



< Back to results | 1 of 1

[Download](#) [Print](#) [Save to PDF](#) [Add to List](#) [Create bibliography](#)

Jurnal Ners • [Open Access](#) • Volume 18, Issue 2, Pages 200 - 209 • June 2023

Document type

Article • [Gold Open Access](#)

Source type

Journal

ISSN

18583598

DOI

10.20473/jn.v18i2.46216

Publisher

Faculty of Nursing, Universitas Airlangga

Original language

English

[View less](#)

Effectiveness of m-health based self-management on self-efficacy in patients with cancer: A systematic review and meta-analysis

Anakotta, Ni Olivya^a; Rochmawati, Erna^{a, b}

[Save all to author list](#)

^a Faculty of Health Sciences, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia

^b International Islamic University Malaysi, Kuala Lumpur, Malaysia

[View PDF](#) [Full text options](#) [Export](#)

Abstract

Author keywords

Sustainable Development Goals 2023

SciVal Topics

Metrics

Abstract

Introduction: M-health has been developed and tested through studies in various settings and found useful for providing knowledge and experience for nurses in cancer care settings. However, none has synthesized the effectiveness of m-health on self-management of patients with cancer. To evaluate the effect of interventions using mobile-based application on patient's self-management, outcome measures were patients' medical adherence, self-efficacy and self-management level and health literacy. Methods: This is a systematic review and meta-analysis that is reported in accordance with the guidelines of the PRISMA statement. A systematic review was conducted in five databases. Randomized controlled trials and quasi-experimental trials evaluating self-efficacy in patients with cancer were included. Critical appraisal was

Cited by 0 documents

Inform me when this document is cited in Scopus:

[Set citation alert >](#)

Related documents

Effect of electronic health (eHealth) on quality of life in women with breast cancer: A systematic review and meta-analysis of randomized controlled trials

Wen, T. , Chen, C. , Ren, W. (2023) *Cancer Medicine*

The Perspective of mHealth in the Self-Assessment of the Parkinson's Disease. Comment on Kalafati et al. Testing of Motor Coordination in Degenerative Neurological Diseases. *Healthcare* 2022, 10, 1948

Giansanti, D. (2023) *Healthcare (Switzerland)*

Look at the compass needle and see your course—navigation as a cancer survivor

Johansen, C. , Dalton, S.O. (2021) *Acta Oncologica*

[View all related documents based on references](#)



Find more related documents in Scopus based on:

[Authors >](#) [Keywords >](#)

performed using the Critical Appraisal Checklist from the Joanna Briggs Institute. Data were synthesized using Review Manager version 4.5. Results: Eight studies were included. There was a significant effect on self-efficacy after interventions using mobile-based applications (SMD = 0.36, CI 95%, [0.16, 0.56], $p < 0.00006$). Qualitative synthesis shows that the use of m-health can improve changes in health behavior, health literacy and physical activity. Conclusions: M-health-based self-management interventions may improve self-efficacy in cancer patients. Meanwhile, changes in health behavior in patients can be significantly improved using m-health-based self-management. M-health can be integrated into health services for the management of patients with cancer. © 2023 Jurnal Ners.

Author keywords

cancer; m-health; self-management; systematic review

Sustainable Development Goals 2023  New 

SciVal Topics  

Metrics 

References (44)

[View in search results format >](#)

All

[Export](#)  [Print](#)  [E-mail](#)  [Save to PDF](#) [Create bibliography](#)

-
- 1 Abasi, S., Yazdani, A., Kiani, S., Mahmoudzadeh-Sagheb, Z.
Effectiveness of mobile health-based self-management application for posttransplant cares: A systematic review

(2021) *Health Science Reports*, 4 (4), art. no. e434. Cited 17 times.

onlinelibrary.wiley.com/journal/23988835

doi: 10.1002/hsr2.434

[View at Publisher](#)

-
- 2 Armbruster, C., Knaub, M., Farin-Glattacker, E., von der Warth, R.
Predictors of Adherence to Cancer-Related mHealth Apps in Cancer Patients Undergoing Oncological or Follow-Up Treatment —A Scoping Review (Open Access)

(2022) *International Journal of Environmental Research and Public Health*, 19 (20), art. no. 13689. Cited 2 times.

