, cadres are essential for solving the PI problem among older adults living at home.

The role of comparable health care volunteers is discussed in various studies,[37, 38] even though no studies were found that specifically focused on PI care. In China, for instance, it appears that volunteers might be effective in reducing emergency room visits and non-acute hospitalization, as well as early detection of acute problems warranting tertiary care.[37] These volunteers consisted of retired healthcare professionals, university students, and openly recruited citizens who received training to provide home care services to hospital-discharged older Chinese adults aged 65+ with chronic conditions identified as high-risk patients of hospital admission and referred by public healthcare providers. In Hong Kong, community-based end of life care involving volunteers brings several benefits to patients, such as granting their wishes and encouraging emotional release.[38] A systematic review involving the majority of studies from western countries also reported that community-based palliative care involving volunteers was an effective approach to providing palliative care.[39]

Institutional and policy-level

Home care agencies who are part of the national health care system do not exist in Indonesia yet. Hospitals in Indonesia can provide home care services,[40] but this has not been implemented yet. Consequently, the Public Health Centres (PHCs) should provide home health care services. As mentioned in the general introduction,

community nurses represent the largest proportion of staff in PHCs.[41] However, this dissertation shows that none of the older adults who suffered from PIs had received formal care focused on PI prevention or treatment (chapter 2). This result is in line with the, study of Amir and colleagues reporting inadequate pressure injury care (prevention and treatment) in Indonesian general hospitals.[5]

Our study shows that community nurses admit to give little to no attention to the provision of PI prevention and treatment as they were not accustomed to PI prevention practices (chapter 6). Many studies reported similar results regarding lack of attention and practice by nurses to PI prevention. However, these studies only focused on the hospital setting.[42-44] These studies revealed that inadequate structural factors such as management support and planning, and missed coordination between care providers or care settings, leads to inappropriate PI care.

Furthermore, several studies identified the same issues as barriers for nurses to PI prevention. Factors identified by hospital nurses in the study of Etafa et al. were a heavy workload, staff shortages, a shortage of resources and equipment such as special mattresses, and insufficient training.[45] Another study executed in England by Taylor et al., reported on barriers perceived by community care teams (registered nurses, physiotherapists, occupational therapists, healthcare assistants and rehabilitation support workers), which were problems associated with self-confidence, such as inspecting intimate anatomical locations, and troubles having conversations with patients and family members at home.[46]

As described in chapter 6 of this dissertation, community nurses assumed that sufficient knowledge and skills gained through training could be the strong facilitators to perform adequate preventive practices. They mentioned that they lacked knowledge and skills about PI prevention. Other studies also showed lack of knowledge and skills about PI prevention among nurses in many care settings.[47-55] Furthermore, research has shown that knowledge and having a positive attitude towards PI prevention is of utmost importance, as having the right attitude is a precursor for good caring behaviour.[56, 57] Both knowledge and attitudes build a strong practice.[58-60] Furthermore, the European Pressure Ulcer Advisory Panel (EPUAP), National Pressure Injury Advisory Panel (NPIAP) and Pan Pacific Pressure Injury Alliance (PPPIA) recommend regularly assessing the knowledge and attitude of caregivers on PI prevention and treatment.[4]

Furthermore, organizational prioritization might facilitate the implementation of PI prevention.[61] Our study identified that even though PHCs in Indonesia are responsible for providing public health activities for the population within a specific area,[62] PI prevention gets little priority in PHCs due to other priorities on a policy level. Learning from a study conducted in Australia, health policy, for instance, regarding the cost of a program to prevent PI could significantly strengthen nurses' performance to prevent PIs, resulting in a reduction in expenditure and positive patient outcomes.[63]

METHODOLOGICAL CONSIDERATIONS

This paragraph discusses the methodological strengths and limitations of our studies related to study design, the study population, questionnaires and the generalizability of the results.

Study design

Three studies in this dissertation used a cross-sectional study design to explore comprehensive data on the prevalence of pressure injuries in community dwelling older adults as well as knowledge, attitude and practice of family caregivers (informal caregivers) and community nurses (formal caregivers) in PI prevention. We chose this design for our study because it allows us to compare many different variables at the same time, including characteristic variables. In addition, the results could be gathered immediately from a large sample of the population. However, a cross-sectional design only gives information about one moment in time, meaning that we do not know if that number (e.g. the prevalence of PIs) is decreasing or increasing after the study. Also, causal relationships are impossible to determine[64] and therefore, it could not be determined what caused the pressure injuries to happen and only associations could be given. However, for these studies, sample size calculations were performed. Therefore, it is expected the results represent the actual information of the PI problem in Indonesian community-dwelling older adults, including family caregiver’s knowledge, attitude and practice on PI prevention and community nurse’s knowledge and attitude of PI prevention.

Finally, focus group interviews were conducted to explore the perception of community nurses about barriers and potential facilitators of pressure injury prevention

and treatment in older adults living at home. A limitation of using focus groups is that the results may not represent all community nurses, and group dynamics may bias the answers.[64] However, we did have a close look if we had a good representation of community nurses and we had a good chair who closely looked at group dynamics. In addition, we conducted several focus groups to reach data saturation. Furthermore, rigor of the analyses was strengthened through reflexivity, credibility and triangulation (e.g. joint analyses, mutual reflection on findings, and researcher's roles).

Study population

Our study had a good representation of the population (community-dwelling older adults and their family caregivers and community nurses) because all cross-sectional studies had a response rate of 100%. Similarly, a high response rate was also reached in the focus group interviews. In total, 235 community nurses met the inclusion criteria for the survey and completed the questionnaires, of whom 87 (37%) wanted to participate in focus group interviews. These numbers of participants allowed us to choose a good representation of community nurses.

Instruments

Five instruments (paper-based questionnaires) were used in this dissertation. Four instruments have high values for Cronbach's alpha (chapters 2, 3, 4 and 5). Another instrument had no reliability values (chapter 6) because reliability values were considered irrelevant for this instrument. Several phases (forward translation, backward translation, evaluation between the original English questionnaire and backward translation results, and clarity of Indonesian wording) had been done to reach equivalence between the English version and the Indonesian version of the questionnaires adopted from the English version, including PUKAT 2.0 and the attitude questionnaire (chapter 5). Forward-backward translation is the most recommended technique for translating questionnaires.[65]

Furthermore, the instruments taken from instruments normally used in hospital settings (LPZ-international questionnaire, PUKAT 2.0, and the attitude questionnaire) were adjusted to the context of community care by involving experts from the Indonesian Community Nursing Association and Indonesian Wound Ostomy and Continence Nursing Association (chapters 2 and 5). Finally, the development and

psychometric evaluation of the KAP-PI instrument followed the best practice guideline for developing and validating scales for health, social, and behavioral research [66], conducting a principal factor analysis (PFA) and confirmatory factor analysis (CFA) for the data analyses (chapter 3). Validity and reliability were derived from two independent samples from two different data collection procedures, including relatively large sample size (120 participants in instrument construction and 240 participants in psychometric testing). However, we conducted no further test and retest reliability in this study.

Generalizability

This study was conducted only in a city in Indonesia. Considering the large area of Indonesia, consisting of 514 cities and regencies, the results in this study do not represent the whole condition of Indonesia. However, the results do give a clear overview of the PI problem in community-dwelling older adults in the region of Bandung including the characteristics of the participants and health service issues. Therefore, the results of this study (chapters 2, 4, 5, and 6) could be generalized to all Indonesian urban areas taking into consideration the same health service issues and characteristics of community nurses and people in the cities. Furthermore, even though community nurses' perceptions (chapter 6) may vary regarding work-related characteristics (e.g. local policy, number of staff) and cultural context (e.g. health-seeking behavior of people in their supervising area, self-development motivation), generalizing the findings still could be done for Indonesian context, but not for different countries. Finally, the KAP-PI instrument was developed and psychometrically tested (chapter 3) based on the Indonesian context of urban community-dwelling older adults. Therefore, the items might be not suitable in other regions or countries. However, we believe the instrument was thoroughly developed and is good to use among populations with the same characteristics as the study population.

IMPLICATIONS FOR CLINICAL PRACTICE AND FUTURE RESEARCH

Implications for clinical practice

PI prevention calls serious attention because PIs affect people's quality of life emotionally, physically and socially[67-69] and even pose a higher risk of dying.[70, 71] PIs cause considerable patient suffering from pain.[72] In addition, PIs lead to an economic burden on healthcare systems [73, 74]. However, no studies presently report on the effect of PIs in Indonesia. Nevertheless, such studies are relevant to why PIs in Indonesian community-dwelling older adults should be seriously overcome. Strategies to address this problem should become a priority. First, we recommend health care providers pay more attention to older adults living at home with at risk of pressure injuries (PIs), such as a low degree of physical activity, a problem in sensory perception, and a history of stroke. Our study also found that more than half of the PIs found in our population were classified as being within preventable category 1. Therefore, it is necessary to perform early PI prevention among older adults in the community to prevent the development of more severe PI categories. In addition, this dissertation advocates for involving health care volunteers in PI prevention among Indonesian community-dwelling older adults with in term of bridging communication between formal caregivers and informal caregivers.

Second, our study shows that family caregivers are highly involved in providing care to their older relatives. However, they lack knowledge and practice in PI prevention. Therefore, adequate support and coaching from professional caregivers is fundamental to educate family caregivers.[26, 75-77] In the community, this should be done by community nurses, given their prominent role in the PI prevention for older adults and family caregivers within their working area.[41] When educating older adults and their family caregivers, community nurses could use international guidelines as references. A scoping review by Hossein and colleagues in 2021[78] identified three guidelines documenting family training content in details, i.e. National Institute for Health and Clinical Excellence,[79] MOH Nursing Clinical Practice Guidelines Prediction and Prevention of Pressure Ulcers in Adults,[80] and the guidelines by the Association for the Advancement of Wound Care 'The AAWC pressure ulcer guidelines'.[81] These guidelines, describe that family caregivers should be knowledgeable about PI risk factors, nutrition, skin assessment, characteristics of pressure injuries, interventions to

prevent pressure injuries, and signs and symptoms of complications of pressure injuries such as infection and using protective equipment and devices.[78] These points of knowledge are covered in the KAP-PI (knowledge, attitude and practice of family caregivers on PI prevention) instrument that was developed and evaluated in our study (chapter 3). Therefore, the KAP-PI instrument could be used as a tool to evaluate family caregiver's knowledge, attitude and practice before and after conducting family caregivers training or education program regarding PI prevention.

Third, our study shows that community nurses had a positive attitude towards PI prevention but considerable knowledge deficiencies. Therefore, we recommend training to increase their fundamental understanding and skills in PI prevention and treatment, for instance, on how to use PI guidelines. Such training could strengthen the implementation of PI prevention, clarify community nurses' roles and responsibilities and further reduce the PI prevalence.[82] The training could be arranged by the department of health in collaboration with academic personnel and nurses associations.

Lastly, the Indonesian health care system is not focused on PI prevention and treatment at home. Therefore, we recommend the Indonesian ministry of health to prioritize a PI prevention and treatment program and to clarify roles and responsibilities of community nurses as primary care providers for older adults within their working area.

Implications for future research

This study is the first in Indonesia to successfully explore pressure injury problems among older adults living at home. However, this study only involved the population of one Indonesian city. Therefore, we first recommend other studies on rural areas in Indonesia to get more insight and comparison into the PI problem among Indonesian community-dwelling older adults.

Second, further research could focus on which education program, educational materials, and practice support are appropriate for family caregivers and community nurses to decrease the PI prevalence rate among Indonesian community-dwelling older adults. Furthermore, it is advisable to examine the skills of community nurses in PI prevention and treatment, which we did not perform in our study. Third, more research is needed to elaborate on the solution to overcome barriers to PI prevention

and treatment, such as gaining leader support within the ministry of health and/or health departments in PI prevention.

Fourth, an instrument to assess family caregivers' knowledge, attitude, and practice on Preventing Pressure Injuries (KAP-PI) among community-dwelling older adults in Indonesia was developed and validated in this dissertation. The instrument can be used directly in family nursing practice, education, and research to assess the function of family caregivers in preventing pressure injuries among community-dwelling older people in Indonesia. However, further research may be needed to improve this instrument, such as adding an element of observation to assess family practice directly in the prevention of pressure sores. In addition, further researches can be performed to see if this instrument can also be used in different countries. Moreover, it is recommended to evaluate barriers experienced by family caregivers in practising PI prevention.

