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Sociodemographic Determinants of Digital Health Literacy: A Systematic Review and Meta-Analysis

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Running title: Sociodemographic determinants of DHL

Highlights

1. Age has a negative effect on DHL, especially in older adults.

2. Higher education, income, and social support are associated to higher DHL.
3. Addressing underprivileged populations' DHL is crucial.
4. Interventions to improve DHL should be tailored to the target population.

Abstract

Introduction: Differences in digital health literacy levels are associated with a lack of access to digital tools, usage patterns, and the ability to effectively use digital technologies. Although some studies have investigated the impact of sociodemographic factors on digital health literacy, a comprehensive evaluation of these factors has not been conducted. Therefore, this study sought to examine the sociodemographic determinants of digital health literacy by conducting a systematic review of the existing literature.

Methods: A search of four databases was conducted. Data extraction included information on study characteristics, sociodemographic factors, and the digital health literacy scales used. Meta-analyses for age and sex were conducted using RStudio software with the metaphor package.

Results: A total of 3922 articles were retrieved, of which 36 were included in this systematic review. Age had a negative effect on digital health literacy (B=-0.05, 95%CI [-0.06; -0.04]), particularly among older adults, whereas sex appeared to have no statistically significant influence among the included studies (B=0.17, 95%CI [-0.61; 0.30]). Educational level, higher income, and social support also appeared to have a positive influence on digital health literacy.

Discussion: This review highlighted the importance of addressing the digital health literacy needs of underprivileged populations, including immigrants and individuals with low socioeconomic status. It also emphasizes the need for more research to better understand the influence of sociodemographic, economic, and cultural differences on digital health literacy.

Conclusions: Overall, this review suggests digital health literacy is dependent on sociodemographic, economic, and cultural factors, which may require tailored interventions that consider these nuances.

Keywords: Digital health literacy; Systematic Review; Digital Health; Meta-analysis; Sociodemographic; Social Inequalities

Summary

What was already known on the topic

- Digital health literacy is important for people to effectively access and use digital tools for health-related purposes.

- Differences in access and usage patterns of digital health tools are ultimately related to socioeconomic context, consequently contributing to social health inequalities.

What this study added to our knowledge

- Though it is known that there are some influencing sociodemographic factors on digital health literacy, a systematic appraisal remains lacking.

- The study found that age negatively affected digital health literacy, particularly among older adults. Higher education level, income, and social support were positively associated with digital health literacy.

- This review highlights the need to address the digital health literacy needs of underprivileged populations, and the importance of tailored interventions based on individuals' sociodemographic, economic, and cultural backgrounds.

Introduction

The development of electronic health records and telemedicine has led to an increasing use of digital health tools, gaining significant momentum in the 2000s with the widely available internet (1). Today, the use of digital health tools has expanded to include health-related apps, wearable devices, and online medical resources to help people manage their health and make informed decisions about health care. The growing use of digital tools in the modern world requires quick adaptation, which is ultimately hindered or facilitated by access to new technologies and the skills needed for their adequate use (2,3). As the proper use of digital health tools, also known as e-health or eHealth tools, demands a vast number of skills, including numeracy, science literacy, technology use, health literacy, and the capacity to critically appraise health information (4), exploring the digital health literacy context constitutes a complex challenge.

Digital health literacy is defined as the ability to find, understand, and use health information from digital sources (5), such as the Internet and mobile devices, and is strongly related to the frequency with which people use different health and digital resources. These resources include online video consultations, digital health records, social networks, and other health-related applications aimed at promoting and improving patient health (6). The burden of digital health illiteracy is significant, as those with difficulty navigating health information may be more vulnerable to misinformation (7). Differences in digital health literacy levels between individuals persist noticeably, as well as in their online skills and Internet knowledge, which are ultimately related to socioeconomic status and autonomy in the use of these tools (8,9), consequently contributing to social health inequalities and poorer health outcomes (10).

Currently, there are several approaches to address digital inequality. A three-level model for digital divide has been presented by van Deursen & Helsper (3), with the first digital divide level being associated with lack of access to digital tools, the second level to usage patterns, and the last level being associated with the ability to use digital technologies to achieve improved outcomes the means to access the Internet and the ability to use digital technologies effectively and efficiently (3,11,12). Nevertheless, digital divide – and each of these levels present on the three-level model - is influenced by factors such as socioeconomic status, generation, sex, region, and health status, with the first being one of the main predictors of Internet access and associated skills, directly influencing competent Internet use (3,11,12). Furthermore, digital health literacy can be influenced by other factors such as technology readiness, attitudes towards technology, and Internet use patterns (13–16). Although some studies have reported the influence of sociodemographic factors on digital health literacy, a systematic appraisal of these factors is lacking. Thus, this study aimed to analyze the sociodemographic determinants of digital health literacy through a systematic review and meta-analysis of the available studies on the topic.

Methods

Screening and study selection

A search was conducted on November 24, 2021, on MedLINE-PubMed, Scopus, Web of Knowledge, and EMBASE databases. To update the results obtained, a new search was conducted on April 12, 2022, using the same databases. The screening of the obtained articles was conducted by title and abstract by two independent researchers (ME and GS), and the search strategy was primarily designed to identify relevant studies that analyze the influencing factors on digital health literacy, and identify which scales were used in these studies to

measure digital health literacy. The keywords used to search the aforementioned databases are as follows:

(digital health OR e-health OR ehealth) AND literacy AND (determinants OR factors OR sociodemographic OR demographic OR scale)

This systematic review was registered in the PROSPERO database (CRD42022325207) (17).

Selection criteria

The inclusion criteria accepted studies that analyzed the influence of sociodemographic factors, such as sex, age, income, geographic region, and social status. There was no time restriction and the languages of the included studies were English, Portuguese, or Spanish. Conference abstracts, systematic reviews, reviews, meta-analyses, editorials, study protocols, scale design and validation studies, correspondence papers, and studies that were not within the scope of our study were excluded.

All titles and abstracts obtained from the searches were independently reviewed by two researchers. The inclusion and exclusion criteria were applied by ME and GS and validated by a third researcher (TH) when there was no agreement. Inter-rater agreement was calculated using the Cohen's kappa coefficient. Full-text articles were selected using the same approach.

Quality assessment

The quality of the included studies was assessed using the Joanna Briggs Institute Checklist for Cross-sectional studies (18). For each study, the risk of bias was assessed separately by two researchers (ME and GS). Similar to the screening process, a third reviewer (TH) acted as a referee to reach a consensus in case of disagreement.

Data analysis

Data extraction retrieved information on authors, year, country, study design, study population, response rate, average digital health literacy score, and a brief description of the main digital health literacy determinants, namely sociodemographic characteristics. The primary outcome was the impact of the aforementioned sociodemographic characteristics on digital health literacy levels, and the secondary outcome was the scale used to analyze digital health literacy. The results were summarized qualitatively and quantitatively. This systematic review and meta-analysis followed the PRISMA (19) and MOOSE (20) guidelines. Further recommendations for conducting meta-analyses of observational studies were retrieved from a study by Mueller (21).

Statistical analysis

All statistical analyses were conducted using RStudio software (v. 4.2.2), and the packages metafor (22), dplyr, and readxl. Regression coefficients were estimated with 95% confidence intervals using a random-effects model with Hedges and Olkin's estimator (23,24). Heterogeneity due to differences between studies was assessed using Cochran's Q and I2-statistic (25,26). Forest plots were used to visually represent the presence of heterogeneity. Publication bias was assessed using funnel plots (27) – *see supplementary figures S2).* Sensitivity for age was assessed through subgroup analyses of young adults, adults, and older adults. As there were no evident subgroups for sex, sensitivity analyses for this variable were conducted using the leave-one-out method.

