Relationship between peer group support with foot care behavior among diabetes mellitus patients: an observational study

Suyanto Suyanto,[1,2] Tintin Sukartini,[2] Ferry Efendi,[2] Tafrihatul Fauzi,[1] Moch. Arifin Noor,[1] Ahmad Ikhlasul Amal,[1] Indah Sri Wahyuningsih,[1] Dwi Retno Sulistyaningsih,[1] Furaida Khasanah[3]

[1]Faculty of Nursing, Universitas Islam Sultan Agung, Semarang; [2]Faculty of Nursing, Universitas Airlangga, Surabaya; [3]Ministry of Health Polytechnic Yogyakarta, Sleman, Indonesia

Abstract

Peer group support plays a crucial role in enhancing diabetic foot care. However, diabetic patients often exhibit suboptimal foot care behavior due to a lack of support. This study aimed to explore the correlation between peer group support and foot care practices in individuals with diabetes mellitus. Employing a cross-sectional design, the research focused on diabetes mellitus patients aged 40-55 years, and those with less than five years of diabetes history. A purposive sampling technique was utilized to select 64 participants. The research variables encompassed demographic factors, peer group dynamics, and diabetic foot care behavior. These were assessed through a modified questionnaire, verified for validity and reliability. Data analysis involved descriptive analysis and chi-square analysis. The findings revealed a prevalence of 79.7% for inadequate peer group support and 20.3% for robust support. In terms of diabetic foot care behavior, 56.3% exhibited poor practices, while only 17.2% demonstrated good foot care behavior. All variables displayed significance concerning the dependent variable, with a p-value < 0.003. This underscores the positive impact of peer group support on improving foot care behavior in diabetes mellitus patients. This study highlights the need for further research to delve into the effects of educational interventions and family involvement in enhancing diabetic foot care behavior.

Correspondence: Suyanto Suyanto, Faculty of Nursing, Universitas Islam Sultan Agung, Semarang, Indonesia.
E-mail: suyanto-2020@fkp.unair.ac.id

Key words: diabetes mellitus, foot care, peer group support.

Contributions: SS, conceptualization, data curation, formal analysis, methodology, validation, visualization, writing – original draft, review and editing; TS, conceptualization, investigation, methodology, validation, and writing – original draft, review and editing; FE, conceptualization, methodology, formal analysis, validation, and writing – original draft, review and editing; TF, MAN, methodology, visualization, writing – review and editing; AIA, FK, resources, investigation, and writing – review and editing; ISW, formal analysis, validation, writing – review and editing; DRS, resources, supervision, and writing –review and editing.

Conflict of interest: the authors declare no conflict of interest.

Funding: this research did not receive external funding.

Ethics approval and consent to participate: the research has received ethical approval from the Health Research Ethics Commission, Faculty of Nursing, Universitas Islam Sultan Agung, based on ethical certificate No. 685/A.1-S1/FIK-SA/X/2021. During the research, the researcher pays attention to the ethical principles of information to consent, respect for human rights, beneficence and non-maleficence.

Patient consent for publication: informed consent was obtained for anonymized patient information to be published in this article.

Availability of data and materials: all data generated or analyzed during this study are included in this published article.

Received: 23 September 2023.
Accepted: 11 December 2023.
Early access: 26 January 2024.

Healthcare in Low-resource Settings 2024; 12:11865
doi:10.4081/hls.2024.11865

Introduction

Diabetic foot complications represent a significant challenge in diabetes mellitus.[1,2] Peer group support plays a crucial role in enhancing foot care behavior among individuals with diabetes. Understanding proper foot care is pivotal in shaping positive attitudes and preventing early diabetic foot complications.[3–6] Patients require not only knowledge but also motivation, and the support of a peer group to effectively care for their feet and mitigate the risk of complications.[7,8] Unfortunately, the current trend reveals a diminishing level of peer group support for foot care, possibly influenced by reduced interactions due to efforts aimed at minimizing disease risks.[9–11]

The prevalence of diabetes mellitus in Central Java was recorded at 13.4% in 2019. A preliminary study conducted at the public health center revealed that, at a minimum, 64 patients were diagnosed with diabetes mellitus between January and June of 2021.[12] In Semarang, the statistics on regular foot care among diabetic patients are concerning. Only 58% of these patients adhered to a consistent foot care routine. Additionally, 55% did not use proper footwear, 55% applied moisturizer only once a month, and merely 39% engaged in foot washing on a weekly basis. These findings underscore the need for increased awareness and interventions to improve diabetic foot care practices in the region.[13]