CONCLUSION

This dissertation focused on the pressure injury problem among community-dwelling older adults in Bandung, West Java province, Indonesia. Studies in this dissertation investigated the prevalence of PIs, family caregivers' knowledge, attitude and practice, community nurses' knowledge and attitude, and community nurses' perception of barriers and potential facilitators in PI prevention. Pressure injuries appeared to be a serious problem among Indonesian community-dwelling older adults, proven by the fact that the prevalence rate was 11%. This dissertation also showed that community nurses and family members lack knowledge and practice on PI prevention and treatment. Furthermore, community nurses experience several barriers in performing PI care, such as a heavy workload, staff shortages, a shortage of resources and equipment and insufficient training. Therefore, solutions are needed to address the problems, including strengthening the role of formal (i.e. community nurses) and informal caregivers (i.e. family caregivers and health care volunteers), and strengthening national regulations that make PI prevention a priority.

REFERENCES

1. Weyant E. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 5th Edition by John W. Creswell and J. David Creswell, Los Angeles, CA: SAGE, 2018, $38.34, 304pp., ISBN: 978-1506386706. Journal of Electronic Resources in Medical Libraries. 2022:1-2.
2. Diane Doran BM, Sean C. Towards a National Report Card in Nursing: A Knowledge Synthesis. Nursing Leadership. 2011;24(2):38-57.
3. Schildmeijer KGI, Unbeck M, Ekstedt M, Lindblad M, Nilsson L. Adverse events in patients in home healthcare: a retrospective record review using trigger tool methodology. BMJ open. 2018;8(1):e019267.
4. European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and treatment of pressure ulcers/injuries: clinical practice guideline. The international guideline. Emily Haesler (Ed.). EPUAP/NPIAP/PPPIA: 2019. Available from: https:// www. epuap. org/ pu-guide lines/.
5. Amir Y, Lohrmann C, Halfens RJ, Schols JM. Pressure ulcers in four Indonesian hospitals: prevalence, patient characteristics, ulcer characteristics, prevention and treatment. International Wound Journal. 2017;14(1):184-93.
6. L. Naing TW, B.N. Rusli. Practical Issues in Calculating the Sample Size for Prevalence Studies. Orofacial Sciences 2006;1:9-14.
7. Ministry of Health Republic of Indonesia, Badan Penelitian dan Pengembangan Kesehatan. Hasil Utama Riskesdas 2018. In: Kesehatan K, editor. Jakarta: Kementerian Kesehatan Republik Indonesia; 2019.
8. Corbett LQ, Funk M, Fortunato G, O'Sullivan DM. Pressure injury in a community population: a descriptive study. J Wound Ostomy Continence Nurs. 2017;44(3):221-7.
9. Bogaisky M, Dezieck L. Early Hospital Readmission of Nursing Home Residents and Community-Dwelling Elderly Adults Discharged from the Geriatrics Service of an Urban Teaching Hospital: Patterns and Risk Factors. Journal of the American Geriatrics Society. 2015;63(3):548-52.
10. Fateme K, Fariba Y, Aliakbar K, Hassan A. Investigating the effect of home-based training for family caregivers on the incidence of bedsore in patients with stroke in ali ebne abitaleb hospital, zahedan, iran: a clinical trial study. Medical-Surgical Nursing Journal. 2018;7(3):1-6.
11. Sari SP, Everink IH, Sari EA, Afriandi I, Amir Y, Lohrmann C, et al. The prevalence of pressure ulcers in community-dwelling older adults: a study in an Indonesian city. International Wound Journal. 2019;16(2):534-41.
12. Tavares BC, Matos E, Cristina I, Maliska A, Benedet SA, Salum NC. Profile of patients diagnosed with chronic ulcer of diverse etiology admitted to an emergency unit. Ciência, Cuidado e Saúde. 2016;15(4):624.
13. Oot-Giromini BA. Pressure ulcer prevalence, incidence and associated risk factors in the community. Decubitus. 1993;6(5):24-32.
14. Rodgers K, Sim J, Clifton R. Systematic review of pressure injury prevalence in Australian and New Zealand hospitals. Collegian. 2021;28(3):310-23.
15. Anthony D, Alosaimi D, Shiferaw WS, Korsah K, Safari R. Prevalence of pressure ulcers in africa: A systematic review and meta-analysis. Journal of Tissue Viability. 2021;30(1):137-45.

16. Moore Z, Avsar P, Conaty L, Moore DH, Patton D, O'Connor T. The prevalence of pressure ulcers in Europe, what does the European data tell us: a systematic review. Journal of Wound Care. 2019;28(11):710-9.
17. McCormack L, Thomas V, Lewis MA, Rudd R. Improving low health literacy and patient engagement: A social ecological approach. Patient Education and Counseling. 2017;100(1):8-13.
18. Manderlier B, Van Damme N, Verhaeghe S, Van Hecke A, Everink I, Halfens R, et al. Modifiable patient-related factors associated with pressure ulcers on the sacrum and heels: secondary data analyses. Journal of Advanced Nursing (John Wiley & Sons, Inc). 2019;75(11):2773-85.
19. Baharestani MM. The lived experience of wives caring for their frail homebound elderly husbands with pressure ulcers: a phenomenological investigation: ADELPHI UNIVERSITY; 1993.
20. Kim J, Choi Y, Shin J, Jang S-Y, Cho KH, Nam JY, et al. Incidence of Pressure Ulcers During Home and Institutional Care Among Long-Term Care Insurance Beneficiaries With Dementia Using the Korean Elderly Cohort. Journal of the American Medical Directors Association. 2017;18(7):638. e1-. e5.
21. Coe NB, Guo J, Konetzka RT, Van Houtven CH. What is the marginal benefit of payment-induced family care? impact on medicaid spending and health of care recipients. Health Economics. 2019;28(5):678-92.
22. Eisenberger A, Zeleznik J. Pressure ulcer prevention and treatment in hospices: a qualitative analysis. Journal of Palliative Care. 2003;19(1):9-14.
23. Martins Pereira S, Maria Soares HI. Pressure ulcers: relatives' perceptions of emotional impact and non-material costs. Revista de Enfermagem Referência. 2012(7):139-48.
24. Nuriyanto A, Rahayuwati L. Family Nursing as an Improvement Strategy of Family Health Index in Indonesia: A Literature Review. Asian Community Health Nursing Research. 2019;1(3):7-16.
25. Nakken N, Spruit MA, Wouters EFM, Schols JMGA, Janssen DJA. Family caregiving during 1-year follow-up in individuals with advanced chronic organ failure. Scandinavian Journal of Caring Sciences. 2015;29(4):734-44.
26. Tsai Y-C, Lin S-Y, Liu Y, Wang R-H. Factors related to the development of pressure ulcers among new recipients of home care services in Taiwan: A questionnaire study. International Journal of Nursing Studies. 2012;49(11):1383-90.
27. Miyawaki CE. caregiving attitudes and needs of later-generation Chinese-American family caregivers of older adults. Journal of Family Issues. 2020;41(12):2377-99.
28. Nies MA, McEwen M. Community/Public Health Nursing-E-Book: Promoting the Health of Populations: Elsevier Health Sciences; 2018.
29. Noesjirwan J. A rule-based analysis of cultural differences in social behaviour: Indonesia and Australia. International Journal of Psychology. 1978;13(4):305-16.
30. Simarmata N, Yuniarti KW, Riyono B, Patria B. Gotong Royong in Indonesian History. Digital Press Social Sciences and Humanities.5:00006.
31. Juniarti N, Haroen H, Yani DI. The Impact of Engaging People and Students in the Rural Community and Family Health Nursing Care. International Journal of Integrated Care (IJIC). 2018;18:1-2.
32. Lukman M, Ibrahim K, Yani DI, Sari SP, Juniarti N. Exploring strategies to improve the performance of community health volunteers for tuberculosis care and prevention: A qualitative study. International Journal of Community Based Nursing and Midwifery. 2019;7(4):270-8.

33. Marlita CY, Usman S, Marthoenis, Syahputra I, Nurjannah. The roles of Health Cadres in the Implementation of Mental Health Programs in Indonesia. International Journal of Nursing Education. 2022;14(1):9-18.
34. Jaftoran EA, Keliat BA, Wardani IY. Nursing intervention, family's role, cadre's role and medical services: Case series on client with hallucination and self-care deficit...4th International Conference for Global Health (ICGH) in conjunction with the 7th Asian International Conference in Humanized Health Care (AIC-HHC), September 26-28, 2019, Jakarta, Indonesia. Enfermería Clínica. 2021;31:S180-S4.
35. Astuti AB, Mulyanti S, Diyono. The Effectiveness of the Interprofessional Collaboration (IPC) Program on The Attitude of Mothers and Health Cadres on Stunting at Puskesmas Karanganom Klaten Central Java Republic of Indonesia. Electronic Journal of General Medicine. 2021;18(6):1-5.
36. Sapar, Salju, Risal M, Samsinar, Zainal S M, Akbar M. The influence of TB care community cadre's roles on the treatment adherence of tuberculosis (TB) sufferers. Enfermería Clínica. 2020;30:244-8.
37. Lai FTT, Wong ELY, Tam ZPY, Cheung AWL, Lau M-C, Wu C-M, et al. Association of volunteer-administered home care with reduced emergency room visits and hospitalization among older adults with chronic conditions: A propensity-score-matched cohort study. International Journal of Nursing Studies. 2022;127:N.PAG-N.PAG.
38. Chan Ws, Funk L. Cultivating mutuality: A qualitative study of community end-of-life care in Hong Kong. Health & Social Care in the Community. 2022;30(3):1189-98.
39. Vernon E, Hughes MC, Kowalczyk M. Measuring effectiveness in community-based palliative care programs: A systematic review. Social Science & Medicine. 2022;296:N.PAG-N.PAG.
40. Kementerian Kesehatan Republik Indonesia. Peraturan menteri kesehatan republik Indonesia nomor 79 tahun 2014 tentang penyelenggaraan pelayanan geriatri di rumah sakit. Jakarta2014.
41. Brenda L. Bonham Howe MRB. The Gerontology Nurse's Guide to the Community-Based Health Network. New York: Springer Publishing Company; 2014.
42. Sving E, Gunningberg L, Högman M, Mamhidir A-G. Registered nurses' attention to and perceptions of pressure ulcer prevention in hospital settings. Journal of Clinical Nursing (John Wiley & Sons, Inc). 2012;21(9-10):1293-303.
43. Maylor ME. Why does wound care remain a low priority? British Journal of Nursing. 2010;19:S2-S.
44. Gobbi P. Pressure sores at hospital admission as sentinel events. Assistenza Infermieristica e Ricerca. 2002;21(1):22-7.
45. Etafa W, Argaw Z, Gemechu E, Melese B. Nurses' attitude and perceived barriers to pressure ulcer prevention. BMC Nursing. 2018;17(1):14.
46. Taylor C, Mulligan K, McGraw C. Barriers and enablers to the implementation of evidence-based practice in pressure ulcer prevention and management in an integrated community care setting: A qualitative study informed by the theoretical domains framework. Health & Social Care in the Community. 2021;29(3):766-79.
47. De Meyer D, Verhaeghe S, Van Hecke A, Beeckman D. Knowledge of nurses and nursing assistants about pressure ulcer prevention: A survey in 16 Belgian hospitals using the PUKAT 2.0 tool. Journal of Tissue Viability. 2019;28(2):59-69.
48. Saleh MYN, Papanikolaou P, Nassar OS, Shahin A, Anthony D. Nurses' knowledge and practice of pressure ulcer prevention and treatment: An observational study. Journal of tissue viability. 2019;28(4):210-7.