<http://www.mdpi.com/journal/ijerph>

doi: 10.3390/ijerph192013689

[View at Publisher](#)

-
- 3 Baik, S.H., Oswald, L.B., Buscemi, J., Buitrago, D., Iacobelli, F., Perez-Tamayo, A., Guitelman, J., (...), Yanez, B.
Patterns of use of smartphone-based interventions among latina breast cancer survivors: Secondary analysis of a pilot randomized controlled trial (Open Access)

(2020) *JMIR Cancer*, 6 (2), art. no. e17538. Cited 8 times.

<https://cancer.jmir.org/2020/2/e17538/PDF>

doi: 10.2196/17538

[View at Publisher](#)

- 4 Bonn, S.E., Löf, M., Östenson, C.-G., Trolle Lagerros, Y.
App-technology to improve lifestyle behaviors among working adults - The Health Integrator study, a randomized controlled trial ([Open Access](#))

(2019) *BMC Public Health*, 19 (1), art. no. 273. Cited 21 times.
<http://www.biomedcentral.com/bmcpublichealth>
doi: 10.1186/s12889-019-6595-6

View at Publisher
-
- 5 Budhwani, S., Wodchis, W.P., Zimmermann, C., Moineddin, R., Howell, D.
Self-management, self-management support needs and interventions in advanced cancer: A scoping review ([Open Access](#))

(2019) *BMJ Supportive and Palliative Care*, 9 (1), pp. 12-25. Cited 30 times.
spcare.bmj.com/
doi: 10.1136/bmjspcare-2018-001529

View at Publisher
-
- 6 Carnio, S., Galetta, D., Scotti, V., Cortinovis, D.L., Antonuzzo, A., Pisconti, S., Rossi, A., (...), Novello, S.
Chemotherapy-induced nausea and vomiting (CINV) in patients with advanced lung cancer during the first-line treatment: assessment by physicians, nurses, and patients from an Italian multicenter survey

(2018) *Supportive Care in Cancer*, 26 (6), pp. 1841-1849. Cited 9 times.
link.springer.de/link/service/journals/00520/index.htm
doi: 10.1007/s00520-017-4004-1

View at Publisher
-
- 7 Delva, S., Waligora Mendez, K.J., Cajita, M., Koirala, B., Shan, R., Wongvibulsin, S., Vilarino, V., (...), Han, H.-R.
Efficacy of Mobile Health for Self-management of Cardiometabolic Risk Factors: A Theory-Guided Systematic Review ([Open Access](#))

(2021) *Journal of Cardiovascular Nursing*, 36 (1), pp. 34-55. Cited 17 times.
<http://journals.lww.com/jcnjournal>
doi: 10.1097/JCN.0000000000000659

View at Publisher
-
- 8 Du, S., Liu, W., Cai, S., Hu, Y., Dong, J.
The efficacy of e-health in the self-management of chronic low back pain: A meta analysis ([Open Access](#))

(2020) *International Journal of Nursing Studies*, 106, art. no. 103507. Cited 78 times.
www.elsevier.com/locate/ijnurstu
doi: 10.1016/j.ijnurstu.2019.103507

View at Publisher
-
- 9 Escriva Bouley, G., Leroy, T., Bernetière, C., Paquenseguy, F., Desfriches-Doria, O., Préau, M.
Digital health interventions to help living with cancer: A systematic review of participants' engagement and psychosocial effects ([Open Access](#))

(2018) *Psycho-Oncology*, 27 (12), pp. 2677-2686. Cited 59 times.
[http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1099-1611](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1099-1611)
doi: 10.1002/pon.4867