Foot care behavior can be significantly enhanced with the support of family or peers.[14] Peer group assistance in treatment has been shown to improve treatment adherence, side-effect management, and the implementation of foot care practices, fostering a positive attitude in preventing diabetic foot ulcers.[15] The influence of peer support is also evident in the increased knowledge observed after peer-led education.[16] Empowering individuals with diabetes mellitus necessitate the active involvement of patients,

their families, and peers.[17] Peers can serve as educational targets, motivating other members to adopt healthier behaviors. Beyond mental support and motivation, peers can offer tangible assistance, providing tools for foot care.[18] This research aimed to explore the correlation of peer group support with diabetic foot care behavior among individuals with diabetes mellitus.

Materials and Methods

Study design

The research employed an observational study design, specifically utilizing a cross-sectional approach. This methodology was chosen to analyze the relationship between peer group support and foot care behavior in patients with diabetes mellitus.

Study participants

The sample size calculated for a population proportion with a specified relative precision, indicated that a minimum of 51 respondents was required for a confidence level of 95% and a relative precision of 6%.[19] However, in this study, a total of 64 respondents were included. The sampling technique employed was nonprobability sampling, specifically using a purposive sampling method. The study's sampling criteria were defined based on individuals diagnosed with diabetes mellitus, aged between 40-55 years, encompassing both male and female genders, and with a duration of diabetes mellitus less than 5 years.

Variable, instrument and data collection

The independent variables in this study consist of demographic factors such as age, gender, education, occupation, religion, economic status, and marital status, as well as peer group dynamics. The dependent variable focuses on diabetic foot care behavior. The research instruments utilized include the Functions of Diabetes Peer Support Group Scale (F-DPSG) for assessing peer group support, which comprises four subscales: enhancing self-care practice, obtaining knowledge and skills, psychological support, and collective identification. For evaluating foot care, the study employs the Nottingham Assessment of Functional Footcare revised 2015 (NAFF), consisting of six indicators: foot assessment, footwear, foot cleanliness, preventing foot injuries, toenails, and callus/corn treatment, and wound care/wound management. A 4-point Likert scale was employed for both instruments, where respondents could express their agreement or disagreement, with the scale ranging from strongly agree (4) to strongly disagree (1). The research instruments underwent rigorous testing for validity and reliability, including construct validity with an alpha Cronbach value of 0.7, confirming their validity and reliability.

Data analysis

The analysis in this study involves descriptive statistics, offering a detailed summary of the data. Additionally, chi-square analysis was conducted using SPSS version 23, which is a statistical software widely utilized for data analysis. This method allows for examining relationships and associations between categorical variables.

Ethical clearance

The research has obtained ethical approval from the Health Research Ethics Commission at the Faculty of Nursing, Universitas Islam Sultan Agung, as evidenced by ethical certificate No. 685/A.1-S1/FIK-SA/X/2021. Prior to data collection, informed consent was diligently acquired from all participants. Throughout the research process, the researcher adhered to ethical principles, including providing clear information for obtaining consent, respecting human rights, and ensuring beneficence and non-maleficence in the study.

Results

Table 1 showed that among the observational variables, specifically demographic factors, 68.8% of the participants are female, 29.7% have not pursued formal education beyond elementary school, and the majority, constituting 32.8%, are employed in the farming sector.

Based on Table 2, the data revealed that the majority of respondents were 56 years old, while the youngest respondent was 39 years old. The data also indicated that the longest duration of diabetes mellitus (DM) among respondents was 10 years.

From the data presented in Table 3, it can be concluded that there was a significant relationship between peer group support and foot care in patients with diabetes mellitus, as evidenced by a p-value of 0.003.

