Personalized care according to patient preferences as a new approach in providing nursing care for society: current and the future era

Coastal community health

Satriya Pranata, M.Kep.,PhD

INTERNATIONAL NURSING CONFERENCE
STIKES MALUKU HUSADA
2025

DISEASES IN COASTAL COMMUNITIES IN INDONESIA: A REVIEW

September 2016 · Public Health of Indonesia 2(3):141-148
DOI: 10.36685/phi.v2i3.84
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Ramadhan Tosepu · Devi Effendy · Hartati Bahar · Show all 6 authors · Pitrah Asfian

Travel Med Infect Dis. 2025 Sep-Oct;67:102913. doi: 10.1016/j.tmaid.2025.102913. Epub 2025 Sep 29.

Prevalence of health problems related to marine tourism among travelers in the Andaman Coast provinces of Southern Thailand

Vitat Tipphayawong [1], Pat Chantapinya [1], Ranida Techasuwanna [2], Amornphat Kitro [3]

Affiliations + expand

PMID: 41033480 DOI: 10.1016/j.tmaid.2025.102913
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China CDC Wkly. 2022 Feb 18;4(7):126-129. doi: 10.46234/ccdcw2022.023.

Exploring the Association Between Infectious Diarrheal Diseases and Sea Surface Temperatures – Coastal Areas of China, 2009–2018

Min Xu [1], Chunxiang Cao [1,2], Heyi Guo [1,2], Yiyu Chen [1,2], Zhongwei Jia [3]

Affiliations + expand

PMID: 35265391 PMCID: PMC8886489 DOI: 10.46234/ccdcw2022.023

Environmental Health

Environ Health. 2008 Nov 7;7(Suppl 2):S3. doi: 10.1186/1476-069X-7-S2-S3

The coastal environment and human health: microbial indicators, pathogens, sentinels and reservoirs

Jill R Stewart [1,✉], Rebecca J Gast [2], Roger S Fujioka [3], Helena M Solo-Gabriele [4], J Scott Meschke [5], Linda A Amaral-Zettler [6], Erika del Castillo [6], Martin F Polz [7], Tracy K Collier [8], Mark S Strom [8], Christopher D Sinigalliano [9,10], Peter DR Moeller [1], A Fredrick Holland [1]

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PMCID: PMC2586716 PMID: 19025674

RISK FACTORS FOR COASTAL COMMUNITY ON THE INCIDENCE OF HYPERTENSION

Putri Nur Riani[1], Wulan Pratiwi[1], Ratih Indah Sari[1], Putri Rifatus Syifa[1]
[1]Medical Laboratory Technology Study Program, Borneo Citra Medika Health Polytechnic

Literature Review

Scabies as a Health Challenge in Coastal Areas and Its Control strategie, Indonesia: A Review

Yulya Lasmita[1,2], Magvirah Tuljanna[1]

[1]Faculty of Public Health, Master of Public Health Study Program, Halu University Oleo, Indonesian Address: Jl.HE. Mokodompit, Anduonohu, Kendari, Southeast Sulawesi Province
[2]Regional Health Center. Pakue Utara District. Kolaka Utara Regency. Southeast Sulawesi Province

Diseases		Percentage (%)
Skin	Hyperpigmentation	80
Eye	Vision disorders	51
	Irritation	33
	Pterygium	23
Hearing	Ear rings	28
Pivot	Low back pain	59
Breathing	Respiratory	38
Abdomen	infection	50
	Gastritis	

Disorders abnormalities	The type of disease
Skin	hyperpigmentation
Eyes	1. The vision abnormalities 2. Irritation 3. Pterygium
Hearing	Ear rings
Pivot	Spinal pain
Lung	Cough with phlegm
Abdominal	Nausea, vomiting, colic
Warm infections	No abnormalities Ascaris Ancylostoma duodenale Trichuris trichura Trichomonas Ascaris + Thrichormonas

- **Malaria → areas prone to mosquito breeding**
- **Diarrhea → poor sanitation and water contamination.**
- **Dengue fever → bites from the Aedes aegypti mosquito, which breeds in stagnant water.**
- **Leptospirosis → water contaminated with animal urine such as rats.**
- **Upper respiratory tract infection → poor ventilation.**
- **Typhoid → contaminated food or drink.**
- **Skin problems → humidity and lack of hygiene.**
- **Hypertension → consumption of foods high in salt**
- **Musculoskeletal problems → working conditions as fishermen or in the maritime sector**
- **Nutrition problems → access to nutritious food**
- **Gastroenteritis → water contaminated with sewage, with symptoms such as nausea, vomiting, diarrhea, and abdominal pain.**

> Int J Environ Res Public Health. 2019 Aug 22;16(17):3044. doi: 10.3390/ijerph16173044.