49. Kim JY, Lee YJ. A study on the nursing knowledge, attitude, and performance towards pressure ulcer prevention among nurses in Korea long-term care facilities. International wound journal. 2019;16(Suppl 1):29-35.
50. Charalambous C, Koulouri A, Roupa Z, Vasilopoulos A, Kyriakou M, Vasiliou M. Knowledge and attitudes of nurses in a major public hospital in Cyprus towards pressure ulcer prevention. Journal of Tissue Viability. 2019;28(1):40-5.
51. Fulbrook P, Lawrence P, Miles S. Australian Nurses' Knowledge of Pressure Injury Prevention and Management: A Cross-sectional Survey. Journal of wound, ostomy, and continence nursing : official publication of The Wound, Ostomy and Continence Nurses Society. 2019;46(2):106-12.
52. Meesterberends E, Wilborn D, Lohrmann C, Schols JMGA, Halfens RJG. Knowledge and use of pressure ulcer preventive measures in nursing homes: a comparison of Dutch and German nursing staff. Journal of Clinical Nursing. 2014;23(13-14):1948-58.
53. Beeckman D, Defloor T, Schoonhoven L, Vanderwee K. Knowledge and Attitudes of Nurses on Pressure Ulcer Prevention: A Cross-Sectional Multicenter Study in Belgian Hospitals. Worldviews on Evidence-Based Nursing. 2011;8(3):166-76.
54. Claudia G, Diane M, Daphney S-G, Danièle D. Prevention and treatment of pressure ulcers in a university hospital centre: A correlational study examining nurses' knowledge and best practice. International Journal of Nursing Practice. 2010;16(2):183-7.
55. Chianca TC, Rezende JF, Borges EL, Nogueira VL, Caliri MH. Pressure ulcer knowledge among nurses in a Brazilian university hospital. Ostomy/wound management. 2010;56(10):58-64.
56. Ajzen I. The theory of planned behavior: frequently asked questions. Human Behavior and Emerging Technologies. 2020;2(4):314-24.
57. Ajzen I. The theory of planned behavior. Organizational Behavior and Human Decision Processes. 1991;50(2):179-211.
58. Moreira ACA, Silva MJd, Darder JJT, Coutinho JFV, Vasconcelos MIO, Marques MB. Effectiveness of an educational intervention on knowledge-attitude-practice of older adults' caregivers. Revista brasileira de enfermagem. 2018;71(3):1055-62.
59. Wan TT, Rav-Marathe K, Marathe S. A systematic review of KAP-O framework for diabetes. Medical Research Archives. 2016;3(9).
60. Badran IG. Knowledge, attitude and practice the three pillars of excellence and wisdom: a place in the medical profession. Eastern Mediterranean Health Journal. 1995;1(1):8-16.
61. Hartmann CW, Solomon J, Palmer JA, Lukas CV. Contextual Facilitators of and Barriers to Nursing Home Pressure Ulcer Prevention. Adv Skin Wound Care. 2016;29(5):226-38; quiz E1.
62. World Health Organization. Primary health care system (PRIMASYS): Case study from Indonesia [internet]. Geneva: World Health Organization; 2017. Available from https://apps.who.int/iris/handle/10665/341075
63. Barakat-Johnson M, Lai M, Wand T, White K, De Abreu Lourenco R. Costs and consequences of an intervention-based program to reduce hospital-acquired pressure injuries in one health district in Australia. Australian Health Review. 2019;43(5):516-25.
64. Peer Wv, Hakemulder Jm, Zyngier S. Scientific Methods for the Humanities. Amsterdam, Netherlands: John Benjamins Publishing Company; 2012.
65. Tyupa S. A theoretical framework for back-translation as a quality assessment tool. New Voices in Translation Studies. 2011;7(1):35-46.

66. Boateng GO, Neilands TB, Frongillo EA, Melgar-Quiñonez HR, Young SL. Best practices for developing and validating scales for health, social, and behavioral research: a primer. Frontiers in Public Health. 2018;6(149).
67. Gorecki C, Brown JM, Nelson EA, Briggs M, Schoonhoven L, Dealey C, et al. Impact of pressure ulcers on quality of life in older patients: a systematic review. Journal of the American Geriatrics Society. 2009;57(7):1175-83.
68. Esson L, Spilsbury K, Nelson E, Cullum C. Inpatients felt that pressure ulcers had emotional, mental, physical, and social effects on quality of life because nurses did not adequately treat or manage their pain or discomfort. Evidence-based nursing. 2007;10(4):128.
69. Jackson DE, Durrant LA, Hutchinson M, Ballard CA, Neville S, Usher K. Living with multiple losses: Insights from patients living with pressure injury. Collegian. 2018;25(4):409-14.
70. Landi F, Onder G, Russo A, Bernabei R. Pressure ulcer and mortality in frail elderly people living in community. Arch Gerontol Geriatr. 2007;44 Suppl 1:217-23.
71. Jaul E, Calderon-Margalit R. Systemic factors and mortality in elderly patients with pressure ulcers. Int Wound J. 2015;12(3):254-9.
72. Briggs M, Collinson M, Wilson L, Rivers C, McGinnis E, Dealey C, et al. The prevalence of pain at pressure areas and pressure ulcers in hospitalised patients. BMC nursing. 2013;12(1):19.
73. Kandilov AMG, Coomer NM, Dalton K. The Impact of Hospital-Acquired Conditions on Medicare Program Payments. Medicare & Medicaid Research Review. 2014;4(4):E1-E23.
74. Russo CA, Steiner C, Spector W. Hospitalizations related to pressure ulcers among adults 18 years and older, 2006: statistical brief# 64. 2006.
75. Kropf NP. Older Adults, Caregiving, and Late-Life Mental Health Issues. Generations. 2018;42(3):23-9.
76. Hagedoorn EI, Paans W, Jaarsma T, Keers JC, van der Schans C, Luttik ML. Aspects of family caregiving as addressed in planned discussions between nurses, patients with chronic diseases and family caregivers: a qualitative content analysis. BMC Nursing. 2017;16(1):37.
77. McGilton KS, Vellani S, Yeung L, Chishtie J, Commisso E, Ploeg J, et al. Identifying and understanding the health and social care needs of older adults with multiple chronic conditions and their caregivers: a scoping review. BMC Geriatr. 2018;18(1):231.
78. Rafiei H, Vanaki Z, Mohammadi E, Hosseinzadeh K. The Role of Family Caregivers in Pressure Injury: Prevention Guidelines: A Scoping Review. Home Healthcare Now. 2021;39(5):253-60.
79. Stephen-Haynes J. NICE pressure ulcer guideline: summary and implications for practice. British Journal of Community Nursing. 2006;11(Sup3):S18-S24.
80. Singapore. Ministry of H, National Medical Research C, National Healthcare G, Singapore Nurses A, SingHealth, Nanyang P, et al. Prediction and prevention of pressure ulcers in adults. Singapore: Ministry of Health; 2001.
81. Bolton L, Girolami S, Hurlow J. The AAWC pressure ulcer guidelines. The American journal of nursing. 2013;113(9):58-63.
82. van Leen MW, Schols JM, Hovius SE, Halfens RJ. A Secondary Analysis of Longitudinal Prevalence Data to Determine the Use of Pressure Ulcer Preventive Measures in Dutch Nursing Homes, 2005-2014. Ostomy Wound Manage. 2017;63(9):10-20.

ADDENDUM

Summary
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SUMMARY

Indonesia is experiencing an ageing population. Around 9.8% (26 million) of its people are 60 years of age or older and are considered older adults in Indonesia. The majority of them (90%) live together with their family members. Cultural and spiritual values make children devote themselves to looking after their parents. However, caring for older adults requires knowledge and skills rather than only the willingness to care for them. Older adults are commonly experiencing one or more chronic medical conditions leading to frailty, dependency, disability, and even death. Inappropriate care or support for this vulnerable population could lead to adverse events, such as pressure injuries (PIs). A pressure injury (PI) is a localized damage to the skin and or underlying tissue, which usually occurs over a bony prominence due to pressure or pressure combined with shear. It affects people's quality of life emotionally, physically and socially and even poses a higher risk of dying. PIs also lead to a heavy care burden.

It is expected that there is a high prevalence rate of PIs among Indonesian older adults living at home. This expectation is based on a combination of factors: the first one is the ageing of the population, the second one is an increase in the prevalence of diseases associated with PIs in this older population, such as stroke, chronic heart failure, chronic obstructive pulmonary disease and arthritis, and the third one is that older adults in Indonesia usually only rely on informal care instead of formal care services. Older adults living in Indonesia often do not access formal care even though health care services and health insurance are available for this population. In fact, a study has shown that almost all patients in Indonesian hospitals who suffered from PIs before hospital admission were older adults who lived at home, and none of them had received any professional home care services before hospital admission.

Based on the Indonesian health care system, older adults living at home could get health care services at home from primary healthcare providers, such as community nurses. Community nurses represent the largest proportion of Indonesian primary health care staff and are the primary professional care providers for people living at home. However, to fulfil their role in prevention and treatment of PIs in the community, it is essential that community nurses have adequate knowledge, a positive attitude and sufficient skills to perform PI preventive activities. On the other hand, as family caregivers in Indonesia have a large role in caring for their older relatives, community

nurses should also collaborate with these family caregivers in preventing and treating PIs. However, family members are usually not trained for tasks such as PI prevention. Little is known about the knowledge, attitude and practice of family caregivers of Indonesian community-dwelling older adults regarding PI prevention. Similarly, no studies are available focusing on Indonesian community nurses' knowledge and attitude towards PI prevention and their perception of barriers and facilitators towards PI prevention and treatment.

This dissertation aimed to explore the prevalence rate and associated factors of pressure injuries (PIs) in community-dwelling older adults in the region of Bandung city, Indonesia. Furthermore, in this dissertation, the knowledge, attitude and practice of family caregivers and community nurses are assessed, as well as barriers and facilitators in PI care.

Chapter one introduces the topics of this dissertation. It provides an overview of the characteristics of older adults living in Indonesia, as well as the availability of health care services for this population. Furthermore, it introduces the concept of pressure injuries and explains how to prevent PI among older adults living at home. The chapter ends with the five objectives of this dissertation: 1) to investigate the prevalence of pressure injuries in the general population of community-dwelling older adults in Bandung city (Indonesia), together with the ulcer characteristics, the background characteristics of older people with PIs and their use of formal and informal care; 2) to develop and psychometrically test an instrument to assess knowledge, attitude and practice of family caregivers in Indonesia in preventing PIs; 3) to examine knowledge, attitude and practice of Indonesian family caregivers towards PI prevention; 4) to examine knowledge and attitude of Indonesian community nurses towards PI prevention; and 5) to explore the perception of community nurses on barriers and facilitators of PI prevention among community-dwelling older adults in Indonesia.

Chapter two presents the results of a cross-sectional study focused on the prevalence of pressure injuries (PIs) in older adults living at home in a city in Indonesia, including the injury severity, participants' characteristics, and their use of formal and informal care. Three hundred and twenty-five (325) participants were randomly selected to participate in this study, representing older adults living at home from all sub-districts in Bandung city. The validated Indonesian version of the International Prevalence Measurement of Care Quality (LPZ-International) questionnaire, adapted to the community setting, was used in this study. Data collection took place in the home

of each participant. The results show that the overall PI prevalence was 10.8% and the PI prevalence excluding category 1 was 5.2%. Factors strongly related to PIs among older adults living at home appeared to be the degree of physical activity, a problem in sensory perception (assessed with the Braden Scale), and a history of stroke. Although most participants with PIs had healthcare insurance, none of them had received formal wound care and/or any information about PU (care) from their formal healthcare providers. Furthermore, family members did not provide PI care at home for most participants. Therefore, more attention should be given to PI care, including the prevention and treatment of PIs by informal and formal caregivers.

Chapter three describes the development and psychometric evaluation of an instrument to measure knowledge, attitude and practice of family caregivers to prevent PIs among community-dwelling older adults in Indonesia (KAP-PI). Three phases of instrument development and evaluation were used, including item generation, instrument construction and psychometric testing of the instrument. A total of 372 family caregivers of community-dwelling older adults were randomly selected and participated in this study. Statistical analysis of principal factor analysis (PFA), confirmatory factor analysis (CFA) and Cronbach's alpha were used for the evaluation. The original version of the KAP-PI instrument was written in Bahasa Indonesia using the standard vocabulary and structures of the Indonesian national language. The final version of the KAP-PI-instruments consists of a 12-item knowledge domain, a 9-item attitude domain, and a 12-item practice domain with Cronbach's Alpha values of 0.83, 0.93 and 0.89, respectively. The instrument appeared to be both reliable and valid.

Chapter four presents the results of a cross-sectional study to examine the family caregivers' knowledge, attitude, and practice about PI prevention for older adults living at home. The paper-based KAP-PI questionnaire was used. In total, 267 randomly selected family caregivers who were living with their older relative, participated in this study. The response rate was 100%, meaning that all randomly selected family caregivers who met the inclusion criteria, gave informed consent and completed the questionnaire. Results showed that in total, 11% (n=30) of the participants lived with an older relative who suffered from (a) PI(s) and 23% (n=61) of the participants cared for their older relative for more than five years. Furthermore, 61% had insufficient knowledge about PI prevention, but nearly all participants (94.4%) had a positive attitude toward PI prevention for their older relatives. Still, 41.2% of the participants had inadequate practice on PI prevention. A correlation analysis revealed that having

sufficient knowledge and a positive attitude towards PI prevention were positively correlated with practice ($p < 0.05$). The findings of this study are the first step to understand family caregivers' knowledge, attitude and practice regarding pressure injury prevention and based on these results, educational strategies are recommended. Research should be performed to explore which educational materials an education programs would be effective to use among family members, as well as which professional support is needed to strengthen family caregivers' role in PI prevention.