Discussion

The research results show that hypotheses significantly correlate the independent and dependent variables. The female gender will be more at risk for developing diabetes mellitus than males.[20] Female gender is also one of the risk factors for diabetes mellitus because women have higher cholesterol than men, and there are also differences in daily lifestyles, men will experience a risk of developing diabetes mellitus 2-3 times while women are at risk 3-7 times more likely to have diabetes mellitus.[21,22] In addition, women are vulnerable to stress, discrimination, and post-traumatic stress disorder, causing a more significant negative impact on sleep health in women than in men. In a meta-analysis of epidemiological studies, women of all ages were shown to be at increased risk for insomnia. Diabetes mellitus can also cause patients to experience short sleep duration, disturbed sleep quality associated with obesity, and even more strongly impaired glucose metabolism that correlates with insulin resistance.[23,24] Women have a high life expectancy, so the risk of suffering from diabetes mellitus is high-

Table 1. Characteristics of respondents.

Indicator	n	%
Gender		
Male	20	31.2
Female	44	68.8
Education		
No formal education	19	29.7
Elementary school	19	29.7
Junior high school	14	21.9
Senior high school	12	17.8
Work		
Not working	11	17.2
Private employees	16	25
Farmer	21	32.8
Businessman	16	25

er.[25] The age of more than 45 years was associated with fasting blood glucose levels, there was a risk of an increase in blood sugar levels.[21] Age can also increase the risk of diabetes mellitus because it is associated with aging, decreasing insulin sensitivity so that blood sugar levels will be affected. In humans, there will be a drastic physiological decline at the age of 40 years, one of which impacts the pancreas itself.[20] The world health organization also explains that when a person is 40 years old, blood sugar levels will increase 1-2 mg% per year while fasting and then will increase to 5.6-13 mg% 2 hours after eating, so it is not surprising that age becomes risk factors for the increase in the number of diabetes mellitus.[26]

The higher level of education of an individual will be able to influence the absorption of information received about health and increase the power of early detection of the incidence of diabetes mellitus.[27] The low level of education and knowledge is a factor that causes the high number of disease cases.[28] The level of education will relate to the health information received, especially about health care for diabetes mellitus. The level of education will increase public knowledge about their health.[29] The more health information obtained, the more comprehensive the knowledge acquired. Education is the most critical factor in self-care, understanding the disease, managing the disease, and overcoming the symptoms that arise with appropriate treatment to prevent complications.[30]

Education is an efficient thing to increase knowledge. Several studies have shown that education can improve patient knowledge based on lifestyle, clinical theory, and a positive environment. Patient compliance while undergoing diabetes treatment, physical activity, and dietary patterns impact diabetes control.[31] It could be that people can control their blood sugar through counseling. Leaflets, but because they are tired of undergoing treatment, they do not want to maintain their blood sugar levels.[25]

The American Diabetes Association (ADA) says that if someone works, it will be of great benefit because their blood sugar levels will be controlled through physical activity and to prevent complications.[32] Occupational factors will also affect the risk of diabetes mellitus because someone who undergoes a job with light activities can lack burning energy, so excess energy will be stored in the body in the form of Fat, leading to obesity. Obesity is a risk factor for diabetes mellitus.[33] When doing exercises, there will be an increase in the energy used by the body, which will cause a decrease in blood glucose levels. Work can also be a factor that affects insight, and work environment factors will make an individual gain experience and understanding both directly and indirectly.[34]

Long duration of suffering from diabetes mellitus is related to the risk of diabetes complications. If diabetes mellitus is not handled correctly, it will cause various body disorders such as eye and heart disease. Coronary heart disease, kidney and nerve disorders, cerebrovascular disease, and the most common is hypertensio.[35] Damage to the peripheral blood vessels of the hands or feet can attack patients with diabetes more quickly than someone who does not have diabetes.[36] If you have had diabetes for more than ten years, you usually experience this complication. So ulcer control must be done early to avoid complications in people with diabetes.[37] The increasing number of complications is directly proportional to the length of suffering from diabetes mellitus. If the longer a person has diabetes, the risk of complications also increases.[38] Peers (peer group support) can meet the personal needs of diabetic patients, such as fulfilling the need for respect, increasing self-esteem, providing information, and providing identity for diabetic patients. Patients are more open to expressing their problems in this peer support group.[39] peer group support is a convenient forum for groups of people with diabetes to give each other, receive emotional support, and receive information exchange.[3,40] When someone has a problem, he will seek support and help from someone around him to help or grow self-confidence and enthusiasm when encountering difficulties so that each individual will feel cared for, appreciated, loved, or not lonely or alone in dealing with problems. The main thing about support is that individuals have friends to talk to, someone to inspire, and someone to give advice.[41]This is appropriate if peers (peer group support) can meet the personal needs of diabetic patients, such as fulfilling the need for respect, increasing self-esteem, providing information, and providing identity for diabetic patients. Patients are more open to expressing their problems in this peer support group.[2]