Burden of Disease in Coastal Areas of South Korea: An Assessment Using Health Insurance Claim Data

Munkhzul Radnaabaatar [1], Young-Eun Kim [2], Dun-Sol Go [1], Yunsun Jung [1], Seok-Jun Yoon [3]

Affiliations + expand

PMID: 31443384 PMCID: PMC6747349 DOI: 10.3390/ijerph16173044

Abstract

Background: While measuring and monitoring disease morbidity, it is essential to focus on regions experiencing inequitable health outcomes, especially coastal populations. However, no research investigating population health outcomes in coastal areas has been conducted. Therefore, we aimed to investigate the burden of disease morbidity in coastal areas of South Korea.

Methods: Using an administrative division map and the ArcGIS, we identified and included 496 coastal districts. In this observational study, years lived with disability (YLDs) were estimated using incidence-based approaches to calculate the burden of disease in 2015. Incidence and prevalence cases were collected using National Health Insurance Service (NHIS) medical claim data using a specialized algorithm.

Results: Age-standardized years lived with disability (ASYLDs) in the coastal areas were 24,398 per 100,000 population, which is greater than the 22,613 YLDs observed nationwide. In coastal areas, the burden of disease morbidity was higher in females than in males. Diabetes mellitus was the leading specific disease of total YLDs per 100,000 population, followed by low back pain, chronic obstructive pulmonary disease, osteoarthritis, and ischemic stroke.

Conclusion: In this study, the coastal areas of South Korea carry a higher burden than the national population. Additionally, chronic diseases compose the majority of the health burden in coastal areas. Despite the limitation of data, YLD was the best tool available for evaluating the health outcomes in specific areas, and has the advantage of simplicity and timely analysis.

Keywords: South Korea; burden of disease; coastal area; population health.

> Ecohealth. 2021 Mar;18(1):61-75. doi: 10.1007/s10393-021-01517-z. Epub 2021 May 17.

Salinity and Water-Related Disease Risk in Coastal Bangladesh

Khatun Mst Asma [1 2], Koji Kotani [3 4 5 6]