Chapter five presents the results of a cross-sectional study to examine the knowledge and attitude of Indonesian community nurses regarding Pressure Injury (PI) prevention. The study involved community nurses permanently working in the Public Health Center (Puskemas) in Bandung, Indonesia. Knowledge was measured using the validated Pressure Ulcer Knowledge Assessment Tool (PUKAT 2.0). Attitudes were measured using a predesigned instrument which included eleven statements on a five point Likert scale. All data were collected using paper-based questionnaires. The response rate was 100%. Respondents (n=235) consisted of 80 community nursing program coordinators (34.0%) and 155 community nurses (66.0%). The percentage of correct answers in the knowledge domain on the PUKAT 2.0 was 30.7%. The theme 'Prevention' had the lowest percentage of correct answers (20.8%). Community nurses who had additional PI or wound care training had a higher knowledge score compared to community nurses who did not have additional PI training (33.7% vs. 30.3%; Z = -1.995; $p = 0.046$). The median attitude score was 44 (maximum score 55; range 28-55), demonstrating a positive attitude among participants towards PI prevention. Further, the higher the education status of participants, the more positive the attitudes (H = 11.773; p = 0.003). This study shows that community nurses need to improve their basic knowledge of PI prevention. Furthermore, research should be performed to explore what community nurses need to strengthen their role in PI prevention.

Chapter six describes a mixed-methods study that further explored barriers and facilitators perceived by community nurses regarding PI prevention, whereby the quantitative phase (questionnaire) was followed by a qualitative phase (focus group interview). In total, 80 community nurses who were community nursing program coordinators (34.0%) and 155 community nurses (66.0%) participated in the survey. Five program coordinators and 11 community nurses participated in the focus group interviews. The results show that Indonesian community nurses were not accustomed

to PI prevention practices. They experienced the following barriers to PI prevention and treatment among older adults living at home: lack of time, inadequate equipment, limited opportunities for training, inadequate knowledge and skills and unavailable actual data about community-dwelling adults at risk of PIs. Community nurses assumed that sufficient knowledge and skills gained through training, a regulation that makes PI prevention a priority, and the availability of data about older adults living at home being at risk of PIs, could facilitate performing adequate preventive practices. The findings from this study highlight that PI prevention and treatment in older adults living at home should include: 1) more intensive collaboration between community nurses and informal caregivers (volunteers and family caregivers) where they exchange information about older people with a high risk of PIs at home 2) training and education about PI prevention and treatment for community nurses, including the implementation of guidelines, 3) prioritization of a PI prevention and treatment program and strengthening support from the leaders within the ministry of health and/or health departments with regard to PI prevention, including clarifying of roles and responsibilities of community nurses as primary care providers for older adults within their working area. In addition, further research should focus on which training and educational materials and practice support are appropriate for community nurses to tackle the PI problem among Indonesian community-dwelling older adults.

Chapter seven summarizes and discusses the main findings of all studies included in this dissertation, followed by theoretical and methodological considerations. It describes the implications for practice, policy and future research, following from the results of this dissertation. The main conclusion of this study is that pressure injuries appeared to be a serious problem among Indonesian community-dwelling older adults. Community nurses as formal caregivers and family as informal caregivers lack knowledge and practice about PI prevention and treatment. Furthermore, community nurses experience several barriers in performing such activities. Solutions are needed to address the problems, including strengthening the role of formal (i.e. community nurses) and informal caregivers (i.e. family caregivers and health care volunteers), and strengthening regulations that make PI prevention a priority program.

SAMENVATTING

Indonesië heeft te maken met een vergrijzende bevolking. Het aandeel van ouderen met een leeftijd van 60 jaar of ouder, die in Indonesië worden geclassificeerd als ouderen, ligt rond de 9.8% (26 miljoen). De meerderheid (90%) van deze ouderen woont samen met familieleden, die vaak voor hun ouders en andere familieleden zorgen. De zorg voor een ouder familielid vereist echter niet alleen de bereidheid om voor iemand te zorgen, maar ook specifieke kennis en vaardigheden. Ouderen hebben namelijk vaak te maken met één of meerdere chronische aandoeningen die leiden tot kwetsbaarheid, afhankelijkheid, morbiditeit en een verhoogde kans op mortaliteit, en het leveren van niet passende zorg of ondersteuning kan leiden tot negatieve gevolgen zoals bijvoorbeeld doorligwonden, ook wel decubitus genaamd.

Een decubituswond is een plaatselijke beschadiging van de huid en/of het onderliggende weefsel, die meestal optreedt als gevolg van druk of druk in combinatie met wrijving. Het hebben van een decubituswond beïnvloedt de kwaliteit van leven van mensen emotioneel, fysiek en sociaal en brengt zelfs een grotere kans op overlijden met zich mee. Hiernaast leidt het hebben van een of meerdere decubituswonden tot een zwaardere zorglast. Familieleden zijn veelal niet opgeleid voor taken zoals de preventie van decubitus.

Naar verwachting is dat de prevalentie van decubitus onder thuiswonende ouderen in Indonesië hoog. Deze verwachting is gebaseerd op een combinatie van factoren: de eerste factor is de vergrijzing van de bevolking, de tweede factor is een toename van de prevalentie van chronische aandoeningen die worden geassocieerd met decubituswonden zoals bijvoorbeeld hypertensie, beroerten, chronisch hartfalen, COPD en artritis. De derde belangrijke factor is dat ouderen in Indonesië meestal afhankelijk zijn van informele zorg en weinig tot geen formele zorg ontvangen.

Ouderen in Indonesië maken vaak geen of te weinig gebruik van formele zorg, ondanks het feit dat er zorgvoorzieningen bestaan en dat zorg voor de meesten inmiddels wordt vergoed door een nationale verzekering. Onderzoek heeft aangetoond dat bijna alle patiënten die waren opgenomen in een Indonesisch ziekenhuis en waarbij voorafgaand aan de opname al sprake was van een decubituswond, ouderen betrof die nog thuis woonden en daar geen professionele zorg ontvingen.

In het gunstigste geval zouden thuiswonende ouderen zorg moeten krijgen van eerstelijnszorgaanbieders, zoals wijkverpleegkundigen, die tegenwoordig de grootste groep zorgverleners in de eerste lijn in Indonesië vormen. Om hun zorgtaken, waaronder de preventie en behandeling van decubitus goed te kunnen vervullen, is

het essentieel dat ze beschikken over voldoende kennis, een positieve grondhouding en de juiste vaardigheden. Aangezien mantelzorgers een grote rol spelen bij de dagelijkse zorg voor hun oudere familieleden, is het belangrijk dat de wijkverpleegkundigen ook goed samenwerken met mantelzorgers bij het voorkomen en behandelen van decubituswonden.

Er is nog weinig bekend over de kennis, de attitude jegens en de uitvoering van decubituspreventie onder mantelzorgers in Indonesië. Daarnaast zijn er ook geen studies beschikbaar over de kennis, attitude en vaardigheden met betrekking tot decubitus van wijkverpleegkundigen in Indonesië of over hun opvattingen jegens de bevorderende en belemmerende factoren hierin.

In dit proefschrift worden studies beschreven over de prevalentie van decubitus onder thuiswonende ouderen in de regio Bandung (Indonesië) en factoren die hieraan gerelateerd zijn. Daarnaast worden in dit proefschrift de kennis, attitude en uitvoering van de decubituszorg, door zowel mantelzorgers als formele zorgverleners onderzocht, evenals de ervaren bevorderende en belemmerende factoren in de decubituszorg.

Hoofdstuk één introduceert de onderwerpen van dit proefschrift. Dit hoofdstuk geeft inzicht in de kenmerken van ouderen wonend in Indonesië en in de beschikbaarheid van gezondheidszorg voor deze doelgroep. Ook wordt uitleg gegeven over wat decubitus is, en wordt ingegaan op de manier waarop decubitus bij thuiswonende ouderen kan worden voorkomen. Het hoofdstuk eindigt met de vijf doelstellingen van dit proefschrift, te weten: 1) het onderzoeken van de prevalentie van decubitus onder thuiswonende ouderen in Bandung, Indonesië, samen met de kenmerken van hun decubituswonden, hun achtergrondkenmerken en hun gebruik van formele en informele zorg; 2) het ontwikkelen en psychometrisch testen van een instrument om kennis over, attitude jegens en uitvoering van decubituspreventie onder mantelzorgers te beoordelen; 3) het onderzoeken van de kennis over, attitude jegens en uitvoering van decubituspreventie onder mantelzorgers van thuiswonende ouderen in Indonesië; 4) inzicht verkrijgen in de kennis over en attitude jegens decubituspreventie onder wijkverpleegkundigen in Indonesië; 5) het krijgen van inzicht in de opvattingen van wijkverpleegkundigen in Indonesië over bevorderende en belemmerende factoren bij de decubituspreventie onder thuiswonende ouderen.

In **hoofdstuk twee** worden de resultaten gepresenteerd van een cross-sectionele studie gericht op de prevalentie van decubitus bij thuiswonende ouderen in een stad

in Indonesië, inclusief de ernst van de wonden, de kenmerken van de deelnemende ouderen en hun gebruik van formele en informele zorg. Driehonderdvijfentwintig (325) thuiswonende ouderen uit alle sub-districten in Bandung werden willekeurig geselecteerd om deel te nemen aan dit onderzoek. De Indonesische versie van de gevalideerde Landelijke Prevalentiemeting Zorgkwaliteit vragenlijst (LPZ-International), aangepast aan de Indonesische eerstelijnssetting, werd gebruikt in deze studie. De gegevensverzameling vond plaats bij elke deelnemer thuis en de resultaten laten een decubitusprevalentie zien van 10,8%. De prevalentie exclusief categorie 1 was 5,2%. Factoren geassocieerd met decubitus in deze populatie waren de mate van fysieke activiteit, een probleem in de zintuiglijke waarneming (beoordeeld met de Braden-schaal) en een voorgeschiedenis van een beroerte. Hoewel de meeste deelnemers met decubitus een zorgverzekering hadden, had geen van hen formele wondzorg en/of informatie over decubituszorg ontvangen van hun formele zorgverleners. Bovendien kregen de meeste ouderen geen preventieve decubituszorg van hun mantelzorgers. Om deze redenen moet meer thuis echt meer aandacht worden besteed aan decubituszorg door zowel formele en informele zorgverleners.

In **hoofdstuk drie** wordt de ontwikkeling en psychometrische evaluatie van de KAP-PI (Knowledge, Attitude and Practice of Family Caregivers at Preventing Pressure Injuries) beschreven. De KAP-PI is een instrument dat de kennis over, attitude jegens en uitvoering van decubituspreventie meet onder mantelzorgers van thuiswonende ouderen in Indonesië.

Er werden drie fasen van instrumentontwikkeling en evaluatie toegepast, waaronder het genereren van items, de instrumentconstructie en het psychometrische testen van het instrument. Een totaal van 372 mantelzorgers van thuiswonende ouderen werd willekeurig geselecteerd en nam deel aan dit onderzoek. Evaluatie van het instrument gebeurde met behulp van statistische analyses: de belangrijkste factoranalyse (PFA), bevestigende factoranalyse (CFA) en Cronbach's alfa. De originele versie van het KAP-PI-instrument is geschreven in de officiële Indonische taal (Bahasa). De definitieve versie van het KAP-PI-instrument bestaat uit een 12-item kennisdomein, een 9-item attitudedomein en een 12-item uitvoeringsdomein met Cronbach's Alpha-waarden van respectievelijk 0,83; 0,93 en 0,89. Het instrument bleek zowel betrouwbaar als valide te zijn.

Hoofdstuk vier presenteert de resultaten van een cross-sectionele studie over de kennis, attitude en uitvoering van decubituspreventie onder mantelzorgers van

thuiswonende ouderen in Indonesië. Er werd gebruik gemaakt van de papieren KAP-PI-vragenlijst. In totaal hebben 267 willekeurig geselecteerde mantelzorgers die bij hun oudere familielid woonden, deelgenomen aan dit onderzoek. De respons was 100%, wat betekent dat alle willekeurig geselecteerde mantelzorgers die aan de inclusiecriteria voldeden, geïnformeerde toestemming gaven en de vragenlijst invulden. De resultaten toonden aan dat in totaal 11% (n=30) van de deelnemers bij een ouder familielid woonde die leed aan een decubituswond, en dat 23% (n=61) van de deelnemers reeds langer dan vijf jaar zorgde voor hun familielid. Resultaten lieten verder zien dat 61% van de deelnemers onvoldoende kennis had over decubituspreventie, maar dat bijna alle deelnemers (94,4%) een positieve attitude hadden ten opzichte van decubituspreventie. Toch voerde 41,2% van de deelnemers de decubituspreventie op onvoldoende wijze uit. Uit een correlatieanalyse bleek dat het hebben van voldoende kennis en een positieve houding ten aanzien van decubituspreventie positief gecorreleerd was met de uitvoering ($p < 0,05$). De bevindingen van dit onderzoek vormen de eerste stap om inzicht te krijgen in de kennis over, attitude jegens en uitvoering van decubituspreventie onder mantelzorgers, en op basis van de resultaten van deze studie worden educatieve strategieën aanbevolen. Meer onderzoek is nodig om na te gaan welk educatief materiaal en welke educatieprogramma's effectief kunnen zijn om te gebruiken bij familieleden, en welke aanvullende professionele ondersteuning nodig is om de rol van mantelzorgers bij decubituspreventie te versterken.