Some patients with diabetes do not know about foot care and the risk of injury.[42] So, to achieve good foot care, good knowledge about foot care is also needed.[31] This theory is based on the fact that diabetic wounds can be prevented through routine foot care. Suppose you do not routinely perform foot care. In that case, you are at risk of experiencing foot problems such as numbness, decreased foot sensation, and cracks, the risk of experiencing diabetic foot injuries, and risk of foot amputation.[43,44] Patients who find it difficult to see their feet or reach their fingers and have thick

Table 2. Distribution and frequency characteristic respondents (age and length of DM).

Variable	Mean+SD	Median	95% CI		Max-Min
			Upper	Lower	
Age	56.39+6.171	56.00	57.93	54.85	71-39
Length of DM	4.66+2.515	4.00	5.28	4.03	10-1

Table 3. Chi-square analysis of peer group support with foot care patients DM.

		Foot care behavior			Total	p
		Not good	Enough	Good		
Peer group support	Not good	33	14	4	51	0.003
	Good	3	3	7	13	
Total		36	17	11	64	

nails should be assisted by health workers or other people such as family or peers to trim their toenails.[31] Diabetes management requires active participation from family, health workers, the community, or peers to improve patients' compliance. Increasing patient compliance can be done by providing information about health and support, especially support obtained from peers (peer group support).[40]

Good social support from peers or family will support the healing of disease in diabetic patients. This is very helpful because when this support is fulfilled, the patient feels comfortable and safe.[45] Social support can change the psychology or physiology of diabetes mellitus patients by protecting them from negative feelings experienced. So, if the level of social support is reduced, it will reduce a person's ability to deal with the problem itself, thereby reducing the level of the stressor.[7] Social support is essential to support self-care behavior in people with diabetes. Diabetes Mellitus type 2, if there is a lack of social support, will impact the low activity of diabetes mellitus patients who experience emotional stress due to long self-care. It can lead to irregular dietary habits and decreased frequency of performing foot examinations.

Conclusions

Peer support can increase knowledge and behavior of foot care in patients with diabetes mellitus. Peer support can improve communication between diabetes patients to strengthen awareness of the importance of foot care knowledge and behavior. Developing methods to improve foot care behavior for families and health workers is necessary.