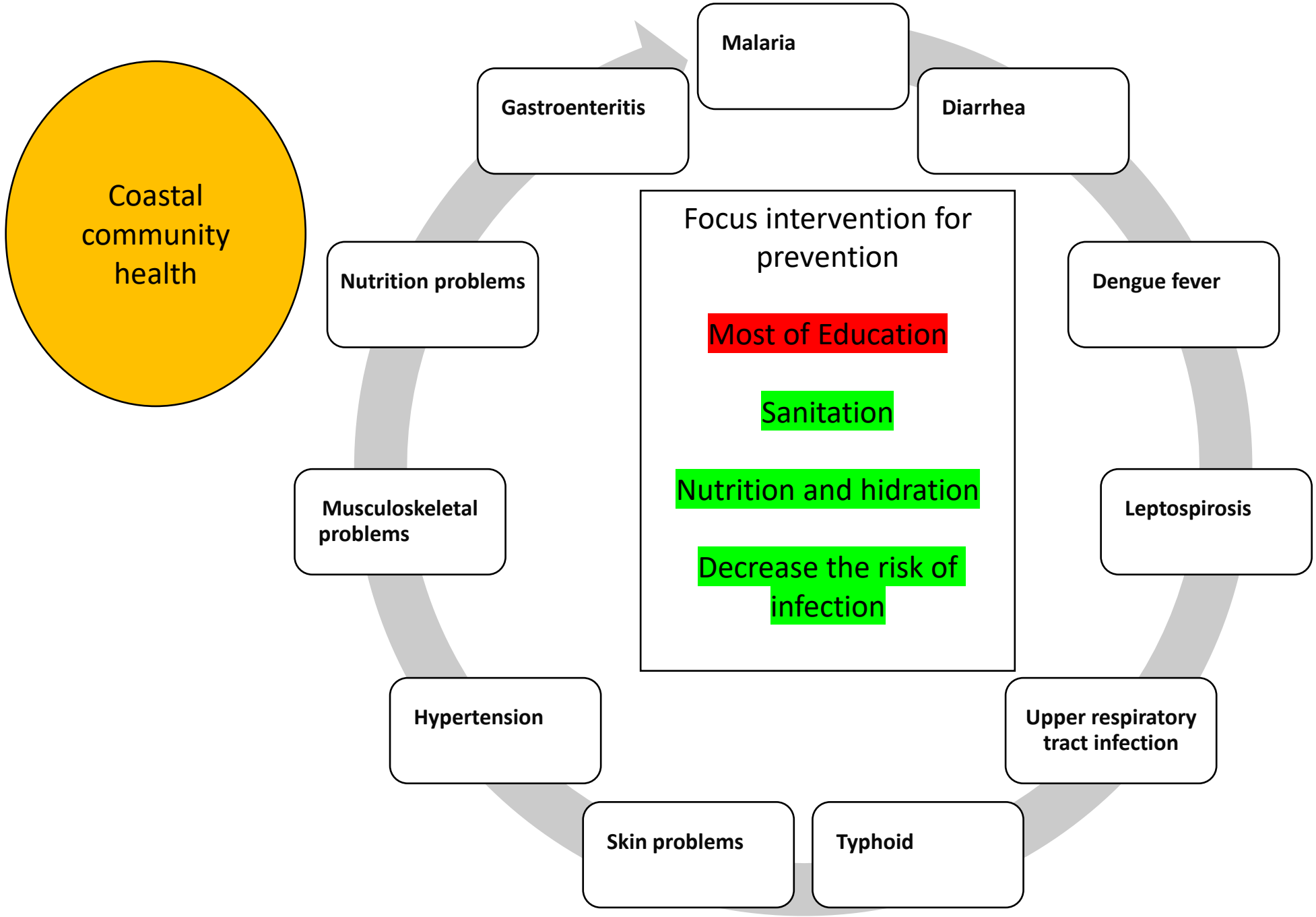
Affiliations + expand

PMID: 34002335 DOI: 10.1007/s10393-021-01517-z

Abstract

An increase in surface and ground-water salinity due to climate change is reported to have become a great threat to the health of coastal inhabitants in Bangladesh. However, little is known about how much such salinity affects the risk of water-related diseases and how such risk can be mitigated in the field. This research examines the association between water-related diseases and coastal salinity along with sociodemographic and anthropometric factors. We conduct questionnaire surveys with 527 households: 273 subjects from the non-salinity and 254 subjects from the salinity rural coastal areas of Bangladesh. The logistic regression analysis demonstrates that the probability of suffering from water-borne, water-washed and water-related diseases are 8%, 14% and 11% higher in the salinity areas than in the non-salinity areas, respectively. However, it is also identified that people who consume rainwater as a drinking source even in the salinity areas have less chances and people who belong to "underweight body mass index" have more chances of being affected by water-related diseases. Overall, the results suggest that the long-term reservation of rainwater and addressing community-based food security & nutrition programs shall be effective countermeasures to reduce the risk of health problems in the coastal population and to sustain their lives even under the threat of land salinity.

Keywords: Body mass index; Salinity; Water-borne disease; Water-related disease; Water-washed disease.


Coastal community health
Malaria
Diarrhea
Dengue fever
Leptospirosis
Upper respiratory tract infection
Typhoid
Skin problems
Hypertension
Musculoskeletal problems
Nutrition problems
Gastroenteritis
Focus intervention for prevention
Most of Education
Sanitation
Nutrition and hidration
Decrease the risk of infection

Why the traditional patient approach and health education insufficient for diabetic control?

Study have stated that **changes in knowledge and attitude through information transfer and instruction are not sufficient to realize the desire self-care behavior**, (Wu et al., 2011; Wu, Liang, Lee, Yu, & Kao, 2013).

The new study stated that more personalized, **respect with patient preferences were more effective than** approach fit for all or **just focus on knowledge**, (Meiliana et al., 2016; Vorderstrasse et al., 2014).