In **hoofdstuk vijf** worden de bevindingen beschreven van een cross-sectionele studie naar de kennis over en attitude jegens de preventie van decubitus onder Indonesische wijkverpleegkundigen. Kennis werd gemeten met behulp van het gevalideerde Decubitus Kennis Assessment Instrument (PUKAT 2.0). De attitude jegens decubituspreventie werd gemeten met behulp van een vooraf ontworpen instrument dat elf uitspraken over decubituspreventie bevatte, met antwoordmogelijkheden op een vijfpunts Likert-schaal. De respondenten (n=235) bestonden uit 80 programmacoördinatoren wijkverpleging (34,0%) en 155 wijkverpleegkundigen (66,0%), allen werkzaam in een Public Health Centre (Puskemas) in Bandung.

Het responspercentage was 100% en het percentage goede antwoorden in het kennisdomein op de PUKAT 2.0 was 30,7%. Het thema 'preventie' had het laagste percentage goede antwoorden (20,8%). Deelnemers die een aanvullende decubitus-

of wondzorgtraining hadden gevolgd, hadden een hogere kennisscore in vergelijking met wijkverpleegkundigen die geen aanvullende decubitustraining hadden gehad (33,7% vs. 30,3%; Z = -1.995; p = 0,046). De mediane attitudescore was 44 (maximale score 55; bereik 28-55), hetgeen wijst op een positieve houding onder de deelnemers ten aanzien van decubituspreventie. Verder bleek: hoe hoger de opleidingsstatus van de deelnemers, hoe positiever de attitude (H = 11,773; p = 0,003). Dit onderzoek laat zien dat wijkverpleegkundigen hun basiskennis over decubituspreventie moeten verbeteren. Verder moet er onderzoek worden gedaan naar wat wijkverpleegkundigen nodig hebben om hun rol in de decubituspreventie te versterken.

Hoofdstuk zes beschrijft de resultaten van een onderzoek naar bevorderende en belemmerende factoren die wijkverpleegkundigen ervaren met betrekking tot decubituspreventie. In dit onderzoek werd gebruik gemaakt van gemixte methoden, waarbij een kwantitatieve fase in de vorm van een vragenlijst werd gevolgd door een kwalitatieve fase in de vorm van een focusgroep. In totaal hebben 80 wijkverpleegkundigen, die programmacoördinator wijkverpleging waren (34,0%) en 155 wijkverpleegkundigen (66,0%) deelgenomen aan het onderzoek. Vijf programmacoördinatoren en 11 wijkverpleegkundigen namen deel aan de focusgroepen. De resultaten lieten zien dat deelnemers weinig ervaring hadden met decubituspreventie bij thuiswonende ouderen. Zij ondervonden de volgende belemmeringen: gebrek aan tijd, onvoldoende middelen, beperkte opleidingsmogelijkheden, onvoldoende kennis en vaardigheden, en geen actuele gegevens over welke ouderen risico op decubitus hebben. Wijkverpleegkundigen waren van mening dat de huidige situatie verbeterd kon worden door scholing met de focus op verbetering van kennis en vaardigheden, regelgeving die van decubituspreventie prioriteit maakt, en de beschikbaarheid van gegevens over thuiswonende ouderen met een risico op decubitus. Verbetering van de preventie en behandeling van decubitus bij thuiswonende ouderen zou volgens wijkverpleegkundigen het volgende moeten omvatten: 1) intensievere samenwerking tussen wijkverpleegkundigen en mantelzorgers, waarbij ook informatie wordt uitgewisseld over welke ouderen een hoger risico op decubitus hebben; 2) training en opleiding over decubituspreventie en behandeling voor wijkverpleegkundigen, inclusief de implementatie van decubitusrichtlijnen; 3) prioritering van een decubitus preventie- en behandelprogramma binnen het ministerie van volksgezondheid, ondersteuning van professionele leidinggevenden op dit gebied en verduidelijking van rollen en

verantwoordelijkheden van wijkverpleegkundigen. Daarnaast zou verder onderzoek zich moeten richten op welke opleidingsmaterialen en praktijkondersteuning geschikt zijn voor wijkverpleegkundigen om het decubitusprobleem bij Indonesische thuiswonende ouderen aan te pakken.

Hoofstuk zeven gaat in op de belangrijkste bevindingen van de studies uit dit proefschrift, gevolgd door een theoretisch en methodologische reflectie. Ook worden de implicaties van de studies voor de praktijk, het beleid en toekomstig onderzoek beschreven. De belangrijkste conclusie van dit proefschrift is dat decubitus een zeer relevant probleem is bij thuiswonende Indonesische ouderen. Wijkverpleegkundigen en mantelzorgers missen kennis over en ervaring met het uitvoeren van decubituspreventie en behandeling. Daarnaast ervaren wijkverpleegkundigen verschillende barrières bij het uitvoeren van deze activiteiten. Er zijn oplossingen nodig om deze problemen aan te pakken, waaronder het versterken van de rol van formele (wijkverpleegkundigen) en informele zorgverleners (familieleden en vrijwilliger), en regelgeving die van decubituspreventie een programma maakt met prioriteit.

KESIMPULAN

Indonesia, sebagaimana negara-negara di dunia, sedang mengalami populasi menua. Sekitar 9,8% (26 juta) penduduk Indonesia berusia 60 tahun keatas. Berdasarkan peraturan perundang-undangan negara Indonesia, kelompok usia ini dikategorikan sebagai lanjut usia (lansia). Mayoritas lansia Indonesia (90%) tinggal bersama pasangan, anak dan atau anggota keluarga yang lain. Hal ini didasari oleh nilai-nilai budaya dan spiritual di Indonesia yang membuat anak-anak cenderung mengabdikan diri untuk merawat orang tua atau kerabat mereka yang lebih tua.

Seiring dengan pertambahan usia dan perubahan fisik, lansia sering mengalami satu atau lebih penyakit kronis yang menyebabkan mereka menjadi lemah, ketergantungan, cacat bahkan kematian. Oleh sebab itu, merawat lansia yang tinggal di rumah memerlukan pengetahuan dan keterampilan yang memadai daripada hanya sekedar keinginan untuk merawat mereka. Perawatan atau dukungan yang tidak tepat pada kelompok berisiko tinggi ini dapat menyebabkan kejadian yang tidak diinginkan seperti luka tekan. Luka tekan adalah kerusakan yang terlokalisir di kulit atau jaringan dibawahnya, yang biasanya muncul diatas tonjolan tulang akibat tekanan atau kombinasi tekanan dan pergeseran. Luka tekan ini memengaruhi kualitas hidup manusia secara fisik, emosional dan sosial bahkan meningkatkan resiko kematian. Luka tekan juga menyebabkan beban berat pada pelayanan kesehatan.

Sebuah penelitian menunjukan bahwa hampir semua pasien di Indonesia yang mengalami luka tekan sebelum masuk rumah sakit adalah lansia yang tinggal di rumah, dan tidak satupun dari mereka menerima pelayanan perawatan rumah oleh tenaga profesional sebelum masuk rumah sakit. Fakta ini mendorong pada asumsi tingginya angka kejadian luka tekan pada lansia yang tinggal di rumah. Asumsi ini didasarkan oleh beberapa keadaan yaitu: pertama adalah jumlah lansia yang hampir mencapai 10% total populasi; kedua adalah meningkatnya angka kejadian penyakit yang berhubungan dengan resiko luka tekan seperti stroke, gagal jantung kronis, penyakit paru obstruksi kronis dan rematik; serta yang ketiga adalah karena lansia di Indonesia sering tidak mengakses pelayanan formal walaupun fasilitas dan asuransi pelayanan kesehatan tersedia bagi populasi ini. Mereka lebih cenderung bergantung pada pelayanan informal daripada pelayanan kesehatan formal. Sementara, anggota keluarga biasanya tidak terlatih dalam hal pencegahan luka tekan ini.

Berdasarkan sistem pelayanan kesehatan Indonesia, lansia yang berada di komunitas dapat menerima pelayanan kesehatan di rumah dari pemberi pelayanan kesehatan primer, seperti perawat komunitas. Perawat komunitas mewakili proporsi terbesar dari staf pemberi pelayanan kesehatan primer di Indonesia dan merupakan penyedia perawatan profesional utama untuk orang yang tinggal di rumah. Namun, untuk memenuhi perannya dalam pencegahan dan pengobatan luka tekan di masyarakat, sangat penting bahwa perawat komunitas memiliki pengetahuan dan keterampilan yang memadai serta sikap yang positif

untuk melakukan kegiatan pencegahan luka tekan tersebut. Di sisi lain, karena anggota keluarga di Indonesia memiliki peran besar dalam merawat lansia di rumah, perawat komunitas juga harus berkolaborasi dengan keluarga dalam mencegah dan mengobati luka tekan.

Tidak banyak yang diketahui tentang pengetahuan, sikap dan praktik anggota keluarga mengenai pencegahan luka tekan pada lansia di Indonesia. Demikian pula, tidak ada penelitian yang berfokus pada pengetahuan dan sikap perawat komunitas Indonesia terhadap pencegahan luka tekan dan persepsi mereka tentang hambatan dan fasilitator terhadap pencegahan dan pengobatan luka tekan bagi lansia yang tinggal di rumah. Disertasi ini bertujuan untuk mengeksplorasi angka kejadian dan faktor-faktor yang berhubungan dengan kejadian luka tekan pada lansia yang tinggal di rumah, khususnya di kota Bandung, Indonesia. Lebih lanjut, disertasi ini mengkaji pengetahuan, sikap dan praktik keluarga serta perawat komunitas dalam pencegahan dan perawatan luka tekan serta persepsi perawat komunitas tentang hambatan dan fasilitator perawatan luka tekan pada lansia di rumah.

Bab satu memperkenalkan topik-topik pada disertasi ini. Ini memberikan gambaran tentang karakteristik lansia Indonesia, serta ketersediaan layanan kesehatan untuk populasi ini. Selanjutnya, diperkenalkan konsep luka tekan dan cara pencegahan luka tekan pada lansia di rumah. Bab ini diakhiri dengan penjabaran lima tujuan disertasi ini: 1) mengetahui prevalensi luka tekan pada populasi umum lansia di komunitas di Kota Bandung (Indonesia), bersama dengan karakteristik luka, karakteristik lansia dengan luka tekan dan penggunaan perawatan formal dan informal; 2) mengembangkan dan menguji psikometri instrumen untuk menilai pengetahuan, sikap dan praktik keluarga di Indonesia dalam mencegah luka tekan; 3) mengkaji pengetahuan, sikap dan praktik keluarga Indonesia terhadap pencegahan luka tekan; 4) mengkaji pengetahuan dan sikap perawat komunitas Indonesia terhadap pencegahan luka tekan; dan 5) untuk mengeksplorasi persepsi perawat komunitas tentang hambatan dan fasilitator pencegahan luka tekan di kalangan lansia di komunitas di Indonesia.

Bab dua menyajikan hasil studi *cross-sectional* yang berfokus pada angka kejadian luka tekan pada lansia yang tinggal di rumah di sebuah kota di Indonesia, termasuk tingkat keparahan luka, karakteristik partisipan, dan penggunaan perawatan formal dan informal. Tiga ratus dua puluh lima (325) peserta dipilih secara acak untuk berpartisipasi dalam penelitian ini, mewakili lansia yang tinggal di rumah dari semua kecamatan di kota Bandung. Kuesioner International Prevalence Measurement of Care Quality (LPZ-International) versi Indonesia yang telah divalidasi, yang disesuaikan dengan keadaan komunitas, digunakan dalam penelitian ini. Pengambilan data dilakukan di rumah masing-masing peserta. Hasil penelitian menunjukkan bahwa angka kejadian luka tekan secara keseluruhan adalah 10,8% dan angka kejadian kategori 1 adalah 5,6%. Faktor yang sangat terkait dengan luka tekan pada lansia yang tinggal di rumah adalah tingkat aktivitas fisik, masalah persepsi sensorik (dinilai dengan

Skala Braden), dan riwayat stroke. Meskipun sebagian besar partisipan yang mengalami luka tekan memiliki asuransi kesehatan, tidak satupun dari mereka telah menerima perawatan luka formal dan/atau informasi apapun tentang luka tekan dari penyedia layanan kesehatan formal mereka. Selanjutnya, sebagian besar keluarga tidak memberikan perawatan luka tekan di rumah bagi lansia. Oleh karena itu, perhatian lebih besar harus diberikan terhadap perawatan luka tekan, termasuk pencegahan dan pengobatan luka tekan oleh keluarga (pengasuh informal) dan tenaga kesehatan di pelayanan primer (formal).