Results

Screening

A total of 3922 articles were retrieved from Pubmed, Scopus, WoS, and EMBASE databases, of which 1886 were duplicates (figure 1). Screening by title and abstract was conducted, and 1926 records were excluded as they did not agree with the inclusion criteria, achieving a Cohen's kappa of 0.623, corresponding to substantial agreement (28); 110 reports were analyzed by full text to check eligibility. Of these, 36 were included in this systematic review. Cohen's kappa of 0.861 was obtained, corresponding to an almost perfect agreement (28) between the researchers.

Quality analysis

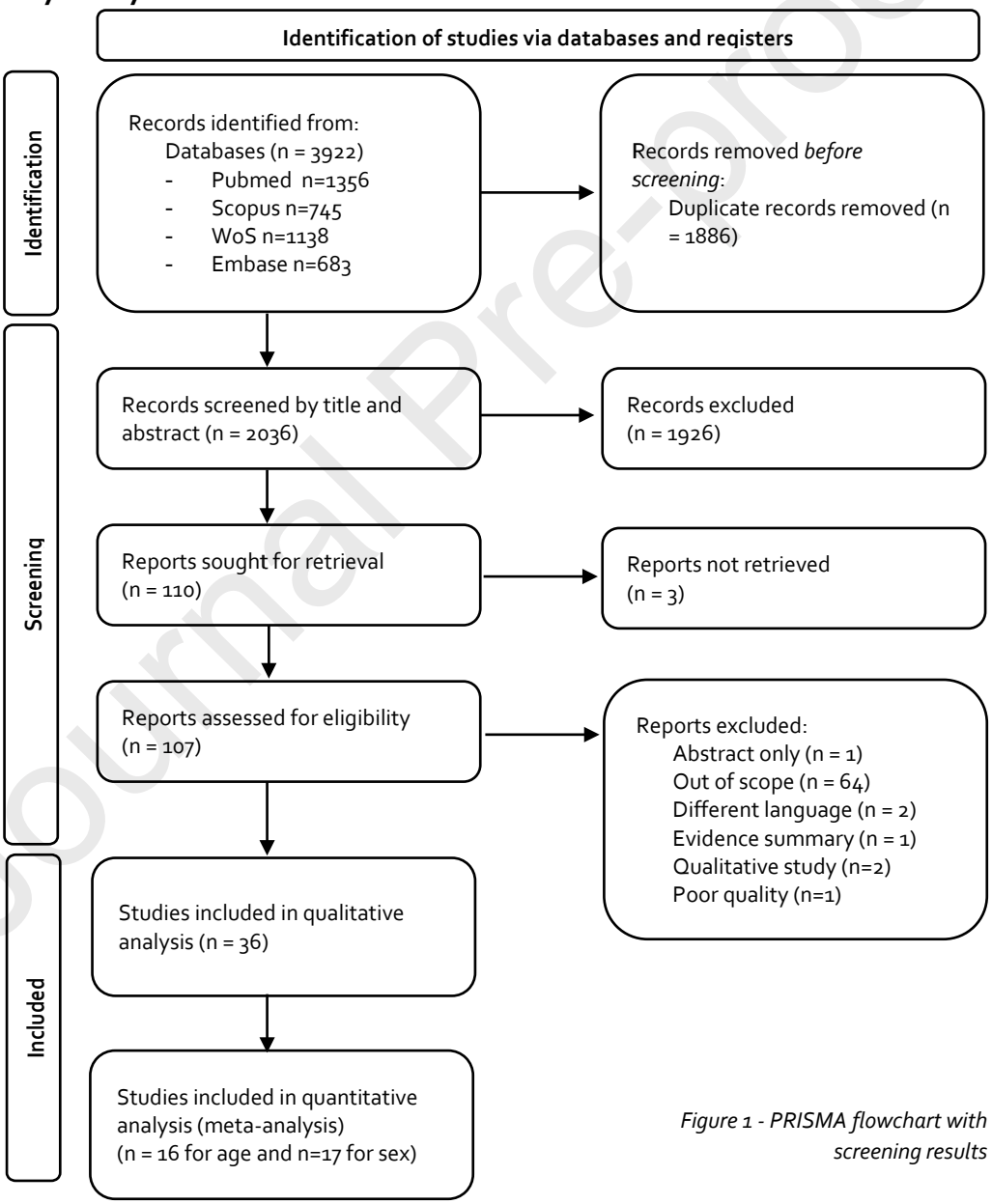

Figure 1 - PRISMA flowchart with screening results

The quality analysis was conducted by two independent researchers. From the thirty-seven studies included after full-text screening, one study was removed for inadequate reporting of results.

Although the remaining studies had overall good quality, some criteria were classified as "unclear" for some studies, especially regarding inclusion criteria of the sample, exposure measurement, and confounding factor identification/management. The results of the quality analysis are shown in Supplementary Table S2.

Studies' characteristics

All studies used the eHealth Literacy Scale (eHEALS), except for Zakar's study (21), which used the Digital Health Literacy Instrument. The weighted average eHEALS score among the studies was 30.4±2.4. Table 1 presents the main characteristics of the studies included. The data extracted from the regression analyses are presented in Table S1.

Table 1 - Characteristics of the included studies

Year	Author	Location	Setting	N	Age (mean)	Sex (% males)	Population	Time period	Response rate (%)	eHEALS mean (SD)
2021	Abdulai, A	Ghana	Online survey	269	28.4	59.7	Adults	Apr 15 - Jun 1, 2020	46.4	4.01 (0.95)*
2019	Alhuwail, D	Kuwait	Online survey	386	36.5	37	Adults	Sep – Oct, 2015	62.7	28.63 (5.6)
2020	Arcury, T	North Carolina (US)	On-site	200	63.5	42	Older adults (55+yo)	Nov 2014-May 2016	31.8	28.4 (7.1)
2021	Bergman, L	Sweden	On-site	681	45.9	43.1	Adults (arabic and swedish native speakers)	Feb – Sep, 2019	96.9	28.7 (6.2) - Total; 28.1 (6.1) - Arabic; 29.3 (6.2) - Swedish
2021	Berkowsky, R	California (US)	Online survey	237	72.7	42.7	Older adults (65+ yo)	2020	-	-
2020	Cherid, C	Canada	On-site	401	67.5	36	Adults (50+ yo)	Sep 2017 - Mar 2018	97.8	29 (24–32)**
2013	Choi, N	Texas (US)	Mixed	980	71.3	30	Low income disabled and home-bound adults	Nov 2012 - Feb 2013	-	3.53 (0.76) - <60 yo * 3.22 (0.85) - >60 yo *

2021	De Santis, K	Germany	CATI	1014	54	47.9	General population (14-93 yo)	Oct, 2020	-	31 (6)
2020	Do, B	Vietnam	Online survey	5209	34.0	32.9	Healthcare workers (21-60 yo)	April 6-19, 2020	-	33.1 (4.8)
2019	Gazibara, T	Belgrade (Servia)	On-site	702	16.5	41.9	High school students	Dec 2016 - Jan 2017	100	26.0 (10)**
2021	Guo, Z	Hong kong	CATI/Online	1501	49.0	47.4	Adults	Sep 1-25, 2019	-	3.71 (0.65)*
2020	Kim, S	Korea	On-site	205	21.7	14.1	Nursing students	Apr 9-23,2020	61.3	26.10 (7.7)
2011	Knapp, C	US	Telephone	2371	40.5	9	Parents with children with care needs	Jul – Oct, 2009	58.2	-
2020	Lee, O	South Korea	Interviews	217	72.2	37.8	Older adults (65+ yo)	-	-	2.7 (1.58) – US*; 3.56 (0.60) – S. Koreans*
2021	Lee, W	Malaysia	On-site	216	46.7	43.5	Adults	Sep-Nov, 2019	-	27.38 (6.59)
2022	Makowsky, M	Canada	On-site	301	39.9	44.9	Adults	May 18-Aug 31, 2014	-	29.27 (6.84)
2021	Maroney, K	Chicago IL (US)	Phone survey	288	52.6	54.5	KT and LT recipients	Mar 2014 - Nov 2016	82	30.88 (5.37)