Integrated care based on individual needs, including interdisciplinary cooperation and **patient involvement in decision-making regarding health goals** based on patient-oriented care **can make patient to be more responsible**, (Sherifali, 2017; Pranata et al., 2022).

Most patients with diabetes do not control their disease very well even though the patient's education has been provided (Ministry of Health, 2025).

History and milestones of education approaching

The intervention to treat chronic and acute disease in the hospital and community has been based on evidence-based practice and guideline for long time

Popular interventions in many countries are health education

In reality

Findings from recent studies suggest that not all patients benefit equally from such a standardized approach

The education must be “tailor-made,” it must be tuned into the individual needs (social–cognitive determinants, intention, and behavior)

Patient-centered education leads to more satisfaction, has important accordance with effective patient education,

(Sassen, 2018; World Self-medication Industry, 2010)

In recent years, research efforts in this direction have been labelled with the term of tailored care with aim to tailor treatment to each person’s in order to maintain a balance between body, mind and spirit.

Nowadays, the aim of tailored care is to improve patients’ health outcomes and care experience by taking their individual needs and preferences into account in developing a treatment plan, (Dekkers & Hertroijs, 2018).

In this approach, patients’ biopsychosocial characteristics are used to identify subgroups of patients with similar care needs, abilities and preferences, for whom tailored solutions can be developed (Dekkers & Hertroijs, 2018)

Trend research currently

THE LANCET

New trends in health inequalities research: now it's personal

Johan P Mackenbach

Affiliations & Notes Article Info

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Recently, Benjamin Chapman and colleagues,[1] in a new trend in health inequalities research, showed that US adults of low and high socioeconomic status differ substantially in their personality profiles. These researchers focused on the so-called Big Five personality traits[2] and noted that people of low socioeconomic status had raised levels of neuroticism and agreeableness and diminished levels of extraversion, openness, and conscientiousness. Because some of these factors are also predictors of mortality, differences in personality accounted for around 20% of inequalities in mortality related to socioeconomic status in this cohort.

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Review > Int J Environ Res Public Health. 2021 Jun 17;18(12):6535. doi: 10.3390/ijerph18126535.

Precision Health Care Elements, Definitions, and Strategies for Patients with Diabetes: A Literature Review

Satriya Pranata [1 2], Shu-Fang Vivienne Wu [1], Javad Alizargar [3], Ju-Han Liu [1], Shu-Yuan Liang [1], Yu-Ying Lu [1]

Affiliations + expand

PMID: 34204428 PMCID: PMC8296342 DOI: 10.3390/ijerph18126535

Free PMC article

Abstract

Diabetes is a prevalent disease with a high risk of complications. The number of people with diabetes worldwide was reported to increase every year. However, new integrated individualized health care related to diabetes is insufficiently developed.

Purpose: The objective of this study was to conduct a literature review and discover precision health care elements, definitions, and strategies.

Methods: This study involved a 2-stage process. The first stage comprised a systematic literature search, evidence evaluation, and article extraction. The second stage involved discovering precision health care elements and defining and developing strategies for the management of patients with diabetes.

Results: Of 1337 articles, we selected 35 relevant articles for identifying elements and definitions of precision health care for diabetes, including personalized genetic or lifestyle factors, biodata- or evidence-based practice, glycemic target, patient preferences, glycemic control, interdisciplinary collaboration practice, self-management, and patient priority direct care. Moreover, strategies were developed to apply precision health care for diabetes treatment based on eight elements.

https://pubmed.ncbi.nlm.nih.gov/34204428/

Precision health care strategies for older adults with diabetes in Indonesia: a Delphi consensus study

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ABSTRACT

BACKGROUND Studies on precision health care for older adults with diabetes in Indonesia are still limited. This study was aimed to reach the experts consensus on the suitable precision health care strategies for older adults with diabetes.

METHODS A total of 10 experts (4 physicians, 4 nurses, and 2 dietitians) agreed to participate in the 3-round interview using Delphi technique. The experts should have at least 5 years of experience in teaching or working as health professionals in a hospital.