View at Publisher

- 10 Guan, T., Santacroce, S.J., Chen, D.-G., Song, L.
Illness uncertainty, coping, and quality of life among patients with prostate cancer ([Open Access](#))
- (2020) *Psycho-Oncology*, 29 (6), pp. 1019-1025. Cited 35 times.
[http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1099-1611](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1099-1611)
doi: 10.1002/pon.5372
- [View at Publisher](#)
-
- 11 Hallberg, D., Salimi, N.
Qualitative and quantitative analysis of definitions of e-health and m-health ([Open Access](#))
- (2020) *Healthcare Informatics Research*, 26 (2), pp. 119-128. Cited 24 times.
<https://www.e-hir.org/upload/pdf/hir-26-2-119.pdf>
doi: 10.4258/hir.2020.26.2.119
- [View at Publisher](#)
-
- 12 Han, M., Lee, E.
Effectiveness of mobile health application use to improve health behavior changes: A systematic review of randomized controlled trials ([Open Access](#))
- (2018) *Healthcare Informatics Research*, 24 (3), pp. 207-226. Cited 92 times.
<https://www.e-hir.org/Synapse/Data/PDFData/1088HIR/hir-24-207.pdf>
doi: 10.4258/hir.2018.24.3.207
- [View at Publisher](#)
-
- 13 Hanlon, P., Daines, L., Campbell, C., Mckinstry, B., Weller, D., Pinnock, H.
Telehealth interventions to support self-management of long-term conditions: A systematic metareview of diabetes, heart failure, asthma, chronic obstructive pulmonary disease, and cancer ([Open Access](#))
- (2017) *Journal of Medical Internet Research*, 19 (5), art. no. e172. Cited 290 times.
http://www.jmir.org/article/viewFile/jmir_v19i5e172/2
doi: 10.2196/jmir.6688
- [View at Publisher](#)
-
- 14 Higgins, J.P.T., Thompson, S.G., Deeks, J.J., Altman, D.G.
Measuring inconsistency in meta-analyses
- (2003) *British Medical Journal*, 327 (7414), pp. 557-560. Cited 42910 times.
<http://www.bmj.com/>
doi: 10.1136/bmj.327.7414.557
- [View at Publisher](#)
-
- 15 (2020) *Cancer fact sheet*. Cited 40 times.
<https://gco.iarc.fr/today/data/factsheets/cancers/39-All-cancers-fact-sheet.pdf>
-
- 16 Iskandar, A.C., Rochmawati, E., Wiechula, R.
Experiences and perspectives of suffering in cancer: A qualitative systematic review ([Open Access](#))
- (2021) *European Journal of Oncology Nursing*, 54, art. no. 102041. Cited 8 times.
<http://www.elsevier.com/inca/publications/store/6/2/3/0/3/1/index.htm>
doi: 10.1016/j.ejon.2021.102041
- [View at Publisher](#)

- 17 Istepanian, R.S.H., Jovanov, E., Zhang, Y.T.
Introduction to the special section on m-Health: Beyond seamless mobility and global wireless health-care connectivity
(2004) *IEEE Transactions on Information Technology in Biomedicine*, 8 (4), pp. 405-414. Cited 586 times.
doi: 10.1109/TITB.2004.840019
[View at Publisher](#)
-
- 18 Kalemikerakis, I., Evaggelakou, A., Kavga, A., Vastardi, M., Konstantinidis, T., Govina, O.
Diagnosis, treatment and quality of life in patients with cancer-related lymphedema ([Open Access](#))
(2021) *Journal of B.U.ON.*, 26 (5), pp. 1735-1741. Cited 6 times.
<https://jbuon.com/archive/26-5-1735.pdf>
-
- 19 Kim, H.J., Kim, S.M., Shin, H., Jang, J.-S., Kim, Y.I., Han, D.H.
A Mobile Game for Patients With Breast Cancer for Chemotherapy Self-Management and Quality-of-Life Improvement: Randomized Controlled Trial ([Open Access](#))
(2018) *Journal of medical Internet research*, 20 (10), p. e273. Cited 74 times.
doi: 10.2196/jmir.9559
[View at Publisher](#)
-
- 20 Li, W.-Y., Chiu, F.-C., Zeng, J.-K., Li, Y.-W., Huang, S.-H., Yeh, H.-C., Cheng, B.-W., (...), Yang, F.-J.
Mobile health app with social media to support self-management for patients with chronic kidney disease: Prospective randomized controlled study ([Open Access](#))
(2020) *Journal of Medical Internet Research*, 22 (12), art. no. e19452. Cited 39 times.
<https://www.jmir.org/2020/12/e19452/pdf>
doi: 10.2196/19452
[View at Publisher](#)
-
- 21 Markossian, T.W., Boyda, J., Taylor, J., Etingen, B., Modave, F., Price, R., Kramer, H.J.
A Mobile App to Support Self-management of Chronic Kidney Disease: Development Study ([Open Access](#))
(2021) *JMIR Human Factors*, 8 (4), art. no. e29197. Cited 6 times.
<https://humanfactors.jmir.org/2021/4/e29197/PDF>
doi: 10.2196/29197
[View at Publisher](#)
-
- 22 McGarrigle, L., Todd, C.
Promotion of physical activity in older people using mHealth and eHealth technologies: Rapid review of reviews
(2020) *Journal of Medical Internet Research*, 22 (12), art. no. e22201. Cited 46 times.
<https://www.jmir.org/2020/12/e22201/pdf>
doi: 10.2196/22201
[View at Publisher](#)
-