2021	Mengestie, N	Ethiopia	On-site	801	21.7	40	Health sciences university students	Apr-May, 2019	94.6	28.7
2022	Moon, Z	England and Wales	On-site and online	1860	60.5	0	Breast cancer survivors	-	64	28.8 (7.34)
2021	Morton, E.	US	Online survey	919	36.9	23.1	People with bipolar	Feb 19-Jul 20, 2020	81.3	31.7 (6.3)
2020	Nguyen, L	Vietnam	On-site	410	22.2	44.9	Medical students	Jul – Dec, 2017	-	27.03 (3.54)
2017	Richtering, S	Australia	On-site	453	67	75.9	Adults (CVD)		-	27.2 (6.59)
2021	Schrauben, S	US	On-site	633	67.9	59	Chronic kidney disease adults	Late 2016 - mid 2018	67.9	-
2020	Shiferaw, K	Ethiopia	On-site	423	35.6	66.3	Chronic patients	Feb – May, 2019	95.3	24.6 (6.4)
2018	Stellefson, M	US	Online survey	176	66.2	49.4	COPD patients	-	13.9	29.11 (5.72)
2015	Tennant, B	US	CATI	283	67.5	54.8	Older adults and baby boomers	Feb, 2013	7.3	29.05 (5.75)
2022	Tran, H	Vietnam	Online survey	1851	20.5	6.9	Nursing students	Apr 7 – May 31, 2020	47.5	31.4 (4.4)
2017	Vicente, M	European union	CATI	26566	-	40	General population (14+ yo)	Sep, 2014	-	-

2019	Wong, D	Hong kong	On-site	1016	31.5	39.2	Patients	Mar-Apr, 2017	94.5	-
2016	Xesfingi, S	Greece	Online and interview	1064	38.1	44.8	Adults	2013	-	-
2021	Xu, R	China	On-site	569	46.3	50.6	Patients	Nov 2019-Jan 2020	71.1	66.4 (21.2)***
2020	Yang, E	South Korea	Online and face-to-face	405	-	19.1	Young and old adults	Nov 2017-Feb 2018	100	30.50 (4.62) - young adults; 30.95 (4.17) - older adults
2017	Yang, S	Taiwan	On-site	556	47.7	-	College students	Dec, 2015	79.4	-
2021	Zakar, R	Pakistan	Online survey	1747	22.5	47.3	University students	May 1 - Jun 15, 2020	88.2	-
2020	Zhou, J	China	Online survey	162	40.6	9.9	Online health communities	Jan – Mar, 2019	73.6	3.79 (0.79)*
2015	Zibrik, L	British Columbia	On-site	896	-	44.5	Chinese and punjabi seniors	2013-2014	-	-

* Average (SD) per item

** Median (IQR)

*** Minimum-maximum normalization

Table 2 summarizes the characteristics analyzed in each study. Almost all the studies analyzed age and sex. The results of the effect of each variable on digital health literacy scores are included in the supplementary material.

Table 2 - Sociodemographic variables studied per study

Author	Age	Sex	Education	Socioeconomic status	Employment	Ethnicity, race and Language spoken	Household composition, social support, and residence
Abdulai, A	✓	✓	✓	✗	✗	✗	✗
Alhuwail, D	✓	✓	✓	✗	✗	✗	✗
Arcury, T	✗	✗	✗	✗	✗	✓	✗
Bergman, L	✓	✓	✓	✗	✗	✓	✗
Berkowsky, R	✓	✓	✓	✓	✓	✓	✓
Cherid, C	✓	✓	✓	✗	✗	✗	✗
Choi, N	✓	✓	✗	✓	✗	✓	✓
De Santis, K	✓	✓	✓	✓	✗	✗	✗
Do, B	✓	✓	✗	✓	✗	✗	✓
Gazibara, T	✓	✓	✓	✓	✗	✗	✓*
Guo, Z	✓	✓	✓	✓	✓	✗	✓
Kim, S	✓	✗	✗	✗	✗	✗	✗
Knapp, C	✓**	✓*	✓*	✓	✗	✓*	✓*
Lee, O	✓	✓	✓	✗	✗	✗	✗
Lee, W	✓	✓	✓	✓	✓	✓	✗

Makowsky, M	✓	✓	✓	✗	✗	✓	✓
Maroney, K	✓	✓	✓	✗	✓	✓	✓
Mengestie, N	✗	✓	✗	✗	✗	✗	✓
Moon, Z	✓	✗	✓	✓	✗	✓	✗
Morton, E	✓	✓	✓	✗	✗	✗	✗
Nguyen, L	✓	✓	✗	✓	✗	✗	✗
Richtering, S	✓	✓	✓	✓	✗	✗	✗
Schrauben, S	✓	✗	✓	✓	✗	✓	✗
Schrauben, S	✓	✗	✓	✓	✗	✓	✗
Shiferaw, K	✗	✗	✓	✓	✓	✗	✓
Stellefson, M	✓	✓	✓	✗	✗	✗	✓
Tennant, B	✓	✓	✓	✓	✗	✓	✓
Tran, H	✓	✓	✗	✓	✗	✗	✗
Vicente, M	✓	✓	✓	✓	✓	✗	✓
Wong, D	✓	✓	✓	✗	✓	✗	✗
Xesfingi, S	✓	✓	✓	✓	✗	✗	✓
Xu, R	✓	✓	✓	✓	✓	✗	✓
Yang, E	✓	✗	✓	✓	✗	✗	✓
Zakar, R	✓	✓	✗	✓	✗	✗	✗
Zhou, J	✓	✓	✓	✗	✗	✗	✓

Yang, S	✓	✗	✗	✗	✗	✗	✗

✓** - parents and children; ✓* - parents'

Study design and setting

All studies had a cross-sectional design. Seventeen studies were conducted on-site (13,16,30–44), either through interviews or the distribution of a questionnaire; nine studies were conducted online (29,45–52), and five studies were conducted through telephone (53–57). The remaining five studies adopted a mixed approach (58–62), using two of the aforementioned data collection strategies.

Location

The included studies are distributed around the globe: almost half of the studies (14/36) were conducted in Asian countries (13,29–35,45–48,58,59). Twelve studies were conducted in North America (16,36–39,49–51,53–55,60), six in Europe (40,41,56,57,61,62), three in Africa (42,43,52) and one in Australia (44).

Population characteristics

Seven studies were conducted among high school or college students (29,30,32,35,41,42,47). Older adults were the target population in six studies (16,31,36,39,49,55), while one study included younger and older adults (59). Of the remaining twenty-two studies, eight targeted populations with specific diseases (36,43,44,50,51,54,60,61), one targeted at healthcare workers (46), and the remaining had patients in general or the general population as the target population.

Digital health literacy levels

From studies that presented average eHEALS scores among respondents, it was observed that healthcare workers (46) and online health consumers (52) presented higher levels of digital health literacy. However, although nursing students from Tran's study (47) presented high scores on eHEALS on average, other groups of nursing and medical students belonged to the studies with the lowest average eHEALS scores (31,32). It was also observed that most studies presenting higher levels of digital health literacy were conducted online and/or through phone. In studies comparing two distinct groups, while no significant differences were noted among young adults and older adults (59), statistically significant differences were observed among Arabic and Swedish speakers (40), those under and above 60 years of age (60), and US and South Korean older adults (31).