RESULTS Consensus was reached that precision health care consisted of eight elements: self-management, interdisciplinary collaborative practice, personalized genetic or lifestyle factors, glycemic target, patient preferences, glycemic control, patient priority-directed care, and biodata- or evidence-based practice. The strategies of precision health care for diabetes were divided into seven steps: conducting brief deducting teaching; assessing self-management level and risk of cardiovascular disease; organizing a brainstorming session among patients to exchange experiences on glycemic target and specific target behavior; making a list of patients' needs and ranking the priorities; setting a goal and writing action; doing follow-up; and reporting the goal attempts.

CONCLUSIONS The eight elements of precision health care provided the basis of precision health care strategies for diabetic older adults, which are the real and measurable strategies for precision health care implementation in clinical settings.

KEYWORDS Delphi technique, diabetes, personal health service, precision health care, precision medicine

https://mji.ui.ac.id/journal/index.php/mji/article/view/5525

No	Elements	Concept descriptions
1.	**Personalized genetic or lifestyle**	Genetic or lifestyle analysis; genomic test screening for diabetes autoantibodies that remain after a drug or insulin dose, gene encoding glucokinase, presence of HNF1A and HNF4A that are associated with forms of diabetes onset; C-peptide is a biomarker that can be used as a guide to treatment choice (insulin deficiency); single-nucleotide polymorphisms provide information regarding drug toxicity
2.	**Biodata-or evidencebased**	Genetic examination to detect various potential health problems, cardiovascular disease, a person's metabolic ability to a nutrient, and HbA1c target
3.	Glycemic target	Based on ADA guidelines, target and therapy differ based on the features and responses of each individual (including HbA1c, blood pressure, and cholesterol)
4.	**Patient preferences**	Identification of whether the patient needs additional medication and their concern regarding hyper/hypoglycemia, further expressing their decision
5.	Glycemic control	Supporting the use of a potent drug to achieve a reduction in HbA1c to <6.5%.
6.	Interdisciplinary collaboration practice	Teamwork entails discussion of the most appropriate treatment for patients
7.	Self-management	Individualizing therapy so that patients can effectively self-manage their disease through increasing self-efficacy
8.	**Patient priority direct care**	Assess the individual as a whole including the complex interplay of comorbid conditions, psychosocial, functional status, and individual need

Diabetes Patients' Preferences and Expectations for Health Services to Prevent Diabetes Complications: A Qualitative Study

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3- Nurse Professional Study Program, Faculty of Medicine, Universitas Tanjungpura, Pontianak, Indonesia.

Abstract: (2301 Views)

Background: Health professionals have been making efforts to avoid heart and kidney complications among diabetes patients. However, these efforts were not effective due to not directly addressing the personal needs of each patient. The purpose of this study was to explore the preferences of diabetes patients regarding health services to prevent heart and kidney complications.
Methods: A qualitative method with a phenomenological approach was used in this study. The samples were diabetes mellitus patients living in the Kedungmundu Community Health Center's working area who were not experiencing heart or kidney complications, totaling about 25 participants. After obtaining consent, in-depth interviews were conducted using five questions prepared as a semi-structured interview guide. The duration of the interviews ranged from 30 to 60 minutes. The data analysis utilized the seven steps of the Colaizzi phenomenological analytic method.
Results: The identified themes were diet pattern adjustment, expectations for health information, information on choosing the right medication, need for information on the right type of exercise, biochemical and hemodynamic control, and expectations for health care services.
Conclusion: The themes found provide valuable information for health professionals and the government to develop a national health improvement program to prevent complications in a more optimal and targeted manner, according to the needs of patients in Indonesia and other countries in Asia with the same culture. The development of a personalized care program to reduce the risk of heart and kidney disease complications needs to be pursued in the future.