- 23 McKay, F.H., Cheng, C., Wright, A., Shill, J., Stephens, H., Uccellini, M.
Evaluating mobile phone applications for health behaviour change: A systematic review ([Open Access](#))
- (2018) *Journal of Telemedicine and Telecare*, 24 (1), pp. 22-30. Cited 218 times.
<http://www.uk.sagepub.com/journals/journal202189>
doi: 10.1177/1357633X16673538
- [View at Publisher](#)
-
- 24 Mostafaei, H., Sadeghi-Bazargani, H., Hajebrahimi, S., Salehi-Pourmehr, H., Ghojzadeh, M., Onur, R., Al Mousa, R.T., (...), Oelke, M.
Prevalence of female urinary incontinence in the developing world: A systematic review and meta-analysis—A Report from the Developing World Committee of the International Continence Society and Iranian Research Center for Evidence Based Medicine ([Open Access](#))
- (2020) *Neurourology and Urodynamics*, 39 (4), pp. 1063-1086. Cited 36 times.
[http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1520-6777](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1520-6777)
doi: 10.1002/nau.24342
- [View at Publisher](#)
-
- 25 Ni, X., Lou, Y., Hu, W., Wang, H., Xu, H., Li, S., Zhou, Y., (...), Ni, Y.
Development of mobile health-based self-management support for patients with lung cancer: A stepwise approach ([Open Access](#))
- (2022) *Nursing Open*, 9 (3), pp. 1612-1624. Cited 6 times.
[http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)2054-1058](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2054-1058)
[http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)2054-1058](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2054-1058)
doi: 10.1002/nop2.1185
- [View at Publisher](#)
-
- 26 Ormel, H.L., van der Schoot, G.G.F., Westerink, N.-D.L., Sluiter, W.J., Gietema, J.A., Walenkamp, A.M.E.
Self-monitoring physical activity with a smartphone application in cancer patients: a randomized feasibility study (SMART-trial) ([Open Access](#))
- (2018) *Supportive Care in Cancer*, 26 (11), pp. 3915-3923. Cited 42 times.
link.springer.de/link/service/journals/00520/index.htm
doi: 10.1007/s00520-018-4263-5
- [View at Publisher](#)
-
- 27 Papadakos, J.K., Hasan, S.M., Barnsley, J., Berta, W., Fazelzad, R., Papadakos, C.J., Giuliani, M.E., (...), Howell, D.
Health literacy and cancer self-management behaviors: A scoping review ([Open Access](#))
- (2018) *Cancer*, 124 (21), pp. 4202-4210. Cited 58 times.
[http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1097-0142](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1097-0142)
doi: 10.1002/cncr.31733
- [View at Publisher](#)
-

- 28 Park, J.-H., Jung, Y.S., Kim, J.Y., Bae, S.H.
Mobile web-based self-management program for breast cancer patients with chemotherapy-induced amenorrhoea: A quasi-experimental study

(2022) *Nursing Open*, 9 (1), pp. 655-665. Cited 5 times.
[http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)2054-1058](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2054-1058)
[http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)2054-1058](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2054-1058)
doi: 10.1002/nop2.1113

View at Publisher
-
- 29 Park, Y., Kim, S.R., So, H.Y., Jo, S., Lee, S.H., Hwang, Y.S., Kim, M.S., (...), Chung, S.J.
Effect of mobile health intervention for self-management on self-efficacy, motor and non-motor symptoms, self-management, and quality of life in people with Parkinson's disease: Randomized controlled trial