Age

The weighted average age of all participants was 40.92±15.37 years old. Considering the statistically significant outcomes, all articles, except Morton (45), reported a negative association between age

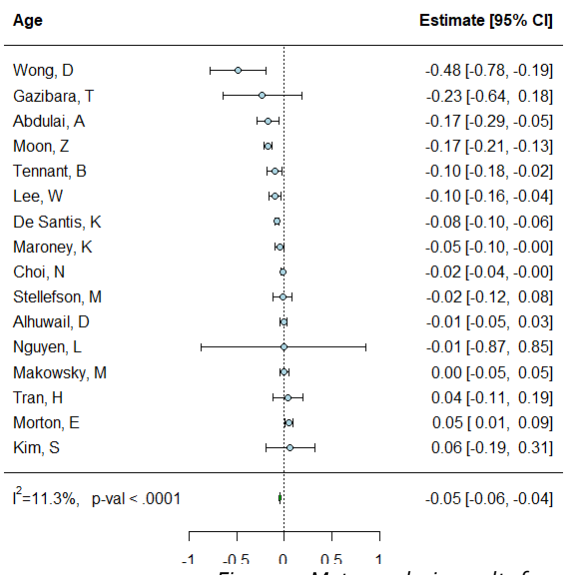

Figure 2 - Meta-analysis results for age

and eHEALS scores. People aged over 75 years are up to four times more likely to have lower levels of digital health literacy (36). When conducting a meta-analysis, a statistically significant negative effect of age on eHEALS scores was observed (B=-0.05, 95%CI [-0.06;-0.04]) (Fig. 2). After conducting subgroup analyses (Supplementary figure S1), a significant effect of age on the eHEALS scores among older adults was observed. The young adults' subgroup presented no heterogeneity but no significant results, whereas the adult group also presented non-significant results and substantial heterogeneity.

Sex

Regarding sex, five studies had more than 80% females as participants, and only seven studies had over 50% males as a study population. From the 28 studies that analyzed the influence of sex on eHEALS scores, only nine studies presented significant results (29,32,41,42,45,46,46–48,52,57). However, although significant, these results present high heterogeneity, with females presenting higher levels of digital health literacy in some studies and lower levels in others. Figure 3 presents the forest plot for the studies included in the meta-analysis, with an effect size of –0.17, 95%CI[-0.61;0.30], confirming the high heterogeneity between the studies and the non-significance of the pooled results. A table with a sensitivity analysis is presented in the Supplementary Material.

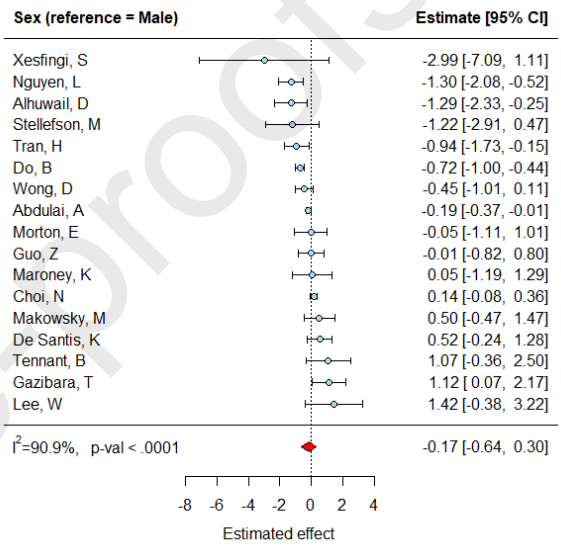

Figure 3 - Meta-analysis results for sex

Education

Among the 27 studies that analyzed the influence of education, every study with statistically significant results presented a positive influence of educational level on eHEALS scores(13,31,36,38,40,43,45,48,50,51,55,56,58,62), with those with a college degree or higher being particularly predisposed to present higher digital health literacy. Gazibara's study (41) analyzed parents' highest educational attainment, with no statistically significant results. Moon's study (61) presents a positive influence of the age at which respondents left full-time education with eHEALS scores.

Socioeconomic status

Regarding income, five studies presented significant results (38,43,56,58,62), with higher income associated with higher eHEALS levels. Two of these studies only presented significant results for populations in the highest income bracket (43,58). Other studies measured the income-to-needs ratio (60), financial and social status (29,46,59), economic condition (32), ability to pay for medication (47), healthcare insurance scheme (34), and Index of Multideprivation quintile (61), where individuals belonging to the 3rd quintile presented lower digital health literacy when compared to their least-deprived counterparts.

Employment

Only seven studies analyzed the influence of employment status on eHEALS scores, with only Xu's study presenting a significant difference in digital health literacy scores between employed and unemployed individuals (34).

Ethnicity, race, and languages spoken

Ethnicity appeared to have no effect on digital health literacy in the included studies, with the exception of Lee's study (13) conducted in Malaysia, where Malaysian Chinese people presented lower levels of eHEALS scores. Tennant et al.(51) evaluated the influence of race and achieved non-significant results. Choi (60) and Bergman (40) analyzed the influence of the languages spoken on eHEALS scores. In Choi's study, being Spanish-speaking in the US had no influence on eHEALS scores, while being an Arabic native speaker in Sweden was associated with a higher probability of presenting low digital health literacy.

Household composition, social support, and residence

None of the studies that analyzed the influence of marital status on eHEALS scores showed statistically significant differences between the groups. Four studies analyzed the impact of residence on digital health literacy, all with no statistically significant results. While having children appeared to have no influence (34), living alone and lack of social support were associated with lower eHEALS (34,51).

Discussion

The role of various socioeconomic and demographic factors in determining DHL has been a subject of interest in the research community. This systematic review and meta-analysis discusses the influence of sociodemographic determinants on DHL, an important aspect of healthcare that involves an individual's ability to access, understand, and use health information from digital sources. Overall, our results suggest that there are some factors that may directly influence the digital health literacy levels, such as age, education, and social support.

Most studies have analyzed the impact of age and sex on DHL levels. One interesting finding of this systematic review and meta-analysis is that sex does not appear to be a significant determinant of digital health literacy. While sex is often associated with disparities in health outcomes, studies demonstrate that these differences are also highly influenced by other variables, such as cultural context, marital status, and socioeconomic conditions (63). While the impact of sex tends to be heterogeneous among studies, a negative relationship between age and DHL levels appears to exist. While it may seem obvious that older individuals may have lower digital health literacy, the review found significant results only in subgroup analyses. However, when conducting subgroup analyses, studies conducted among young adults showed no significant impact of age on the DHL levels. Studies of the general population are highly heterogeneous; thus, they lack sufficient consistency to draw conclusions. However, the included studies on older adult subgroups presented a significant negative impact of age on eHEALS scores. However, these results should be carefully considered, as only two studies were included in this subgroup. Thus, our results suggest that age may not be a strong predictor of digital health literacy on its own.

The review included studies that investigated the direct impact of socioeconomic factors such as education, income, and employment status on digital health literacy. As expected, the results showed that individuals with higher levels of education tended to have higher digital health literacy than those with lower levels of education, thus reinforcing its role in digital health literacy. These results agree with the previously published literature on the impact of educational level on health literacy, digital literacy, and digital health literacy (64,65). Socioeconomic status also seemed to influence the level of digital health literacy. As low socioeconomic status is associated with suboptimal use of health resources and health status (64), it is only expected that it is also reflected in the ability to acquire adequate health information from digital sources. Furthermore, access to the Internet and digital health tools may also be severely hindered by individuals' economic status, thus highlighting the importance of reinforcing digital health interventions among those who are the most underprivileged (3,11,12). This review also highlights the influence of social support on health literacy, suggesting that individuals with more social support tend to have higher health literacy than those with less social support.

While ethnicity by itself appears to have no effect on digital health literacy levels on most of the included studies, and appear to be very dependent on the context, being a native speaker may constitute an advantage for higher digital health literacy levels when compared to their immigrant counterparts. As immigrants are at a higher risk of social exclusion, which consequently hinders access to healthcare services (66), it is also important to target DHL interventions for these populations, ultimately helping them navigate the country's health systems.