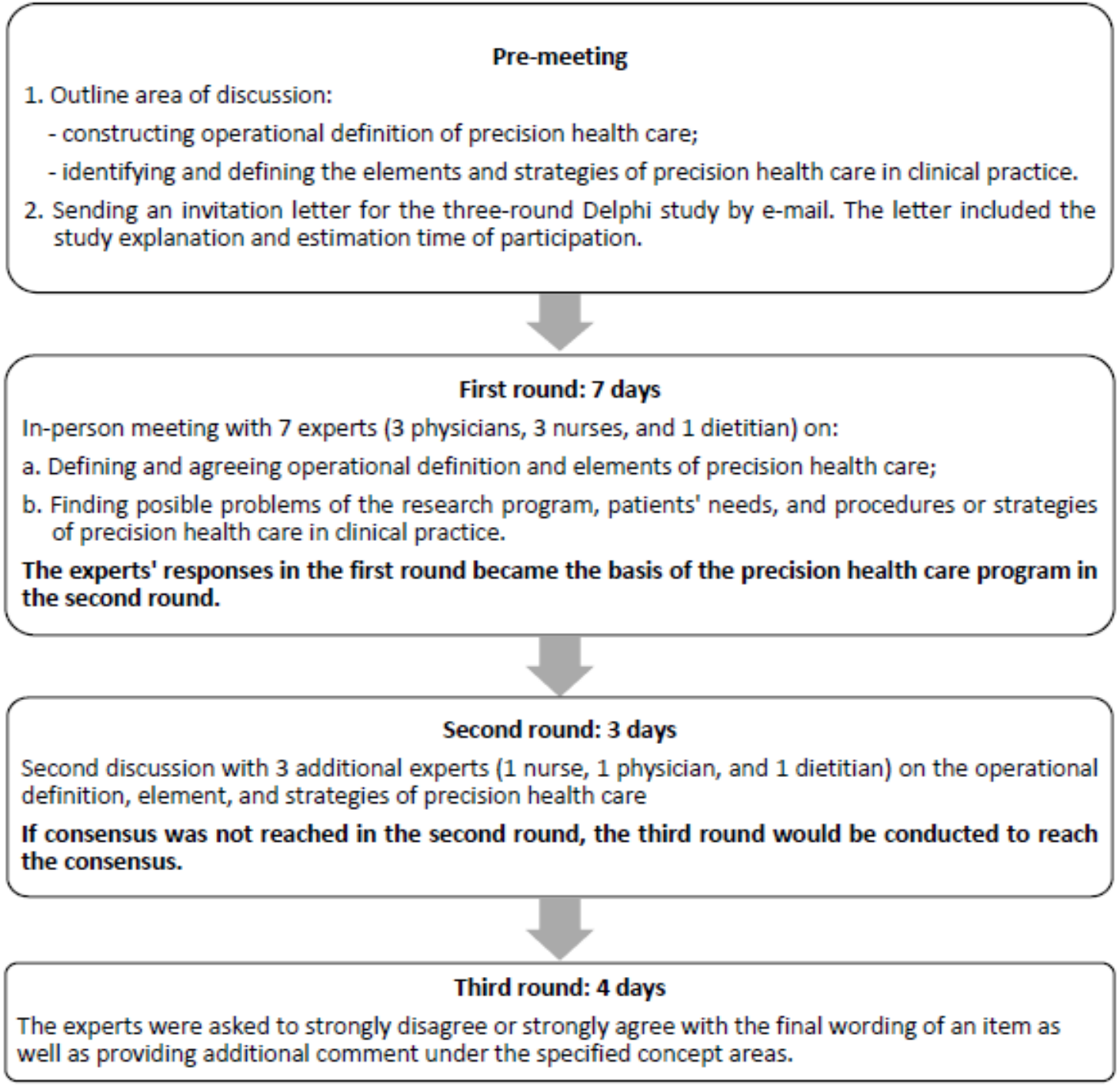
Keywords: Patient satisfaction, Personal health services, Diabetes

Precision health care

- providing integrated care **based on individual needs**, including interdisciplinary cooperation and patient involvement in decision-making regarding health goals, providing care that meets **patient expectations and preferences**, providing patient-oriented care, and **using biodata as evidence-based** care disposal to improve patient self-management (Pranata et al. 2021).

Precision health care for diabetes definition

- **Tailoring** integrated **care** through interdisciplinary collaborative practice among patients, nurses, and physicians **based on the patient's genetics or lifestyle**, glycemic target, biodata- or evidence-based practice, **patient preferences, and priority** for improving patient self-management to achieve glycemic control (Pranata et al. 2021)..



Developed strategies to implement personalized health care through Delphi study

A consensus was reached on the elements of precision health care, which became the basis of the 7-step strategy for precision health care implementation

1. Brief deducting teaching
2. Assessing self-management level and risk of cardiovascular disease among patients
3. Organizing a brainstorming session among patients to exchange experiences on glycemic target and specific target behavior
4. Making a list of patients' needs then ranking the priorities
5. Setting a goal and writing action
6. Doing follow-up
7. Reporting the goal attempts.