(2022) *Geriatric Nursing*, 46, pp. 90-97. Cited 4 times.
<http://www.elsevier.com/inca/publications/store/6/2/3/0/8/8/index.htm>
doi: 10.1016/j.gerinurse.2022.05.003

View at Publisher
-
- 30 Peters, M., Potter, C.M., Kelly, L., Fitzpatrick, R.
Self-efficacy and health-related quality of life: A cross-sectional study of primary care patients with multi-morbidity (Open Access)

(2019) *Health and Quality of Life Outcomes*, 17 (1), art. no. 37. Cited 69 times.
<http://www.hqlo.com/home/>
doi: 10.1186/s12955-019-1103-3

View at Publisher
-
- 31 Pitman, A., Suleman, S., Hyde, N., Hodgkiss, A.
Depression and anxiety in patients with cancer (Open Access)

(2018) *BMJ (Online)*, 361, art. no. k1415. Cited 347 times.
<http://www.bmj.com/>
doi: 10.1136/bmj.k1415

View at Publisher
-
- 32 Rabbani, M., Tian, S., Anik, A.A., Luo, J., Park, M.S., Whittle, J., Ahamed, S.I., (...), Oh, H.
Towards Developing a Voice-activated Self-monitoring Application (VoIS) for Adults with Diabetes and Hypertension (Open Access)

(2022) *Proceedings - 2022 IEEE 46th Annual Computers, Software, and Applications Conference, COMPSAC 2022*, pp. 512-519.
<http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=9842455>
ISBN: 978-166548810-5
doi: 10.1109/COMPSAC54236.2022.00095

View at Publisher
-
- 33 Romero, S.A.D., Jones, L., Bauml, J.M., Li, Q.S., Cohen, R.B., Mao, J.J.
The association between fatigue and pain symptoms and decreased physical activity after cancer

(2018) *Supportive Care in Cancer*, 26 (10), pp. 3423-3430. Cited 20 times.
link.springer.de/link/service/journals/00520/index.htm
doi: 10.1007/s00520-018-4203-4

View at Publisher

- 34 Sedhom, R.
Caring for the Patient With Cancer: Body and Soul
(2020) *Journal of Pain and Symptom Management*, 60 (5), pp. 1066-1069. Cited 4 times.
www.elsevier.com/locate/jpainsymman
doi: 10.1016/j.jpainsymman.2020.05.008
View at Publisher
-
- 35 Sundberg, K., Lindström, V., Petersson, L.-M., Langius-Eklöf, A.
Supporting health literacy using an interactive app for symptom management during radiotherapy for prostate cancer (Open Access)
(2021) *Patient Education and Counseling*, 104 (2), pp. 381-386. Cited 13 times.
www.elsevier.com/locate/pateducou
doi: 10.1016/j.pec.2020.08.003
View at Publisher
-
- 36 Sunjaya, A.P., Sengupta, A., Martin, A., Di Tanna, G.L., Jenkins, C.
Efficacy of self-management mobile applications for patients with breathlessness: Systematic review and quality assessment of publicly available applications (Open Access)
(2022) *Respiratory Medicine*, 201, art. no. 106947. Cited 3 times.
<http://www.harcourt-international.com/journals/rmed/>
doi: 10.1016/j.rmed.2022.106947
View at Publisher
-
- 37 Tan, F.C.J.H., Oka, P., Dambha-Miller, H., Tan, N.C.
The association between self-efficacy and self-care in essential hypertension: a systematic review (Open Access)
(2021) *BMC Family Practice*, 22 (1), art. no. 44. Cited 30 times.
<http://www.biomedcentral.com/bmcfampract/>
doi: 10.1186/s12875-021-01391-2
View at Publisher
-
- 38 Taylor, S., Bellhouse, S., Allsop, M., Radford, J., Yorke, J.
The role of e-health in the delivery of care for patients with hematological cancers: A systematic literature review (Open Access)
(2020) *Telemedicine and e-Health*, 26 (9), pp. 1093-1105. Cited 10 times.
http://www.liebertpub.com/publication.aspx?pub_id=54
doi: 10.1089/tmj.2019.0231
View at Publisher
-
- 39 Van De Velde, D., De Zutter, F., Satink, T., Costa, U., Janquart, S., Senn, D., De Vriendt, P.
Delineating the concept of self-management in chronic conditions: A concept analysis
(2019) *BMJ Open*, 9 (7), art. no. 027775. Cited 93 times.
<http://bmjopen.bmj.com/content/early/by/section>
doi: 10.1136/bmjopen-2018-027775
View at Publisher
-