Bab tiga menjelaskan pengembangan dan evaluasi psikometri dari instrumen untuk mengukur pengetahuan, sikap dan praktik keluarga untuk mencegah luka tekan pada lansia di komunitas di Indonesia (KAP-PI). Tiga fase pengembangan dan evaluasi instrumen digunakan, termasuk pembuatan item, konstruksi instrumen dan pengujian psikometri instrumen. Sebanyak 372 keluarga lansia di komunitas yang dipilih secara acak berpartisipasi dalam penelitian ini. Principal Factor Analysis (PFA), Confirmatory Factor Analysis (CFA) dan alfa Cronbach digunakan untuk evaluasi secara statistik. Versi asli instrumen KAP-PI ditulis dalam Bahasa Indonesia dengan menggunakan kosa kata dan struktur baku bahasa nasional Indonesia. Pengujian validitas dan reliabiltas terakhir instrumen KAP-PI menghasilkan 12 item domain pengetahuan, 9 item domain sikap, dan 12 item domain praktik dengan nilai Alpha Cronbach masing-masing 0,83, 0,93 dan 0,89 secara berurutan. Berdasarkan nilai-nilai ini maka instrumen dapat dinyatakan reliabel dan valid.

Bab empat menyajikan hasil studi *cross-sectional* untuk menguji pengetahuan, sikap, dan praktik keluarga tentang pencegahan luka tekan untuk lansia yang tinggal di rumah. Kuesioner KAP-PI berbasis kertas digunakan. Secara total, 267 keluarga yang dipilih secara acak yang tinggal bersama lansia berpartisipasi dalam penelitian ini. Tingkat respons adalah 100%, yang berarti bahwa semua keluarga yang dipilih secara acak yang memenuhi kriteria inklusi, memberikan persetujuan dan berpartisipasi mengisi kuesioner. Hasil menunjukkan bahwa secara total, 11% (n=30) dari peserta tinggal dengan lansia yang menderita luka tekan dan 23% (n=61) dari peserta merawat lansia selama lebih dari lima tahun. Sebanyak 61% keluarga memiliki pengetahuan yang cukup tentang pencegahan luka tekan, tetapi hampir semua peserta (94,4%) memiliki sikap positif terhadap pencegahan luka tekan pada lansia. Namun, 41,2% dari peserta memiliki praktik yang tidak memadai tentang pencegahan luka tekan. Analisis korelasi mengungkapkan bahwa memiliki pengetahuan yang cukup dan sikap positif terhadap pencegahan luka tekan berkorelasi positif dengan praktek ($p < 0,05$). Temuan penelitian merupakan langkah pertama untuk memahami pengetahuan, sikap dan praktik keluarga mengenai pencegahan luka tekan dan berdasarkan hasil ini, strategi pendidikan direkomendasikan. Penelitian harus dilakukan untuk mengeksplorasi materi pendidikan dan program pendidikan mana yang efektif untuk digunakan diantara anggota keluarga, serta

dukungan profesional mana yang diperlukan untuk memperkuat peran keluarga dalam pencegahan luka tekan.

Bab lima menyajikan hasil studi *cross-sectional* untuk mengkaji pengetahuan dan sikap perawat komunitas Indonesia tentang pencegahan luka tekan. Penelitian ini melibatkan perawat komunitas yang bekerja secara permanen di Puskesmas di Bandung, Indonesia. Pengetahuan diukur dengan menggunakan *Pressure Ulcer Knowledge Assessment Tool* yang telah divalidasi (PUKAT 2.0). Sikap diukur dengan menggunakan instrumen yang telah dirancang sebelumnya yang mencakup sebelas pernyataan pada lima poin skala Likert. Semua data dikumpulkan dengan menggunakan kuesioner berbasis kertas. Tingkat respons partisipan adalah 100%. Responden (n=235) terdiri dari 80 koordinator program keperawatan komunitas (34,0%) dan 155 perawat komunitas (66,0%). Persentase jawaban benar pada domain pengetahuan pada PUKAT 2.0 sebesar 30,7%. Tema 'Pencegahan' memiliki persentase jawaban benar terendah (20,8%). Perawat komunitas yang mendapatkan pelatihan luka tekan tambahan atau perawatan luka memiliki skor pengetahuan yang lebih tinggi dibandingkan dengan perawat komunitas yang tidak memiliki pelatihan luka tekan tambahan (33,7% vs 30,3%; Z = -1,995; p = 0,046). Nilai median sikap adalah 44 (skor maksimum 55; rentang 28-55), menunjukkan sikap positif diantara partisipan terhadap pencegahan luka tekan. Selanjutnya, semakin tinggi status pendidikan partisipan, semakin positif sikapnya (H = 11,773; p = 0,003). Penelitian ini menunjukkan bahwa perawat komunitas perlu meningkatkan pengetahuan dasar mereka dalam pencegahan luka tekan. Selanjutnya, penelitian harus dilakukan untuk mengeksplorasi apa yang dibutuhkan perawat komunitas untuk memperkuat peran mereka dalam pencegahan luka tekan.

Bab enam menjelaskan studi *mix-methods* yang mengeksplorasi lebih lanjut hambatan dan fasilitator yang dirasakan oleh perawat komunitas mengenai pencegahan luka tekan, dimana fase kuantitatif (kuesioner) diikuti oleh fase kualitatif (wawancara kelompok fokus). Secara total, 80 perawat komunitas yang menjadi koordinator program keperawatan komunitas (34,0%) dan 155 perawat komunitas (66,0%) berpartisipasi dalam survei. Lima koordinator program dan 11 perawat komunitas berpartisipasi dalam diskusi kelompok terfokus (*Focus group Discussion*). Hasil penelitian menunjukkan bahwa perawat komunitas Indonesia belum terbiasa dengan praktik pencegahan luka tekan. Mereka mengalami hambatan berikut untuk pencegahan dan pengobatan luka tekan pada lansia yang tinggal di rumah: kurangnya waktu, peralatan yang tidak memadai, kesempatan yang terbatas untuk pelatihan, pengetahuan dan keterampilan yang tidak memadai dan data aktual yang tidak tersedia tentang lansia di komunitas yang berisiko mengalami luka tekan. Perawat komunitas berasumsi bahwa pengetahuan dan keterampilan yang cukup diperoleh melalui pelatihan, peraturan yang menjadikan pencegahan luka tekan sebagai prioritas, dan ketersediaan data tentang lansia yang tinggal di rumah yang berisiko mengalami luka tekan dapat memfasilitasi

pelaksanaan praktik pencegahan. Temuan dari penelitian ini menyoroti bahwa pencegahan dan pengobatan luka tekan pada lansia yang tinggal di rumah harus mencakup: 1) kolaborasi yang lebih intensif antara perawat komunitas dan pengasuh informal (kader dan keluarga) di mana mereka bertukar informasi tentang lansia yang berisiko tinggi mengalami luka tekan 2) pelatihan dan pendidikan tentang pencegahan dan pengobatan luka tekan untuk perawat komunitas, termasuk penerapan pedoman, 3) pengutamaan program pencegahan dan pengobatan luka tekan dan penguatan dukungan dari pimpinan di lingkungan Kementerian Kesehatan dan/atau Departemen Kesehatan terkait untuk pencegahan luka tekan, termasuk memperjelas peran dan tanggung jawab perawat komunitas sebagai penyedia perawatan primer untuk lansia di wilayah kerja mereka. Selain itu, penelitian lebih lanjut harus fokus pada materi pelatihan dan pendidikan dan dukungan praktik mana yang sesuai bagi perawat komunitas untuk mengatasi masalah luka tekan pada lansia di Indonesia.

Bab tujuh merangkum dan membahas temuan-temuan utama dari semua studi dalam disertasi ini, diikuti dengan pertimbangan teoretis dan metodologis. Ini menjelaskan implikasi untuk praktek, kebijakan dan penelitian masa depan berdasarkan hasil studi-studi pada disertasi ini. Kesimpulan utama dari penelitian ini adalah bahwa luka tekan menjadi masalah serius di kalangan lansia di masyarakat Indonesia. Perawat komunitas sebagai pengasuh formal dan keluarga sebagai pengasuh informal kurang memiliki pengetahuan dan praktik tentang pencegahan dan pengobatan luka tekan. Selanjutnya, perawat komunitas mengalami beberapa hambatan dalam melakukan kegiatan tersebut. Solusi diperlukan untuk mengatasi masalah tersebut, termasuk penguatan peran formal (yaitu perawat komunitas) dan pengasuh informal (yaitu keluarga dan relawan kesehatan/ kader), dan penguatan peraturan yang menjadikan pencegahan luka tekan sebagai program prioritas.

IMPACT

This dissertation gives a first view on the problem of pressure injuries among Indonesian community-dwelling older adults. The studies in this dissertation provide a comprehensive basis of information from the individual level to the institutional/policy level to stimulate further development of community nursing practice and education in preventing pressure injuries among community-dwelling older adults. The studies in this dissertation focused on 1) the prevalence of PIs among older adults living at home; 2) the family caregivers' knowledge, attitude and practice in PI prevention; 3) community nurses' knowledge and attitude toward PI prevention; and 4) community nurses' perception of barriers and facilitators in PI prevention.

This chapter reflects on the impact of the studies of this dissertation on practice, education, and society. Furthermore, activities that will be performed to disseminate the study results are discussed.

RELEVANCE

Societal relevance

Indonesia is a middle-income country experiencing an ageing population [1]. Around 23 million of its people are older adults (60 years of age or older) living at home, mostly with their family members and are considered community-dwelling older adults.[2-4] The prevalence of chronic diseases (i.e. hypertension, arthritis, diabetes and stroke) among this vulnerable population significantly increased in the last ten years leading to more frailty, care dependency and disabilities.[5] Inappropriate care for this vulnerable population could lead to adverse events such as pressure injuries (PIs). However, Indonesian older adults often do not access formal care even though health care services currently are available for this population.[2, 6, 7] Consequently, these older adults primarily receive care provided by their family members even though the majority of them (78.8%) have a healthcare insurance.[6, 8-10] No information is available with regard to whether or not older adults received appropriate care from family caregivers. In fact, almost all patients in Indonesian hospitals who suffered from PIs before hospital admission were older adults who lived at home, and none had received home care services before hospital admission.[9] The only way to investigate such real life situations is by directly examining older adults and their family caregivers in the general population. Our studies are the first in Indonesia investigating PIs among

community-dwelling older adults, irrespective of whether they used health care services. We found a prevalence rate of PIs among 325 community-dwelling older adults of 10.8%. Based on this number and considering the number of inhabitants in Bandung, it is expected that around 11,000 to 32,000 people aged 60 years or older living at home suffer from Pis.[11] Therefore, our studies reveal a serious problem in society and this must raise awareness of the PI problem in the community among older adults and their family caregivers, program coordinators of the health department, the municipalities and research locations.

Therefore, first, the older adults and their family caregivers were informed about our study objectives and and why these are important. After collecting the data, we also discussed with them about pressure injuries, including the definition, symptoms, causes, impact and how to prevent PIs at home. Second, the municipalities were also informed about the study objectives and the results. We discussed which support they can provide regarding this issue. Third, we collaborated closely with the coordinators of the health department starting from the early beginning of our studies. This collaboration built their interest in thinking and talking about pressure injuries among community-dwelling older adults and reflecting on what this means concerning community nursing programs. Next to their role as program planners in the health department, the coordinators do realize clearly now that the problem of pressure injuries among community-dwelling older adults must be a priority concern even though, at this moment it is not in the planned program.

It is clear that our results stress the importance of preventing PIs among community-dwelling older adults through comprehensive planning at individual, family, community and institutional / health care organisational levels. Considering the fact that pressure injuries lead to an economic burden on healthcare systems,[12, 13] affect people's quality of life emotionally, physically and socially[14-16] and even pose a higher risk of dying,[17, 18] our results will be of interest for government, scientists, academic personnel and health insurance companies.

Family and community nursing practice and education

Pressure Injuries (PIs) are a global health care problem. In the community, the prevalence and incidence rates of PIs are high in populations at risk, such as community-dwelling older adults.[19] This is also the case in Indonesia. As the first in Indonesia, our studies gave insight into the problem of pressure injuries among

community-dwelling older adults. With a prevalence rate of >10%, our results show that pressure injuries among older adults living at home call for serious attention and strategies to address this problem should become a priority.

Due to the nature of their role, community nurses could take the lead in decreasing the prevalence rate of PIs among community-dwelling older adults.[20-24] Community nurses perform various activities, including health promotion, disease management, and public health activities, such as community empowerment.[20] As this is in line with PI prevention activities, this should also be one of their major official responsibilities. The results of this dissertation might increase community nurses' awareness to pay more attention to this problem in their working area.

This dissertation also showed that more than half of the PIs found in our population were classified as being the preventable category 1. Therefore, it is essential that community nurses provide family caregivers with essential knowledge and skills regarding PI prevention among older adults at home, as well as support the improvement of self-care management among older adults.