Pranata et al. Scr Med 2023 Mar;54(1):61-7. DOI:10.5937/scriptamed54-42230

ORIGINAL ARTICLE

A Pilot Test for Implementing Precision Healthcare Programme in Patients with Diabetes in Indonesia

Satriya Pranata,[1] Shu-Fang Vivienne Wu,[2] Tsae-Jyy Tiffany Wang,[2] Shu-Yuan Liang,[2] Difran Nobel Bistara,[3] Yeu-Hui Chuang,[4] Kuo-Cheng Lu,[5,6] Hadi Kusuma Atmaja[7]

Abstract

Background/Aim: An evaluation of precision healthcare interventions among patients with diabetes in a small sample through a pilot test before being tested in a larger sample is needed. Thus, the purpose of this study was to evaluate the feasibility of a precision healthcare programme. It also assesses the programme's outcome among patients with diabetes in Indonesia.

Methods: Data were collected during December 2020. The researchers first gathered data about participant characteristics. Furthermore, the strategies of precision healthcare were implemented in sixty respondents to evaluate the feasibility and outcome of the programme in a month.

Results: The participants mentioned that they can follow all procedures of precision healthcare. However, they asked the researcher to provide a guide and monitoring book which provides safe choices information on diet, exercise, glucose monitoring and drug medication. Moreover, participants mentioned that they could complete all questionnaires but needed a company of a research assistant. The benefits of a month of precision healthcare were improved diabetes self-care activity, blood pressure and blood glucose level. However, the body weight, body mass index (BMI), triglyceride, cholesterol and triglyceride glucose index were not significantly improved.

Conclusion: A pilot test is needed to ensure the feasibility of the implementation strategy with the culture and background of diabetic patients in Indonesia. Improving diabetes self-care activity stabilised blood pressure and blood glucose during a month, so it can be assumed that precision healthcare approaches were potentially being applied in Indonesia. On the other hand, it is needed more than a month to improve body weight, BMI, triglyceride, cholesterol and triglyceride glucose index. Thus, testing the precision healthcare approach in a larger sample

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Table 4: Diabetes self-care activity, blood pressure, blood glucose, body weight, body mass index (BMI), triglyceride, cholesterol and triglyceride glucose index difference before and after intervention

Variables	Pre-intervention (mean)	Post-intervention (mean)	Difference (mean ± SD)	p-value
Diabetes self-care activity	45.68	60.96	15.28 ± 1.30	< 0.001
Systolic blood pressure	133.10	126.88	6.22 ± 2.07	< 0.001
Diastolic blood pressure	86.09	85.43	0.66 ± 2.07	< 0.001
Blood glucose	255.19	245.60	9.59 ± 6.78	< 0.001
Body weight	57.83	59.46	1.63 ± 0.54	0.402
BMI	22.98	23.67	0.69 ± 0.35	0.671
Triglyceride	227.86	225.80	2.06 ± 5.71	0.278
Cholesterol	186.74	190.56	3.82 ± 12.97	0.393
Triglyceride glucose index	5.23	5.14	0.09 ± 0.24	0.165

Precision healthcare approaches have the potential to be applied in Indonesia. It is needed more than a month to improve the body weight, BMI, triglyceride, cholesterol and triglyceride glucose index. There was no control group and small samples which were limitations of this study. Therefore, future studies with large samples with long evaluation times are needed (Pranata et al. 2021).

Implementing Precision Health Care Program at Hospitals in Indonesia

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4- Veteran General Hospital, Taipei, Taiwan.

Abstract: (3013 Views)

Background: A precision healthcare approach is needed in the context of the healthcare system, especially as an effort to improve the self-management activities of diabetes patients. Accordingly, this study explores the perception of the possibility of implementing a precision healthcare program in hospitals through interviews with policymakers and health professionals.

Methods: The purposive sampling via one-on-one, in-depth semi-structural interviews was conducted to collect the data in this study. The data saturation was achieved after interviewing 17 policymakers and health professionals in the selected hospitals. The participants discussed the possibility of a program being implemented in Indonesia and the challenges to implementing the program, as well as discovering the solutions. The narratives were analyzed by the Colaizzi phenomenological analytic method.