- 40 van der Hout, A., Holtmaat, K., Jansen, F., Lissenberg-Witte, B.I., van Uden-Kraan, C.F., Nieuwenhuijzen, G.A.P., Hardillo, J.A., (...), Verdonck-de Leeuw, I.M.

The eHealth self-management application 'Oncokompas' that supports cancer survivors to improve health-related quality of life and reduce symptoms: which groups benefit most? ([Open Access](#))

(2021) *Acta Oncologica*, 60 (4), pp. 403-411. Cited 22 times.
<http://www.tandfonline.com/loi/ionc20>
doi: 10.1080/0284186X.2020.1851764

[View at Publisher](#)

- 41 Wang, Q.-Q., Zhao, J., Huo, X.-R., Wu, L., Yang, L.-F., Li, J.-Y., Wang, J.
Effects of a home care mobile app on the outcomes of discharged patients with a stoma: A randomised controlled trial ([Open Access](#))

(2018) *Journal of Clinical Nursing*, 27 (19-20), pp. 3592-3602. Cited 49 times.
[http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1365-2702](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1365-2702)
doi: 10.1111/jocn.14515

[View at Publisher](#)

- 42 Wang, Y.-H., Li, J.-Q., Shi, J.-F., Que, J.-Y., Liu, J.-J., Lappin, J.M., Leung, J., (...), Bao, Y.-P.

Depression and anxiety in relation to cancer incidence and mortality: a systematic review and meta-analysis of cohort studies ([Open Access](#))

(2020) *Molecular Psychiatry*, 25 (7), pp. 1487-1499. Cited 235 times.
<http://www.nature.com/mp/index.html>
doi: 10.1038/s41380-019-0595-x

[View at Publisher](#)

- 43 Yerrakalva, D., Yerrakalva, D., Hajna, S., Griffin, S.
Effects of mobile health app interventions on sedentary time, physical activity, and fitness in older adults: Systematic review and meta-analysis ([Open Access](#))

(2019) *Journal of Medical Internet Research*, 21 (11), art. no. e14343. Cited 98 times.
<https://www.jmir.org/2019/11/e14343/PDF>
doi: 10.2196/14343

[View at Publisher](#)

- 44 Zhu, J., Ebert, L., Liu, X., Wei, D., Chan, S.W.-C.
Mobile breast cancer e-support program for chinese women with breast cancer undergoing chemotherapy (Part 2): Multicenter randomized controlled trial ([Open Access](#))

(2018) *JMIR mHealth and uHealth*, 6 (4), art. no. e104. Cited 56 times.
<https://mhealth.jmir.org/2018/4/e104/PDF>
doi: 10.2196/mhealth.9438

[View at Publisher](#)

✉ Rochmawati, E.; Faculty of Health Sciences, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia; email:erochmaw@gmail.com

© Copyright 2023 Elsevier B.V., All rights reserved.

About Scopus

[What is Scopus](#)
[Content coverage](#)
[Scopus blog](#)
[Scopus API](#)
[Privacy matters](#)

Language

[日本語版を表示する](#)
[查看简体中文版本](#)
[查看繁體中文版本](#)
[Просмотр версии на русском языке](#)

Customer Service

[Help](#)
[Tutorials](#)
[Contact us](#)

ELSEVIER

[Terms and conditions ↗](#) [Privacy policy ↗](#)

All content on this site: Copyright © 2023 Elsevier B.V. ↗, its licensors, and contributors. All rights are reserved, including those for text and data mining, AI training, and similar technologies. For all open access content, the Creative Commons licensing terms apply. We use cookies to help provide and enhance our service and tailor content. By continuing, you agree to the use of cookies ↗.