One of the limitations of this review was the high heterogeneity and variability of the included studies. This was expected, as the included studies were cross-sectional, representing only a specific population, and being at risk for a higher selection bias of participants. Furthermore, it is observed that those studies conducted through an online survey tend to present higher average levels of digital health literacy, which might be result of an exclusion of those individuals who are unable to use digital tools. Additionally, this review only included articles that analyzed the direct influence of socioeconomic variables, and studies on differences were excluded. However, the review had some strengths, including the inclusion of studies from around the world, reliability of the scale used, and lack of publication bias. The eHEALS (4) is the most widely used scale to measure digital health literacy, presenting high levels of validity and consistency (67,68). However, while digital health literacy may have not changed since its development, the context in which digital health skills are applied nowadays has, and eHEALS focuses only on information gathering (Health 1.0 skills), disregarding interactivity on the Web (Health 2.0) (69). The ever-growing influence of social media on health decisions and the risk of health misinformation (70) are prominent problems that were not as present as they are now. Furthermore, as there is so much misinformation circulating on the Internet, people with low digital health literacy may also be more susceptible to cognitive bias, overestimating their knowledge base (71). As the eHEALS is a scale comprising self-reporting questions, it may not entirely reflect the actual digital health literacy levels of the population. Thus, it is also important to assess actual digital health literacy through performance-based items, possibly with reference to those developed by van der Vaart and Weiss (69,72).

Conclusions

In conclusion, this review provides valuable insights into the influence of socioeconomic and demographic factors on digital health literacy. These findings suggest that DHL is multifactorial and may be influenced by cultural and contextual factors. Nevertheless, educational level,

social support, and socioeconomic status may be key factors for improving digital health literacy. Nevertheless, this review also highlights the need for more research to better understand the influence of sociodemographic, economic, and cultural differences on digital health literacy. Thus, we recommend targeting digital health interventions considering these nuances, to improve their effectiveness, as they may not be one-size-fits-all, and their effectiveness is highly dependent on several underlying factors.

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Supplementary material

Table S1 - Data extracted on sociodemographic characteristics' influence on DHL

							AGE
Year	**Author**		**B**	**SE**	**95%CI**	**β**	**95%CI**
2021	Abdulai, A	.	-0.17	0.06		-0.16**	[-0.29; -0.05]
2019	Alhuwail, D	.	-0.01	0.02		-0.02	.
2021	Berkowsky, R	.	-0.067	.	.	.	.
2013	Choi, N	.	-0.02**	0.01	.	.	.
2021	De Santis, K	.	-0.18	0.01	.	-0.22**	.
2020	Do, Binh N.	21-40 (ref)	.	.	.	.	.
		41-60	-0.3	.	[-0.65; 0.04]	.	.
2019	Gazibara, T		-0.23	.	[-0.64; 0.19]	.	.
2021	Guo, Z	18-39 (ref)	.	.	.	.	.
		40-59	-0.77	.	[-1.82; 0.28]	.	.
		>=60	-5.48***	.	[-6.91; -4.05]	.	.
2020	Kim, S	.	0.06	0.13	.	0.03	.
2020	Lee, O	US	0.01	.	.	0.07	.
		Korean	0	.	.	-0.03	.
2021	Lee, W	.	-0.017	.	[-0.10; 0.06]	-0.03	.

2022	Makowsky, M	.	0	.	[-0.05; 0.05]	.	.
2021	Maroney, K	.	-0.05*	.	[-0.1; 0]	.	.
2022	Moon, Z	.	-0.17***	0.02	.	-0.25	[-0.2; -0.14]
2021	Morton, E	.	0.05	0.02	.	0.09**	.
2020	Nguyen, L	.	-0.01	0.44	.	.	[-0.86; 0.85]
2018	Stellefson, M	.	-0.02	0.05	.	.	.
2015	Tennant, B	.	-0.1	0.04	.	-0.19**	.
2022	Tran, H	.	0.04	.	[-0.12; 0.19]	.	.
2019	Wong, D	.	-0.48	0.15	.	-0.15***	.
2021	Xu, R	16-30 (ref)	.	.	.	.	.
		31-40	-2.05	.	[-8.87; 4.78]	.	.
		41-50	-4.96	.	[-12.24; 2.33]	.	.
		51-60	-6.37	.	[-14.15; 1.41]	.	.
		>=61	-7.91	.	[-16.35; 0.53]	.	.
2020	Yang, E	Young adults	-0.18	.	.	-0.18	.
		Older adults	-0.06	.	.	-0.07	.
2021	Zakar, R	.	-0.02	0.04	[-0.09; 0.05]	.	.
2020	Zhou, J	.	-0.86	.	.	.	.

				Crude OR	95%CI	Adjusted OR	95%CI
2021	Bergman, L		19-24 (ref)	.	.	.	.
		25-54		1.08	[0.61; 1.91]	0.69	[0.34; 1.14]
		55-64		1.66	[0.82; 3.36]	1.03	[0.44; 2.41]
		65+		2.51*	[1.32; 4.76]	1.65	[0.74; 3.7]
2020	Cherid, C.		50-64 (ref)	.	.	.	.
		65-74		1.3	[0.4; 2.3]	1.3	[0.7; 2.5]
		>=75		4	[1.9; 8.2]	4.2	[2; 8.9]
2017	Richtering, S	<65 (ref)		.	.	.	.
		65-70				1.41	[0.96; 2.08]
		>70				1.94	[1.27; 2.96]
2021	Schrauben, S	Age (per 10 years)		.	.	0.74	[0.63; 0.85]
2016	Xesfingi, S	.			0.617****		

SEX

Year	Author		B	SE	95% CI	β	95% CI
2021	Abdulai, A	Female	-0.19	0.09	.	-0.15*	[-0.37; -0.01]
2019	Alhuwail, D	Female	-1.29	0.53	.	-0.23*	.

2021	Berkowsky, R	Female	.	.	.	0.33	.
2013	Choi, N	Female	0.14	0.11	.	.	.
2021	De Santis, K	Female	0.52	0.39	.	0.04	.
2020	Do, Bi	Male	0.72**	.	[0.43; 1]	.	.
2019	Gazibara, T	Female	1.12*	.	[0.07; 2.18]	.	.
2021	Guo, Z	Female	-0.01	.	[-1.82; 0.28]	.	.
2020	Lee, O	US Female	-0.53	.	.	-0.16	.
		Korean Female	0	.	.	-0.11	.
2021	Lee, W	Female	1.42	.	[-0.38; 3.22]	0.1	.
2022	Makowsky, M	Female	0.5	.	[-0.47; 1.47]	.	.
2021	Maroney, K	Female	0.05	.	[-1.2; 1.29]	.	.
2021	Morton, E	Female	-0.05	0.54	.	0	.
2020	Nguyen, L	Male	1.30***	0.4	.	.	[0.55; 2.1]
2018	Stellefson, M	Female	-1.22	0.86	.	.	.
2015	Tennant, B	Female	1.07	0.73	.	0.1	.
2022	Tran, H	Male	0.94**	.	[0.15; 1.73]	.	.
2019	Wong, D	Female	-0.45	0.29	.	-0.05	.
2016	Xesfingi, S	Male	2.99	.	[-1.11; 7.1]	.	.
2021	Zakar, R	Female	0.93**	0.33		[0.28; 1.56]	

2020	Zhou, J	Male	-0.14*	.	.		

			Crude OR	95% CI	Adjusted OR	95% CI
2021	Bergman, L	Female	1.05	[0.75;1.48]	0.89	[0.58; 1.36]
2020	Cherid, C	Male	.	.	1.4	[0.8; 2.5]
2021	Mengestie, N	Female	1.41*	[1.01;1.88]	1.55*	[1.08; 2.22]
2017	Richtering, S	Female	.	.	0.52	[0.24; 1.11]
2016	Xesfingi, S	Female	1.02	.		