In this dissertation, we developed and validated the "KAP-PI" (Knowledge, Attitude and Practice of Pressure Injuries) instrument to assess family caregivers' knowledge, attitude, and practice in preventing pressure injuries. This instrument is available to be used in community care, education and research to assess the performance of family caregivers in preventing pressure injuries. The KAP-PI instrument could for instance assess family caregivers' knowledge, attitude and practice before and after conducting health education activities.

This dissertation also provided insight into the knowledge and attitude of community nurses toward PI prevention in Bandung city. To deliver evidence-based PI prevention and/or treatment, community nurses need adequate knowledge and skills.[19] Furthermore, understanding their attitudes towards PI prevention is important because a positive attitude is considered to be a precursor to preferred behaviour.[25] The European Pressure Ulcer Advisory Panel (EPUAP), National Pressure Injury Advisory Panel (NPIAP) and Pan Pacific Pressure Injury Alliance (PPPIA) recommend to regularly assess the knowledge and attitude of health care professionals on pressure injury care.[19] In addition, former studies showed that knowledge and attitude correlate positively with the practice of PI prevention.[26, 27] Various studies evaluated nurses' knowledge about and attitude towards PI prevention (8-21), but most of these studies focused on nurses working in hospitals or nursing homes. Our study in Indonesia (the

first in the context of the community,) shows that community nurses in a large city in Indonesia had considerable knowledge deficiencies but a positive attitude towards PI prevention. Therefore, we recommend training to increase their fundamental understanding and skills of PI prevention and treatment, based on international guidelines. Planning, developing and providing the training could be interesting for academic personnel, coordinators of the health department, the Indonesian Community Nursing Association, and the Indonesian Wound Ostomy and Continence Nursing Association.

Dissemination of findings

In an academic setting, awareness can be created by publishing and presenting the study results in national and international journals and on conferences. A number of articles has already been published. Our first article, titled "The prevalence of pressure ulcers in community-dwelling older adults: a study in an Indonesian city", was one of the most frequently read articles in the International Wound Journal (in the year of publication). Next to the publications, presentations about study results were given in various (inter)national scientific conferences. In addition, we disseminate the results to the municipalities of the study area through direct presentations in front of the leaders and provide them with the research report.

The collaboration with the health department aided the dissemination of our research findings. For instance, when recruiting community nurses in Bandung city for the studies described in chapters five and six, the results described in chapter 2 were presented to these community nurses. This contributed to their awareness of the pressure injury problem. Moreover, we reported our findings to program coordinators of the health department in Bandung city. Following this approach, this provides opportunities to further disseminate the findings to other relevant stakeholders.

To disseminate the results and build awareness on an even wider scale, it is important to disseminate our study results to the Indonesian National Nurse Association, the Indonesian Community Nursing Association and the Indonesian Wound Ostomy and Continence Nursing Association. Members of these associations include nurses from all Indonesian provinces. It is expected that the outcomes of our studies will contribute to the prevention of pressure injuries among community-dwelling older adults in Indonesia.

REFERENCES

1. Nikkil Sudharsanan DEB. The Demography of Aging in Low- and Middle-Income Countries: Chronological versus Functional Perspectives. In: Majmundar MK HM, editor. National Academies of Sciences, Engineering, and Medicine; Division of Behavioral and Social Sciences and Education; Committee on Population Future Directions for the Demography of Aging: Proceedings of a Workshop. Washington (DC): National Academies Press (US); 2018.
2. Badan Pusat Statistik-Statistics Indonesia. Statistik penduduk lanjut usia 2021 [Internet]. Badan Pusat Statistik. 2021 [cited 27 December 2021]. Available from: https://www.bps.go.id/publication/2021/12/21/c3fd9f27372f6ddcf7462006/statistik-penduduk-lanjut-usia-2021.html.
3. Pemerintah Negara Republik Indonesia. Peraturan Menteri Kesehatan Republik Indonesia nomor 67 Tahun 2015 tentang Penyelenggaraan pelayanan kesehatan lanjut usia, (2015).
4. Pemerintah Negara Republik Indonesia. Undang-Undang No.13 Tahun 1998 tentang Kesejahteraan Lanjut Usia. In: Indonesia MNSNR, editor. Jakarta: Menteri Negara Sekretaris Negara Republik Indonesia; 1998.
5. Kementerian Kesehatan Republik Indonesia: Badan Penelitian dan Pengembangan Kesehatan. Hasil Utama Riskesdas 2018. Jakarta: Kementerian Kesehatan Republik Indonesia; 2019.
6. Sari SP, Everink IH, Sari EA, Afriandi I, Amir Y, Lohrmann C, et al. The prevalence of pressure ulcers in community-dwelling older adults: a study in an Indonesian city. International Wound Journal. 2019;16(2):534-41.
7. Badan Pusat Statistik-Statistics Indonesia. Statistik Penduduk Lanjut Usia 2019 [Internet]. ©Badan Pusat Statistik; 2020:106. Available from: https:// www. bps. go. id/ publi cation/ downl oad. html? nrbvfeve= YWIxN 2U3NW RiZTYzMGUw NTExM GFINT Ni& xzmn= aHR0c HM6Ly 93d3c uYnBz LmdvL mlkL3 B1Ymx pY2F0 aW9uL zIwMTkvMTIvMjAv YWIxN 2U3NW RiZTYzMGUw NTExM GFINT NiL3N 0YXRp c3Rpay1wZW 5kdWR 1ay1s YW5qd XQtdX NpYS0 yMDE5 Lmh0b Ww% 3D& twoad fnoar feauf= MjAyM S0wMS 0xOSA xNTox NDo0NQ% 3D% 3D.
8. Amir Y, Tan FE, Halfens R, Lohrmann C, Schols J. Pressure ulcer prevalence and care in indonesian hospitals: a multicenter, cross-sectional evaluation using an extended donabedian model. Ostomy Wound Manage. 2017;63(2):8-23.
9. Amir Y, Lohrmann C, Halfens RJ, Schols JM. Pressure ulcers in four Indonesian hospitals: prevalence, patient characteristics, ulcer characteristics, prevention and treatment. International Wound Journal. 2017;14(1):184-93.
10. Amir Y, Halfens RJ, Lohrmann C, Schols JM. Pressure ulcer prevalence and quality of care in stroke patients in an Indonesian hospital. J Wound Care. 2013;22(5):254, 6, 8-60.
11. L. Naing TW, B.N. Rusli. Practical Issues in Calculating the Sample Size for Prevalence Studies. Orofacial Sciences 2006;1:9-14.
12. Kandilov AMG, Coomer NM, Dalton K. The Impact of Hospital-Acquired Conditions on Medicare Program Payments. Medicare & Medicaid Research Review. 2014;4(4):E1-E23.
13. Russo CA, Steiner C, Spector W. Hospitalizations related to pressure ulcers among adults 18 years and older, 2006: statistical brief# 64. 2006.

14. Gorecki C, Brown JM, Nelson EA, Briggs M, Schoonhoven L, Dealey C, et al. Impact of pressure ulcers on quality of life in older patients: a systematic review. Journal of the American Geriatrics Society. 2009;57(7):1175-83.
15. Esson L, Spilsbury K, Nelson E, Cullum C. Inpatients felt that pressure ulcers had emotional, mental, physical, and social effects on quality of life because nurses did not adequately treat or manage their pain or discomfort. Evidence-based nursing. 2007;10(4):128.
16. Jackson DE, Durrant LA, Hutchinson M, Ballard CA, Neville S, Usher K. Living with multiple losses: Insights from patients living with pressure injury. Collegian. 2018;25(4):409-14.
17. Landi F, Onder G, Russo A, Bernabei R. Pressure ulcer and mortality in frail elderly people living in community. Arch Gerontol Geriatr. 2007;44 Suppl 1:217-23.
18. Jaul E, Calderon-Margalit R. Systemic factors and mortality in elderly patients with pressure ulcers. Int Wound J. 2015;12(3):254-9.
19. European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and treatment of pressure ulcers/injuries: clinical practice guideline. The international guideline. Emily Haesler (Ed.). EPUAP/NPIAP/PPPIA: 2019. Available from: https:// www. epuap. org/ pu-guide lines/. 2. Corbett LQ, Funk M, Fortunato G, O'Sulliva
20. Pemerintah Negara Republik Indonesia. Peraturan Pelaksanaan Undang-Undang Nomor 38 Tahun 2014 Tentang Keperawatan 26 (2019).
21. Kementerian Kesehatan Republik Indonesia. Keputusan Menteri Kesehatan Republik Indonesia Nomor Hk.01.07/Menkes/425/2020 Tentang Standar Profesi Perawat HK.01.07/MENKES/425/2020 (2020).
22. Pemerintah Negara Republik Indonesia. Peraturan Menteri Pendayagunaan Aparatur Negara Dan Reformasi Birokrasi Republik Indonesia Nomor 35 Tahun 2019 Tentang Jabatan Fungsional Perawat, Nomor 35 (2019).
23. Kementerian Kesehatan Republik Indonesia. Peraturan Menteri Kesehatan Republik Indonesia Nomor 43 Tahun 2019 Tentang Pusat Kesehatan Masyarakat (2019).
24. Kementerian Kesehatan Republik Indonesia. Peraturan Menteri Kesehatan Republik Indonesia Nomor 40 Tahun 2017 Tentang Pengembangan Jenjang Karir Profesional Perawat Klinis (2017).
25. Ajzen I. The theory of planned behaviour: Reactions and reflections. Psychology & Health. 2011;26(9):1113-27.
26. Beeckman D, Defloor T, Schoonhoven L, Vanderwee K. Knowledge and Attitudes of Nurses on Pressure Ulcer Prevention: A Cross-Sectional Multicenter Study in Belgian Hospitals. Worldviews on Evidence-Based Nursing. 2011;8(3):166-76.
27. Barakat-Johnson M, Barnett C, Wand T, White K. Knowledge and Attitudes of Nurses Toward Pressure Injury Prevention: A Cross-Sectional Multisite Study. Journal of wound, ostomy, and continence nursing : official publication of The Wound, Ostomy and Continence Nurses Society. 2018;45(3):233-7.

ACKNOWLEDGMENTS

"*Alhamdulillahirabbilálamiin*". I praise Allah, the Most Compassionate, Most Merciful, for His grace and blessings so that I can complete my PhD at Maastricht university. Completing the PhD trajectory was a great journey. Therefore, I would like to thank all the incredible people who meant a lot on the journey. I wish I could mention all anonymous names.

My deepest gratitude goes to:

My supervisory team: Prof. dr. Jos M.G.A. Schols, Prof. dr. Christa Lohrmann, dr Ruud Halfens, Dr Irma H.J. Everink, and Dr Yufitriana Amir. Thank you very much for your remarkable supervision. I feel so blessing having all of you as my supervisors. You are a perfect team. I would say that I am the luckiest PhD student ever because I have a perfect team of supervisors like you. Your care is crystal clear because you have supervised and supported me not only in my academics but also in my personal life.

The assessment committee: Prof. dr. Sandra Zwakhalen, Prof. dr. Rob A. de Bie, Dr Hartiah Haroen, Prof. dr. Jan Kottner and Prof. dr. Milena Pavlova. Thank you for your time and willingness to assess and provide feedback on my thesis.

The high-skilled co-authors: Prof. dr. Dimitri Beeckman, Prof. dr.Zeena Moore and Prof. DR. Yati Afiyanti, S.Kp., MN. I am honoured to work with you. Thank you for giving me a chance to learn from you.

The courageous paranymphs: dr. Fury Maulina and dr. Alessandra Enrica Kemna. I appreciate your willingness to accompany me on the stage.

Health Department of Bandung city, all community nurses who participated in my studies, and all participants and participating municipalities in Bandung. I appreciate your cooperation in facilitating and participating in my study.

The supervisory team of The Joint Doctoral Program Nursing Science Maastricht University (the Netherlands), Institute of Nursing Science Medical University of Graz (Austria) and Health Division Bern University of Applied Science (Switzerland): Prof. dr. Jos Schols, DR Ruud Halfens, Prof. dr. Sandra Zwakhalen, Prof. dr. Christa Lohrmann and Prof. dr. Sabine Hahn. Thank you for all of the sharing and motivation sessions.

The members of the Doctoral Program Nursing Science: Friederike, Simone, Viviene, Priscilla, Gerhilde, Nursis, Manuela, Selvedina, Lena, Nick, Franziska, Christoph, Caroline, Silvia, Monica, Baptiste and Maisa. Thank you for all the togetherness, sharing, laughing and academic discussions. My appreciation also goes to Sandra, who always informed me about the program.

The head of the department of Health Services Research, Prof. dr. Dirk Ruwaard, and PhD coordinator of CAPRHI, Hannerieke van der Boom. Thank you for welcoming and reminding me of all academic requirements.