References

1. Kemenkes RI. Hari Diabetes Sedunia Tahun 2018. Pusdatin Kemenkes RI. 2018;1-8.
2. Faizah R, Efendi F, Suprajitno S. The effects of foot exercise with audiovisual and group support foot exercises to diabetes mellitus patients. J Diabetes Metab Disord 2021;20:377-82.
3. Zhao X, Yu X, Zhang X. The role of peer support education model in management of glucose and lipid levels in patients with type 2 diabetes mellitus in Chinese adults. J Diabetes Res 2019;2019.
4. Rismayanti IDA, Nursalam, Farida VN, et al. Early detection to prevent foot ulceration among type 2 diabetes mellitus patient: A multi-intervention review. J Public Health Res 2022;11:2752.
5. Joseph S, Munshi B, Agarini R, et al. Near infrared spectroscopy in peripheral artery disease and the diabetic foot: A systematic review. Diabetes Metab Res Rev 2022;38:e3571.
6. Novida H, Hariftyani AS, Edward M, Mudjanarko SW. Mortality prediction model in patients with diabetic foot ulcer: a case-control study from a tertiary referral hospital in Surabaya, Indonesia. J Heal Sci Med Res 2023;41(1).
7. Gavrila V, Garrity A, Hirschfeld E, et al. Peer Support through a diabetes social media community. J Diabetes Sci Technol 2019;13:493-7.
8. Akoit EE, Efendi F, Dewi YS. Impact of diabetes self-management education in middle-aged patients with type 2 diabetes mellitus: A systematic review . Gac Med Caracas 2022;130:S1183-95.
9. Baradaran A, Ebrahimzadeh MH, Baradaran A, Kachooei AR. Prevalence of comorbidities in COVID-19 patients: A systematic review and meta-analysis. Arch Bone Jt Surg 2020;8:247-55.
10. Ningsih ESP, Yusuf A, Firdaus S, et al. Psychometric properties of the Indonesia version religious health fatalism questionnaire in diabetic foot ulcer outpatients. J Public Health Res 2022;11:22799036221106605.
11. Huda N, Sukartini T, Pratiwi NW. The impact of self efficacy on the foot care behavior of type 2 diabetes mellitus patients in Indonesia. J Ners 2019;14:181-6.
12. Dinas Kesehatan Provinsi Jawa Tengah. Profil Kesehatan Provinsi Jateng Tahun 2019. Dinas Kesehat Provinsi Jawa Teng 2019;3511351:273-5.
13. Hardianti D, Adi MS, Saraswati LD. Description of factors related to severity of diabetic mellitus patient type 2 (study in Rsud Kota Semarang). J Kesehat Masy 2018;6:132-40.
14. Embuai S, Lestari P, Ulfiana E. Pengaruh Edukasi Perawatan Kaki Dan Senam Kaki Terhadap Upaya Pencegahan Risiko Foot Ulcer Pada Klien Diabetes Melitus. J Penelit Kesehat "SUARA FORIKES" (Journal Heal Res "Forikes Voice") 2017;8:180-90.
15. Pourkazemi A, Ghanbari A, Khojamli M, et al. Diabetic foot care: Knowledge and practice. BMC Endocr Disord 2020;20:1-8.
16. Ghasemi M, Hosseini H, Sabouhi F. Effect of peer group education on the quality of life of elderly individuals with diabetes: A randomized clinical trial. Iran J Nurs Midwifery Res 2019;24:44-9.
17. Nurmansyah MI, Jannah M, Rachmawati E, Maisya IB. Religious affiliation, religiosity and health behaviors among high school students in Jakarta, Indonesia. Int J Public Heal Sci 2020;9:184-91.
18. Castillo-Hernandez KG, Laviada-Molina H, Hernandez-Escalante VM, et al. Peer support added to diabetes education improves metabolic control and quality of life in mayan adults living with type 2 diabetes: a randomized controlled trial. Can J Diabetes 2021;45:206-13.
19. Chadha VK. Sample size determination in health studies. 2006;55-62.
20. Komariah K, Rahayu S. Hubungan Usia, Jenis Kelamin Dan Indeks Massa Tubuh Dengan Kadar Gula Darah Puasa Pada Pasien Diabetes Melitus Tipe 2 Di Klinik Pratama Rawat Jalan Proklamasi, Depok, Jawa Barat. J Kesehat Kusuma Husada 2020;May:41-50.
21. Sharoni AS, Razi MM, Rashid AN, Ahmad Sharoni SK MY, Rashid A, Khuzaimah Ahmad Sharoni S, et al. Self-efficacy of foot care behaviour of elderly patients with diabetes Bachelor of Nursing (hons) (UiTM). Malaysian Fam Physician 2017;12:2-8.
22. Imelda, Sjaaf F, PAF P. Faktor- Faktor yang Berhubungan dengan Kejadian Hipertensi pada Lansia di Puskesmas Air Dingin Lubuk Minturun. Heal Med J 2020;2:68-77.
23. Jernigan VBB, Huyser KR, Valdes J, Simonds VW. Food insecurity Among American Indians and Alaska Natives: a national profile using the current population survey-food security supplement. J Hunger Environ Nutr 2017;12:1-10.
24. Costa PD, Canaan JCR, Castelo PM, et al. Influence of micronutrient intake, sociodemographic, and behavioral factors on periodontal status of adults assisted by a public health care system in Brazil: A cross-sectional multivariate analysis. Nutrients 2021;13:1-15.
25. Rahmadita I, Latiifah NUR, Keperawatan PS, et al. Dengan Kadar Glukosa Darah Puasa Pada Penderita Diabetes Melitus