EDUCATION

Year	Author		B	SE	95% CI	β	95% CI
2021	Abdulai, A	Senior high	-2.13	1.4	.	-0.16	[-4.9; 0.74]
		Diploma	-0.64	1.4	.	-0.5	[-3.3; 2.1]
		Degree	-0.34	1.3	.	-0.3	[-2.8; 2.2]
		Masters (ref)	.	.	.	.	.
2019	Alhuwail, D	Primary school	0.41	1.78	.	0.07	.
		High School	0.73	0.75	.	0.13	.
		Diploma	0.4	0.84	.	0.07	.
		Degree (ref)	.	.	.	.	.
		Masters	1.24	0.8	.	0.22	.

		Doctorate	3.52	0.97	.	0.62***	.
2021	De Santis, K	.	0.78	0.2	.	0.14***	.
2019	Gazibara, T	Highest education (mother)	0.6			[-0.58; 1.79]	
		Highest education (father)	1.21*			[-0.01; 2.27]	
2021	Guo, Z	Primary or below (ref)	.	.	.	.	.
		Secondary	3.58***	.	[1.98; 5.18]	.	.
		Tertiary or above	6.22***	.	[4.39; 8.06]	.	.
2020	Lee, O	US	0.4	.	.	0.36***	.
		Korean	0.11	.	.	0.32**	.
2021	Lee, W	Up to secondary level	-2.02	.	[-3.71; -0.33]	-0.14*	.
2022	Makowsky, M	<High School (ref)	.	.	.	.	.
		High School	7.69	.	[-13.17; 28.56]	.	.
		≥College	10.69	.	[-10.17; 31.55]	.	.
2021	Maroney, K	High School (ref)	.	.	.	.	.
		≥College	2.15	.	[0.93; 3.37]	.	.
2021	Morton, E	High School (ref)	.	.	.	.	.
		Post secondary	0.57	0.66	.	0.04	.
		Undergraduate	0.9	0.6	.	0.07	.
		Postgraduate	1.79	0.7	.	0.11**	.

2018	Stellefson, M	8th-11th	-4.7	2.7	.	.	.
		High school	-4.67**	1.58	.	.	.
		Some college	-2.56*	1.2	.	.	.
		College grad	-4.1**	1.39	.	.	.
		Post-grad (ref)	.	.	.	.	.
2015	Tennant, B	.	0.48	0.18	.	0.18**	.
2022	Tran, H	.	-0.01	0.25	.	-0.002	.
2021	Xu, R	No or primary education (ref)	.	.	.	.	.
		Secondary	-2.78	.	[-8.35; 2.78]	.	.
		Tertiary or above	-0.7	.	[-7.23; 5.83]	.	.
2020	Yang, E	Young adults	1.25	.	.	0.08	.
		Older adults	0.96	.	.	0.11	.
2020	Zhou, J	.	0.23***	.	.	.	.

Year	**Author**		**Crude OR**	**95% CI**	**Adjusted OR**	**95% CI**
2021	Bergman, L	Academic education (ref)	.	.	.	.
		7-12 years	1.58*	[1.11; 2.25]	1.68	[1.07; 2.63]
		0-6 years	2.94**	[1.42; 6.08]	1.63	[0.63; 4.2]
2020	Cherid, C	University Yes (ref)	.	.	.	.
		University No			1.9	[1.1; 3.4]

2017	Richtering, S	None/primary/secondary (ref)		.	.	0.64	[0.32; 1.3]
		Technical or vacational				0.51	[0.25; 1.02]
		Undergrad or postgrad					
2021	Schrauben, S	>= HighSchool		.	.	1.9	[1.01; 3.61]
2020	Shiferaw, K	Primary (ref)		.	.	.	.
		Secondary		0.99	[0.53; 1.86]	1.71	[0.74; 3.96]
		Diploma or more		3.62***	[2.06; 6.36]	3.48	[1.54; 7.87]
2016	Xesfingi, S	.		1.7***	.	.	.

SOCIOECONOMIC STATUS

Year	Author		B	SE	95% CI	β	95% CI
2021	Berkowsky, R	.	-0.23	.	.	.	.
2013	Choi, N	Income-to-needs-ratio	0.11	0.07	.		
2021	De Santis, K	.	1.14	0.19	.	0.21***	
2020	Do, B	Social status: Low (ref)	.	.	.	.	.
		Middle or high	0.22	.	[-0.16; 0.59]	.	.
2019	Gazibara, T	.	0.47	.	[-0.34; 1.28]	.	.
2021	Guo, Z	<=10k HK$ (ref)	.	.	.	.	.
		10k-20k	-0.4	.	[-1.69; 0.88]	.	.

		20k-30k	0.62	.	[-0.86; 2.1]	.	.
		>30k	2.25**	.	[0.63; 3.88]	.	.
2021	Lee, W	>USD 1k/month	1.47	.	[-0.4; 3.35]	0.107	
2022	Moon, Z	IMD quintile (5 - least deprived - ref)	.	.	.	.	.
		4	-0.34	0.48	.	-0.02	[-1.28; 0.61]
		3	-1.02*	0.49	.	-0.06	[-1.99; -0.05]
		2	-0.67	0.52	.	-0.04	[-1.69; 0.35]
		1 (most deprived)	-0.59	0.59	.	-0.02	[-1.65; 0.66]
2020	Nguyen, L	Economic condition (Not poor - ref)	.	.	.	.	.
		Poor	-0.45	0.58	.	.	[-1.58; 0.68]
2022	Tran, H	Ability to pay for medication (Very or fairly difficult - ref)	.	.	.	.	.
		Very or fairly easy	0.79***	.	[0.39; 1.19]	.	.
2021	Xu, R	<=1800¥ (270 USD) (ref)	.	.	.	.	.
		1801-3800 (270.15-570)	-1.34	.	[-6.23; 3.54]	.	.
		3801-6400 (570.15-960)	-1.32	.	[-6.9; 4.25]	.	.
		>= 6401 (960.15)	-4.74	.	[-10.69; 1.21]	.	.
		Free healthcare scheme insurance (ref)	.	.	.	.	.

		Urban employee basic insurance	-3.03	.	[-10.82; 4.76]	.	.
		Urban resident basic insurance	-2.21	.	[-10.47; 6.06]	.	.
		New rural cooperative medical system	-2.12	.	[-10.91; 6.67]	.	.
		No	-4.95	.	[-17.27; 7.38]	.	.
2020	Yang, E	Financially unstable (Young adults)	1.15	.	.	0.08	.
		Financially unstable (Older adults)	-0.83	.	.	-0.09	.
2021	Zakar, R	Subjective social status	-0.09	0.08	[-0.024; 0.06]	.	.

Year	**Author**		**Crude OR**	**95% CI**	**Adjusted OR**	**95% CI**
2017	Richtering, S	<1000 AUS $/week (ref)	.	.		.
			1000-2000		0.84	[0.44; 1.61]
		>2000			1.78	[0.9; 3.52]
2021	Schrauben, S	<20K$ (ref)	.	.	.	.
		>=20K			1.9	[1.28; 2.83]
			No answer		1.78	[1.12; 2.84]
2020	Shiferaw, K	<800 (ref)	.	.	.	.
		800-1500	0.8	[0.42; 1.52]	0.59	[0.22; 1.57]
		1500-3500	0.67	[0.38; 1.17]	0.62	[0.24; 1.59]

		3500-5000	1.93*	[1.04; 3.56]	1.38*		[0.52; 3.73]
		>5000	7.29***	[3.37; 15.78]	4.44*		[1.32; 14.86]
2016	Xesfingi, S	.	1.02	.			