The secretaries of the HSR department and LPZ: Brigitte, Suzanne, Saskia, and Joanna. Thank you for facilitating me with all necessary documents and working facilities during my PhD trajectory. Thank you for your fast response whenever I had required documents from my scholarship or had problems with my stay in Maastricht.

The IT supports: Arnold and FHML ICT support team. Thank you for always providing suggestions and solutions for my IT problems.

Statistical support: Prof. dr. Gerard van Breukelen and Desri Kristina Silalahi, MSi. Thank you for giving me an insight into the appropriate statistical analysis for my study.

Proofread support: Barbara Greenberg. I appreciate your suggestions and corrections on some of my manuscripts. Thanks to Marissa and Neslihan as well, who helped me with language issues in my writing.

PhD funding: the Indonesia Endowment Fund for Education (LPDP) and Ministry of Research, Technology and Higher Education of the Republic of Indonesia (BUDI-LN Scholarship). Thank you for all the funding support in my PhD trajectory. It is the best scholarship in Indonesia that I have ever known.

The previous and current periods of Rector Universitas Padjadjaran, Prof. Dr. med. Tri Hanggono Achmad, dr. and Prof. Dr. Rina Indiastuti, M.SIE. Thank you for the opportunity and your permission for me to pursue the doctoral program.

Dean Faculty of Nursing Universitas Padjadjaran: Prof. DR. Henny Suzana Mediani, M.Ng. (previous period) and Prof. DR. Kusman Ibrahim, S.Kp., M.NS. (current period). Thank you for your motivation and permission for me to obtain the doctoral program.

All academic staff and secretaries at Universitas Padjadjaran, both at the faculty and university levels. Thank you for always helping me to provide the documents needed in my PhD trajectory.

All collegues in faculty of nursing, Universitas Padjadjaran. I appreciate all the attention, caring and motivation during my PhD trajectory.

All the teachers who helped and supported me along the way.

My lovely husband, Muhammad Haris, and my gorgeous daughter, Maryam Hafizhah Khafiyya. You are my pain killers and dopamine. Having you in my life is the greatest blessing from Allah. Every day, you bring me the spirit to complete my study. It is more pleasant than a cup of coffee.

My extended families: aunties (especially Ibu Ayang, who substitutes for my mother's love), uncles, parents-in-law, cousins, nephews, nieces, stepfamily, sisters and brothers-in-law that I cannot mention one by one. Thank you for all the love, prayers and attention given directly or indirectly to me. Without your support, it would be impossible to reach this achievement.

My close friends and your families who love me unconditionally. I feel you guys as my sisters and brothers rather than friends. I cannot mention your name individually, but I believe you know your position in my heart. Thank you for always warming and charming my heart. I know you guys are always there whenever I need you.

PhD students from Indonesia at Maastricht University: Adryan, Untung, Nael, Carla, Fauzan, Dexon, Joshua, Alya, Bobby, Wawan, Fury, Tricia, Tari, Nurul, Bona. We spent time together eating, travelling, and sharing. I will miss those moments.

Families in Maastricht: Bu Ati, Uni Upie and family, Tante Julin, Mas Ary and family, Mba Masni and family, Kang Aep and family, Mba Wanda and family, Mba Juli and families and all friends from other cities of the Netherlands and Belgium. Thank you for all the beautiful moments and togetherness.

Finally, I dedicate this achievement to my mother (Misrawati), father (Syahril Radjanin), Raymond Purbaya and Muhammad Benny Permana (my brothers). None of them is seeing this achievement. I experienced sadness and traumatic events during my

studies because of losing them. My mother left me when I was 15 and just started senior high school. My younger brother (Bang Mon) passed away when I was in the last month of my bachelor's degree. My father died when I was in the last month of my master's degree. And the last one, my oldest brother (Bang Ben) left me the same day I submitted my dissertation. I have no words to describe how broken my heart is. However, I believe that they are at peace and proud of me.

ABOUT THE AUTHOR

Sheizi Prista Sari was born on 6 May, 1982 in Padang Panjang, West Sumatera, Indonesia. She lived in her hometown until completing senior high school at the SMUN 1 in Padang Panjang. Losing her mother when she was 15 brought her to a dream to become a health care professional. In 2000, she continued her study in the faculty of nursing at Universitas Padjadjaran, Bandung, Indonesia. In 2005, she obtained a bachelor's degree in nursing science and completed a one-year internship program afterwards to become a registered nurse.

Shortly after graduation, Sheizi passed the national examination for Indonesian government employees. She became a lecturer in 2005 in the faculty of nursing at Universitas Padjadjaran with three main tasks: education, research and community service. In 2012, she obtained a master's degree in community health nursing at Universitas Padjadjaran. While completing her master's degree, she was involved in activities at the provincial level dedicated to strengthening community-based health care services in West Java province. She received an award from West Java's Governour in 2012 because of her dedication to those activities.

In 2016, Sheizi got an opportunity to join two weeks in-service training of advanced geriatric nursing curriculum development in Japan, organized by JICA Japan and the Ministry of Health of Republic Indonesia. After joining the training, she became a national trainer of Basic Geriatric Nursing training for hospital nurses arranged by the Ministry of Health and hospitals in Indonesia. Her experiences in Japan learning about health care services for older adults led her to focus her research on the quality of life of community-dwelling older adults. Simultaneously, she was involved in national training for vocational nursing school educators on improving the quality of community health services through interprofessional collaboration at the education level.

In 2017, Sheizi decided to develop her research skills and complete her highest level of education in the doctoral program. After successfully getting a scholarship from the Indonesia Endowment Fund for Education (LPDP) and the Ministry of Research, Technology and Higher Education of the Republic of Indonesia (BUDI-LN Scholarship), she started her PhD trajectory at the department of Health Services Research at Maastricht University in May 2018. She worked under supervision from Prof. dr. Jos M.G.A. Schols, Prof. dr. Christa Lohrmann, Dr Ruud Halfens, Dr Irma H.J. Everink, and Dr Yufitriana Amir. In addition to conducting her PhD trajectory, she attended training and courses at Maastricht University. She also joined regular PhD student meetings involving PhD nursing students from the Department of Health Services Research Maastricht University (the Netherlands), Institute of Nursing Science Medical University of Graz (Austria) and Health Division Bern University of Applied Science (Switzerland). To communicate and present her research, Sheizi published several articles and joined international conferences. After obtaining her PhD, she will continue working as a lecturer in the Faculty of Nursing at Universitas Padjadjaran with the motto "being the best is not the goal, giving the best is the most important."

PUBLICATIONS

International Publications

Sari SP, Everink IHJ, Lohrmann C, Amir Y, Sari EA, Halfens RJG, et al. Development and psychometric evaluation of an instrument to assess Knowledge, Attitude and Practice of Family Caregivers at Preventing Pressure Injuries (KAP-PI) in Indonesian community-dwelling older adults. BMC Nursing. 2022;21(1):222.

Sari SP, Everink IHJ, Amir Y, Lohrmann C, Halfens RJG, Moore Z, Beeckman D, Schols JMGA. Knowledge and attitude of community nurses on pressure injury prevention: a cross-sectional study in an Indonesian city. International Wound Journal. 2021;18(4):422-31.

Sari SP, Everink IHJ, Sari EA, Afriandi I, Amir Y, Lohrmann C, Halfens RJG, Schols JMGA. The prevalence of pressure ulcers in community-dwelling older adults: a study in an Indonesian city. International Wound Journal. 2019;16(2):534-41.

Lukman M, Ibrahim K, Yani DI, **Sari SP**, Juniarti N. Exploring strategies to improve the performance of community health volunteers for tuberculosis care and prevention: A qualitative study. International Journal of Community Based Nursing and Midwifery. 2019;7(4):270-8.

National Publications

Mukhtar H, **Sari SP**, Sari EA. Faktor risiko yang mempengaruhi tingkat keparahan luka tekan pada lansia di masyarakat. Journal of Health Science and Prevention. 2019 Mar 29;3(1):32-8.

Sari EA, **Sari SP**, Pratiwi SH. Community Self-Efficacy of Coronary Heart Disease Based on Characteristic Risk Factors. NurseLine Journal. 2018 Nov 25;3(2):65-71.

Yuliani S, Widianti E, **Sari SP**. Resiliensi remaja dalam menghadapi perilaku bullying. Jurnal keperawatan BSI. 2018 Jul 9;6(1).

Putra DM, Juniarti N, **Sari SP**. Kebutuhan Masyarakat Sekolah Tentang Media Edukasi Dalam Meningkatkan Personal Hygiene Pada Anak Di SD Sukagalih. Jurnal Keperawatan Komprehensif (Comprehensive Nursing Journal). 2018 Feb 12;4(1):13-24.

Juniarti N, **Sari SP**, Yani DI. Analysis and evaluation of implementation of undergraduate nursing curricullum for family nursing in West Jawa. Indonesian Nursing Journal of Education and Clinic (Injec). 2017 Feb 8;1(2):103-14.

Witdiawati W, Rahayuwati L, **Sari SP**. Studi Kualitatif Pola Kehidupan Pasien Kanker Payudara. Jurnal Keperawatan Padjadjaran. 2017;5(1).

Witdiawati W, Rahayuwati L, **Sari SP**. Enculturation in the life pattern of breast cancer patients: An ethno-nursing study on sundanese women. Jurnal Ners. 2017;12(1):99-107.

Sari RF, **Sari SP**, Hernawaty T. Resiliensi Remaja Stunting: Sebagian Merasa Sulit Bangkit dan Bertahan Menghadapi Permasalahan. Jurnal Keperawatan BSI. 2017 Dec 12;5(2).

Silalahi DK, Mukhtar H, **Sari SP**, Sari EA, Barus DT. The Effect Analysis of Braden Scale on Pressure Ulcer in Community-Dwelling Older Adults. ComTech: Computer, Mathematics and Engineering Applications. 2020 Dec 16;11(2):83-8.

Kusuma DP, **Sari SP**, Nurhidayah I. Hubungan persepsi dengan perilaku ibu membawa balita ke posyandu. Jurnal Keperawatan Padjadjaran. 2015;3(1).

Windyastuti E, **Sari SP**, Lukman M, Yamin A. Faktor-Faktor Yang Berhubungan Dengan Rencana Pemilihan Pertolongan Persalinan Pada Ibu Hamil Di Kelurahan Margawati Wilayah Kerja Puskesmas Pasundan Kabupaten Garut. Jurnal Kesehatan Kusuma Husada. 2015 Jun 29.

Sukarna N, Lukman M, **Sari SP**. Faktor-Faktor Yang Berhubungan Dengan Perilaku Skrining TB Pada Kontak Serumah di Kabupaten Pandeglang. Jurnal Medika Cendikia. 2015 Dec 27;2(02):1-9.

Internationally Published Abstract of Conferences

The 7th Padajdjaran International Nursing Conference. Knowledge and attitude of community nurses on pressure injury prevention: a cross-sectional study in an Indonesian city. Bandung-Indonesia, September 2020.

The 17° European Doctoral Conference in Nursing Science. The prevalence of pressure ulcers in community-dwelling older adults: a study in an Indonesian city. Maastricht, June 2018.

International conference “Disaster Management and Infection Control”. Meeting the nutritional needs of children under five years during disaster: stake holder perspective in a red zone of West Java Province. Bandung Indonesia, 18 – 19 July 2017.

International conference “Improving Quality of Services Through Clinical Teaching and Practices: Preparing Global Health Challenges”. Effect of community-based education to self-efficacy among
Type 2 diabetes mellitus patients in Bandung, West Java Province, Indonesia. Jakarta Indonesia, 11-12 April 2017.

International seminar of health sciences. The correlation between perception and disease prevention behaviors among people who have a genetic derivative of diabetes. Tasikmalaya Indonesia, 22 April 2017.

International nursing conference the association of Indonesian nurse education center AINEC. Analysis and evaluation implementation of undergraduate nursing curriculum for family nursing and community health nursing in west java Indonesia. Bangka Belitung, Indonesia 13-14 October 2016.

International nursing conference. The role of family in supporting breast cancer survivors. Bandung Indonesia, 16 March 2016.

International nursing conference in cancer care nursing. The effect of the online support caring application for quality of life of breast cancer survivors. Vancouver Canada, 8-11 July 2015.

International nursing conference. The condition of stress of elderly after 9 month post-earth-quake west java 2009. Yogyakarta Indonesia, 16 March 2015.

Books, Awards, and Innovations

Rahayuwati L, **Sari SP**. Studi Ethnography-Ethnonursing: Konsep Dan Aplikasi Penelitian Tentang Kehidupan Pasien Kanker Payudara. Unpad Press; 2018.

Modul of Training for Trainer (TOT): Nursing Center (Sentra Keperawatan} in Improving Community Health Services, ISBN 97 A-6o2-14422-5-A; 2017.

Innovator of Dacin Inovasi Permata Hati (Innovation Product for Society Services); 2013.

Innovator of Revitalization of Community Services in West Java ; 2012.