Tipe 2 Di Puskesmas. 2020.
26. Ramirez-Perdomo C, Perdomo-Romero A, Rodríguez-Vélez M. Knowledge and practices for the prevention of the diabetic foot. Rev Gauch Enferm 2019;40:e20180161.
27. Mohebi S, Parham M, Sharifirad G, Gharlipour Z. Social Support and Self Care Behavior Study. 2018;1-6.
28. Yulisetyaningrum, Mardiana SS, Susanti D. Hubungan Tingkat Pendidikan Dan Pengetahuan Tentang Diet DM Dengan Kepatuhan Diet Pasien Diabetes Mellitus Di RSUD R.A Kartini Jepara. Indones J Perawat 2018;3:44-50.
29. Jakosz N. Book review - IWGDF Guidelines on the Prevention and Management of Diabetic Foot Disease. Wound Pract Res 2019;27:144.
30. Lisnawaty, Sulastri N, Sabilu Y, et al. Risk Factors of Type 2 diabetes mellitus in coastal communities in the working area of community health centre of Kapota of Wakatobi Regency in 2018. Int J Sci Basic Appl Res 2018;4531:56-65.
31. Efriliana, Noor Diani HS 1Program. Karakteristik Pasien Diabetes Melitus Dengan Pengetahuan Tentang Perawatan Kaki Diabetes Melitus. Din Kesehat. 2018.
32. Arania R, Triwahyuni T, Prasetya T, Cahyani SD. Hubungan Antara Pekerjaan Dan Aktivitas Fisik Dengan Kejadian Diabetes Mellitus Di Klinik Mardi Waluyo Kabupaten Lampung Tengah. J Med Malahayati 2021;5:163-9.
33. Mariam TG, Alemayehu A, Tesfaye E, et al. Prevalence of diabetic foot ulcer and associated factors among adult diabetic patients who attend the diabetic follow-up clinic at the University of Gondar Referral Hospital, North West Ethiopia, 2016: Institutional-Based Cross-Sectional Study. 2017.
34. Wahyudi, Raya P. Hubungan Lama Menderita Diabetes Melitus Dan Kadar Glukosa Darah Sewaktu Dengan Tingkat Sensitivitas Kaki Di Puskesmas Pahandut Palangkaraya. 2019;001.
35. Indonesia PE. Pengelolaan dan Pencegahan Diabetes Melitus Tipe 2 di Indonesia. PB PERKENI. 2015.
36. Nurhanifah D. Faktor-Faktor Yang Berhubungan Dengan Ulkus Kaki Diabetik Di Poliklinik Kaki Diabetik. Heal J 2017;1:32.
37. Nuraisyah F, Solikhah S, Ruliyandari R. Do descendants of families contribute to type 2 diabetes mellitus? Int J Public Heal Sci 2020;9:303-6.
38. Amelia R. Hubungan Perilaku Perawatan Kaki dengan Terjadinya Komplikasi Luka Kaki Diabetes pada Pasien Diabetes Melitus Tipe 2 di Puskesmas Tuntungan Kota Medan. Talent Conf Ser Trop Med 2018;1:124-31.
39. Williams EM, Egede L, Oates JC, et al. Peer approaches to self-management (PALS): Comparing a peer mentoring approach for disease self-management in African American women with lupus with a social support control: Study protocol for a randomized controlled trial. Trials 2019;20:1-13.
40. Diatiningsih Y, Kusnanto K, Bakar A. Kepatuhan Pengelolaan Penyakit Diabetes mellitus Tipe II melalui Peer Group Support di Wilayah Kerja Puskesmas Kebonsari Surabaya. Crit Med Surg Nurs J 2019;1(1).
41. Syatriani S. Hubungan Pekerjaan Dan Dukungan Keluarga Dengan Stres Pada Pasien Dm Tipe 2 Di Daerah Pesisir Kota Makassar. Sinergitas Multidisiplin Ilmu Pengetah dan Teknol 2019;2:26-7.
42. Kasih S, Surakarta IBU, Publikasi N. Pengaruh peer group support terhadap kadar gula darah pada pasien diabetes mellitus tipe 2 di rumah sakit kasih ibu surakarta naskah publikasi. 2019.
43. Ngadiluwih MS. Pengaruh Perawatan Kaki Terhadap Sensitivitas Kaki Pada Penderita Diabetes Melitus Tipe II. 2018.
44. Dewi EU, Widari NP, Nursalam N, et al. The relationship between diabetes self-care management and blood glucose level among type 2 diabetes mellitus patients. Int J Public Heal Sci 2023;12:1165.
45. Pienaar M, Reid M. Self-management in face-to-face peer support for adults with type 2 diabetes living in low- or middle-income countries: a systematic review. BMC Public Health 2020;20:1-10.