EMPLOYMENT

Year	Author		B	SE		β	
2021	Berkowsky, R	Employed	0.754	.	.	.	
2021	Guo, Z	Employed	0.39	.	[-0.89; 1.66]	.	
2021	Lee, W	Not employed	-1.768	.	[-3.63; 0.10]	-0.127	
2022	Makowsky, M	Not employed	-1.14	.	[-2.41; 0.13]	.	
2019	Wong, D	Managers, executives, officials (ref)	-0.184	0.111	.	-0.07	
2021	Xu, R	Not employed	-4.55*	.	[-9.02; -0.08]	.	
			Crude OR	**95% CI**	**Adjusted OR**		**95%CI**
2020	Shiferaw, K	Govmt job	1.85*	[1.16; 2.95]	1.73**		[1.11; 2.68]
		Private sector	1.35	[0.82; 2.22]	1.02		[0.89; 1.67]

ETHNICITY, RACE, AND LANGUAGES SPOKEN

Year	**Author**		**B**	**SE**	**95% CI**	**β**	**95% CI**
2021	Berkowsky, R	Non-white	0.93	.	.	.	.
		Hispanic	0.43	.	.	.	.

2013	Choi, N	Black	0.17	0.14	.	.	.
		Hispanic	-0.27	0.19	.	.	.
		Spanish-speaking	-0.03	0.76	.	.	.
2021	Lee, W	Chinese	-4.24***	.	[-5.98; -2.50]	-0.29	.
		Other	-1.72	.	[-4.14; 0.70]	.	.
2022	Makowsky, M	Community (Sikh - ref)	.	.	.	.	.
		Hindu	0	.	[-1.03; 1.03]	.	.
		Other	-0.69	.	[-2.34; 0.96]	.	.
2022	Moon, Z	Ethnicity (White british)	0.02	0.64	.	0.001	-[1.24; 1.27]
2015	Tennant, B	Race	0.04	0.35	.	0.01	.
Year			**Crude OR**	**95% CI**	**Adjusted OR**	**95% CI**	
2020	Arcury, T	White	.	.	1.18		[0.4; 3.47]
		Minority (ref)					
2021	Bergman, L	Native Language: Swedish (ref)	.	.	.	.	
		Arabic	1.75**	[1.24; 2.45]	2.35*		[1.13; 4.86]
2021	Schrauben, S	White (ref)	.	.	.	.	
		Black			1.01		[0.75; 1.36]
		Hispanic			1.27		[0.76; 2.12]

		Other			1.04	[0.44; 2.46]

HOUSEHOLD COMPOSITION, SOCIAL SUPPORT AND RESIDENCE

Year	Author		B	SE	95% CI	β
2021	Berkowsky, R	Married	0.36	.	.	.
2013	Choi, Namkee G.; Dinitto, Diana M.	Live alone	0.09	0.11	.	
2020	Do, B	Ever married	0.16	.	[-0.14; 0.46]	.
2019	Gazibara, T	Married (parents)	1.08	.	[-0.23; 2.39]	.
2021	Guo, Z	Never married (ref)	.	.	.	.
		Married/cohab	-1.03	.	[-2.09; 0.02]	.
		Divorced/separated/widowed	-1.83	.	[-3.93; 0.27]	.
2022	Makowsky, M	Married	-0.5	.	[-2.04; 1.04]	.
2021	Maroney, K	Single/Unmarried	-0.65	.	[-1.92; 0.62]	.
2018	Stellefson, M	Divorced (ref)	.	.	.	.
		Married	1.29	1.04	.	.
		Widowed	0.55	1.68	.	.
		Never married	3.42	2.01	.	.
		Social support	0.33*	0.16		
2015	Tennant, B	Married - Ref	-0.26	0.37	.	-0.05

2021	Xu, R	Single (ref)	.	.	.	.
		Married	-2.63	.	[-12.44; 7.17]	
		Divorced/widowed	3.57	.	[-8.57; 15.91]	
		Live with family or others (ref)	.	.	.	
		Live alone	-6.82*	.	[-13.8; -0.36]	
		Rural resident (ref)	.	.	.	
		Urban resident	-1.8	.	[-6.18; 2.59]	
		No children (ref)	.	.	.	
		1	-2.84	.	[-13.15; 7.47]	
		2	-1.06	.	[-11.56; 9.43]	
		>=3	-6.89	.	[-18.22; 4.43]	
2020	Yang, E	Young adults	0.915	.	.	0.08
		Older adults	-0.321	.	.	-0.03
2020	Zhou, J	City (Large city - 2; Medium - 1; Other - 0)	-0.085	.	.	
			Crude OR	**95% CI**	**Adjusted OR**	**95% CI**
2021	Mengestie, N	Rural (ref)			.	.
		Urban	1.5*	[1.12; 2.03]	1.27	[0.86; 1.85]
2020	Shiferaw, K	Rural (ref)				

		Urban	3.77***	[1.88; 7.57]	1.37	[0.54; 3.49]
2016	Xesfingi, S	Married		1.081	0.46	

***p<0.05**

****p<0.01**

*****p<0.001**

Table S2 - Quality analysis results

Year	Authors	1. Were the criteria for inclusion in the sample clearly defined?	2. Were the study subjects and the setting described in detail?	3. Was the exposure measured in a valid and reliable way?	4. Were objective, standard criteria used for measurement of the condition?	5. Were confounding factors identified?	6. Were strategies to deal with confounding factors stated?	7. Were the outcomes measured in a valid and reliable way?	8. Was appropriate statistical analysis used?	Overall appraisal (Include/Exclude)
2021	Abdulai, A	✓	✓	✓	✓	✓	✓	✓	✓	✓
2019	Alhuwail, D	✓	✓	✓	✓	✓	✓	✓	✓	✓
2020	Arcury, T	✓	✓	✓	✓	✓	✓	✓	✓	✓
2021	Bergman, L	✓	✓	✓	✓	✓	✓	✓	✓	✓
2021	Berkowsky, R	✓	✓	✓	✓	✓	✓	✓	✓	✓
2020	Cherid, C.	✓	✓	✓	✓	✓	✓	✓	✓	✓
2013	Choi, N	o	✓	✓	✓	✓	✓	✓	✓	✓
2021	De Santis, K	✓	✓	o	✓	✓	✓	✓	✓	✓

2020	Do, B	○	✓	✓	✓	✓	✓	✓	✓	✓
2019	Gazibara, T	✓	✓	✓	✓	✓	✓	✓	✓	✓
2021	Guo, Z	✓	✓	✓	✓	✓	✓	✓	✓	✓
2020	Kim, S	✓	✓	✓	✓	○	○	✓	✓	✓
2011	Knapp, C	✓	✓	✓	✓	○	○	✓	✓	✓
2020	Lee, O	○	✓	○	✓	○	○	✓	✓	✓
2021	Lee, W	✓	✓	✓	✓	✓	✓	✓	✓	✓
2022	Makowsky, M	○	✓	○	✓	○	○	✓	✓	✓
2021	Maroney, K	✓	✓	✓	✓	✓	✓	✓	✓	✓
2021	Mengestie, N	✓	✓	○	✓	✓	✓	✓	✓	✓
2022	Moon, Z	✓	✓	○	✓	✓	✓	✓	✓	✓