Results: The three themes that were identified to illustrate the perception of the possibility of implementing precision health care programs at hospitals in Indonesia were as follows: 1) Precision health care for diabetes related to genetics, big data, and patient preference; 2) Barriers to implementing precision health care in Indonesian hospitals; and 3) The implementation of precision health care succeeded step by step.

Conclusion: More time is needed to implement Indonesia's precision healthcare concept. It requires time; however, applying the concept has great potential to be developed in reducing the risk of complications caused by diabetes mellitus in the future.

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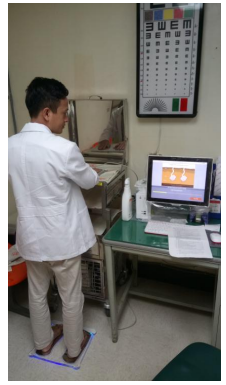
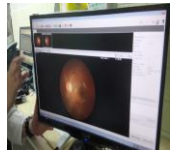
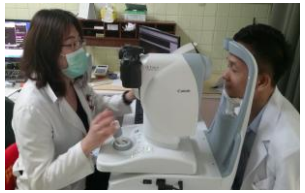
You can also search for this author in: PubMed, Google Scholar

https://jrh.gmu.ac.ir/article-1-2318-en.html







- We need regulations that govern
- Skilled health professionals
- Support health technology
- Continue research
- Set up huge costs to implement it in the future

- **Teach patients and or student in diverse settings:** *Certified Nurse Educator*
- **Executive nurse leaders:** *Nurse Executive Certification*
- **Clinical genetics nurses:** *Advanced Clinical Genomics Nurse*
- **Nurse administrators:** *Related credential with Nurse Executive Certification*
- **Informatics nurse specialists:** *Certified Informatics Nurse*

How about the current era, is there any changes?








ORIGINAL ARTICLE

Bali Medical Journal (*Bali MedJ*) 2021, Volume 10, Number 3 Special Issue ICONURS: 1304-1307
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The implementation of precision personalized care to improve diabetes patients' self-management at taipei veteran general hospital: an observational study

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ABSTRACT

Introduction: Precision Personalized Care (PPC) defines as a new approach to health care service on improving diabetes patients' self-management. To date, Taipei Veterans General Hospital has started implement the program of PPC. The purpose of this study was to observe the implementation of PPC and its' beneficial on the improvement of self-management among diabetes patients at the Taipei Veteran General Hospital, Taiwan.

Methods: This study applied a clinical observational-exploration method such as supervision by visiting the wards, examination rooms and laboratories in the hospital and further discussing with the health professionals' and patients with diabetes by direct interview while observing each PPC implementation from April 18th to May 2nd, 2019. The participants of this observational study included three nurses, a nutritionist, a doctor and 3 patients. Descriptive and explorative methods were attempted to analyze the data.

Results: The comprehensive and continuous implementation of diabetes self-management education (DSME) and diabetes self-management support (DSMS) programs were the target and focus point of activities to improve diabetes patients' self-management. It focused on the patient centered-care, tailored, and more precise to find patients' personal meet as defined as PPC. Clinical laboratory tests (e.g., blood sugar, hemoglobin A1C counts, low-density cholesterol, kidney functions, proteinuria, fundus and peripheral neuropathy examinations) were carried out regularly to support the program. Both programs and clinical assessment test were integrated with the Diabetes Pay for Performance (diabetes -P4P), a large-fund government program which supported by Taiwan National Health Insurance (NHI).

Conclusion: The continuous and comprehensive PPC can successfully reduce the incidence of diabetes complications in Taiwan. The PPC approach can be used as a magnificent reference for the development of quality health services and research development for diabetes patients in Indonesia.

Keywords: Precision personalized care, self-management, diabetes, education, support.
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Research Paper

Effectiveness of Tailored Care Intervention Program on Biochemical Outcomes of Patients With Diabetes in Indonesia: A Randomized Controlled Trial

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ABSTRACT

Background: Although patients with diabetes have common problems, their educational needs may differ, and they have the right to participate in planning and implementing individual or group healthcare programs. Because there are no proper care interventions for diabetic patients in Indonesia, this study evaluated the efficacy of a tailored care intervention program on some blood biochemical outcomes among Indonesian patients with diabetes.

Methods: We conducted a randomized controlled trial (RCT) with a pre-test-post-test design. We recruited

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