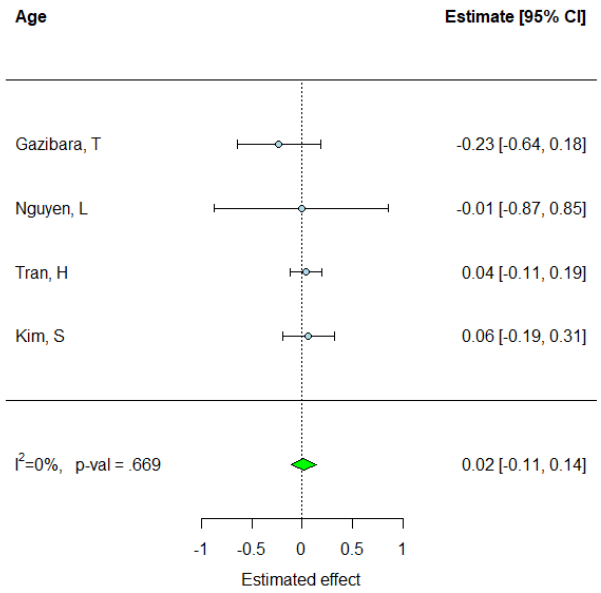
2021	Morton, E	✓	✓	o	✓	o	o	✓	✓	✓
2020	Nguyen, L	o	✓	o	✓	o	o	✓	✓	✓
2017	Richtering, S	✓	✓	o	✓	✓	✓	✓	✓	✓
2021	Schrauben, S	✓	✓	✓	✓	✓	✓	✓	✓	✓
2019	Shiferaw, K	o	✓	✓	✓	o	o	✗	✓	✗
2020	Shiferaw, K	o	✓	✓	✓	✓	✓	✓	✓	✓
2018	Stellefson, M	o	✓	o	✓	✓	✓	✓	✓	✓
2015	Tennant, B	✓	✓	o	✓	✓	✓	✓	✓	✓
2022	Tran, H	✓	✓	✓	✓	✓	✓	✓	✓	✓
2017	Vicente, M	✓	✓	o	✓	o	o	✓	✓	✓
2019	Wong, D	✓	✓	✓	✓	✓	✓	✓	✓	✓

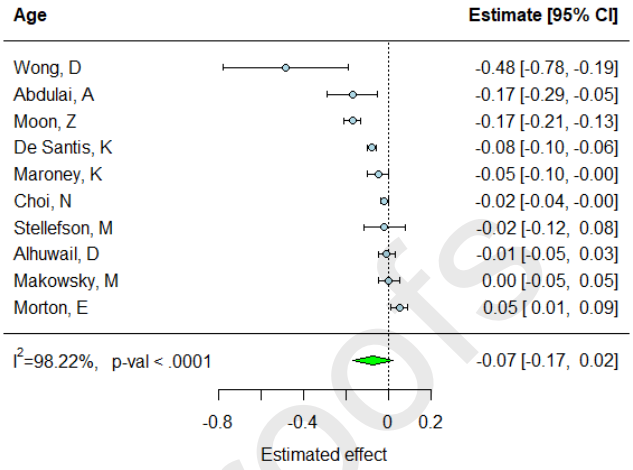
2016	Xesfingi, S	o	✓	o	✓	✓	✓	✓	✓	✓
2021	Xu, R	✓	✓	o	✓	✓	✓	✓	✓	✓
2020	Yang, E	o	✓	✓	✓	✓	✓	✓	✓	✓
2017	Yang, S	✓	✓	o	✓	✓	✓	✓	✓	✓
2021	Zakar, R	o	✓	✓	✓	✓	✓	✓	✓	✓
2020	Zhou, J	o	✓	✓	✓	✓	✓	✓	✓	✓
2015	Zibrik, L	o	✓	o	✓	✓	✓	✓	✓	✓

✓ Yes

✗ No

o Unclear





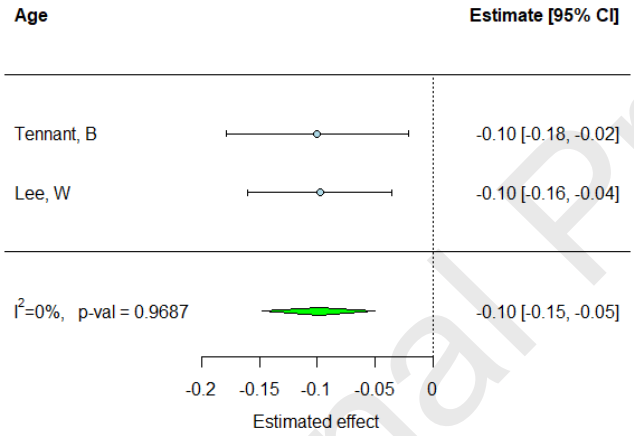


Figure S1 - Subgroup analyses per age group (young adults, adults, and older adults)

Table S3 - Leave-one-out analyses for sex

estimate	se	zval	pval	ci.lb	ci.ub	Q	Qp	tau2	I2	H2
-0.167	0.254	-0.655	0.512	-0.665	0.332	59.432	0.000	0.736	87.179	7.800
-0.100	0.243	-0.412	0.680	-0.577	0.377	55.077	0.000	0.678	91.170	11.325
-0.195	0.253	-0.773	0.440	-0.691	0.300	47.170	0.000	0.726	88.000	8.334

-0.219	0.248	-0.882	0.378	-0.705	0.268	56.044	0.000	0.703	91.331	11.535
-0.122	0.252	-0.482	0.630	-0.616	0.373	43.788	0.000	0.722	89.651	9.663
-0.249	0.235	-1.060	0.289	-0.710	0.212	53.440	0.000	0.620	90.434	10.453
-0.180	0.253	-0.709	0.478	-0.676	0.317	59.240	0.000	0.743	91.788	12.177
-0.229	0.228	-1.005	0.315	-0.676	0.218	56.349	0.000	0.590	90.103	10.104
-0.212	0.248	-0.854	0.393	-0.699	0.275	57.461	0.000	0.711	91.525	11.800
-0.180	0.253	-0.713	0.476	-0.676	0.316	59.288	0.000	0.755	92.041	12.564
-0.176	0.253	-0.693	0.488	-0.672	0.321	59.364	0.000	0.751	91.970	12.453
-0.089	0.243	-0.366	0.714	-0.566	0.388	51.578	0.000	0.669	90.942	11.040
-0.125	0.246	-0.508	0.612	-0.608	0.358	57.992	0.000	0.716	91.697	12.044
-0.229	0.237	-0.967	0.333	-0.694	0.235	56.434	0.000	0.645	90.838	10.915
-0.114	0.249	-0.458	0.647	-0.603	0.375	55.902	0.000	0.713	91.460	11.710
-0.146	0.254	-0.577	0.564	-0.644	0.351	58.573	0.000	0.738	91.476	11.732
-0.150	0.208	-0.720	0.472	-0.558	0.258	57.644	0.000	0.480	88.169	8.452

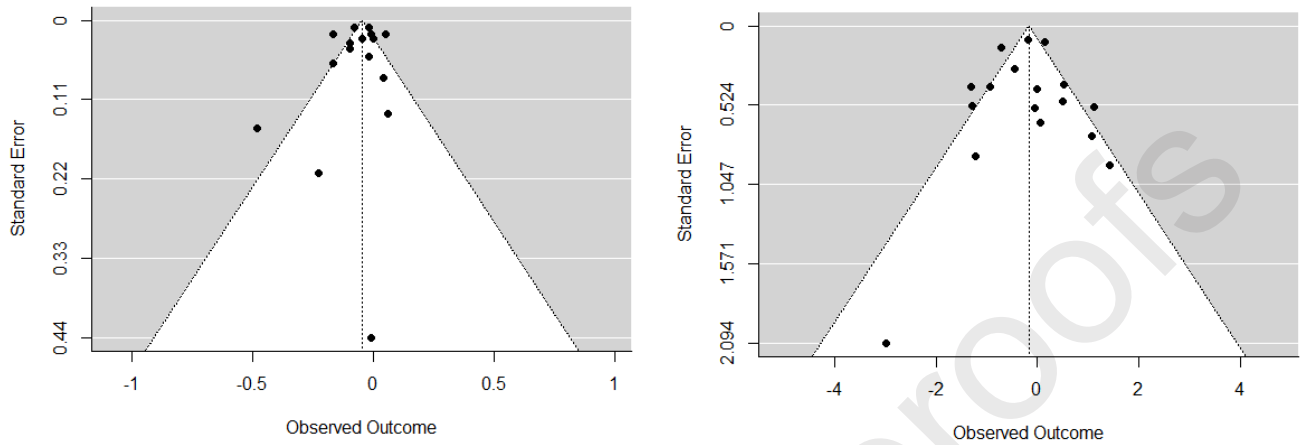


Figure S2 - Funnel plots for age and sex

Declaration of interests

☒ The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

☐ The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: