

Association between Social Demographic Factors and Health Literacy in Jordan

Anber Abraheem Shlash Mohammad¹, Main NaserAlolayyan², Khaleel Ibrahim Al- Daoud³, Yara Mahmoud Al Nammas⁴, AsokanVasudevan⁵, Suleiman Ibrahim Mohammad⁶

Abstract

The study highlights that low health literacy is a serious global health threat, causing health problem denial, poor communication with healthcare providers, and widening disparities. It aims to investigate how income, education, and socio-economic status affect health literacy levels. The study conducted an occasional design using quantitative data. This study was conducted using a structured questionnaire to obtain information from 413 randomly selected Ammani residents. The questions were designed to assess the impact of health literacy level. The study's quantitative results show that socio-economic factors are the reasons for the health literacy among Amman residents, based on the 413 sample. Although gender only shows little differences, age, income, and education greatly affect health literacy, with those aged 30-60, higher income earners, and people with higher education levels having better understanding. It is necessary to design health literacy interventions for different demographic groups so as to eliminate the disparities and to get the so desired health outcomes. This study assesses the association between social demographic factors and health literacy in Jordan and found the level of literacy affected by social and economic factors, but in varying proportions for each topic with some recommendations.

Keywords: *Health Literacy, Social Demographic Factors, Level of Literacy, Health Literacy Disparities.*

Introduction

The World Health Organization defines health as "a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity" (WHO, 1946). Despite global efforts in healthcare, the lack of health awareness (health illiteracy) remains a significant issue, creating major challenges and burdens on health systems worldwide. The researchers found that poor health awareness (health illiteracy) involves insufficient knowledge of disease prevention, public health, and healthy behaviors, impacting health decisions, lifestyle, and communication with healthcare providers. Health illiteracy negatively affects individuals' ability to make informed health choices.

Research shows that poor health literacy is linked to worse self-rated health and higher use of services. Although one study found a non-significant relationship between low health literacy and poor control of hypertension and diabetes, poor health literacy may directly contribute to poor health outcomes. Patients with poor health literacy have greater difficulties naming their medications and describing their indications more frequently hold health beliefs that interfere with adherence and are more likely to have poor understanding of their condition and its management (Al-Adamat et al., 2023; Al-Batah et al., 2024a; Al-Batah et al., 2024b; Schillinger, D., 2002).

Health literacy involves the knowledge and skills needed to navigate health demands in modern society, but lacks a consistent definition and conceptual framework. The study aims to review existing definitions and models to develop an integrated, evidence-based definition and conceptual model of health literacy

¹Digital Marketing Department, Faculty of Administrative and Financial Sciences, Petra University, Jordan, Research follower, IN'TI International University, 71800 Negeri Sembilan, Malaysia, Email: mohammad197119@yahoo.com.

² Department of health management and policy. Faculty of Medicine. Jordan University of Science and Technology, Email: mnalolayyan@just.edu.jo.

³Department of Accounting– business school Faculties–Al Ahilya Amman University –Amman-Jordan, Email: K.aldaoud@ammanu.edu.jo.

⁴Health management and policy- Faculty of medicine – Jordan University of Science and Technology.

⁵ Faculty of Business and Communications, IN'TI International University, 71800 Negeri Sembilan, Malaysia, Email: sokan.vasudevan@newinti.edu.my

⁶ Electronic Marketing and Social Media, Economic and Administrative Sciences Zarqa University, Jordan, Research follower, IN'TI International University, 71800 Negeri Sembilan, Malaysia, Email - dr_sliman@yahoo.com, (Corresponding Author)

(Aldaihani et al., 2023; Al-Fakeh et al., 2023; Sørensen, Kristine, et al., 2012). In Jordan, health literacy is influenced by socio-economic factors and access to healthcare, with notable disparities across different demographic groups such as age, income, and education (WHO, 2018). Despite efforts to promote health education, challenges remain, especially in rural areas, necessitating tailored, culturally relevant interventions to improve health outcomes and reduce inequalities.

Problem Statement: Despite its importance, understanding how to effectively promote health literacy across diverse populations remains lacking. Termed the "health literacy epidemic," nearly half of American adults struggle with health information (Davis T, Wolf MS, 2004). This research aims to address the main issues associated with health literacy and its consequences, particularly considering demographic factors, and find solutions to reduce health illiteracy's spread.

Project Goals and Objectives: The decline in health literacy globally poses urgent health threats, emphasizing the need to address its implications. Challenges of inadequate health literacy include poor understanding of health issues, communication barriers with healthcare providers, and compromised treatment adherence. This study aims to explore the impact of social and economic factors on health literacy levels and their relationship with socio-economic status.

Research Hypotheses: Socioeconomic factors such as income and education are significant predictors of health literacy, with higher socioeconomic status correlating with higher health literacy levels.

Literature Review

The importance of health literacy is emphasized by its ability to enable individuals to navigate health care systems, make informed choices, and actively participate in their health management. Lower health literacy was associated with adverse health outcomes, reduced use of preventive care, and increased disparities in health care (Al-Husban et al., 2023; Alkhalaf et al., 2023; Berkman et al., 2011; Paasche-Orlow & Wolf, 2007). Thus, understanding the determinants of health literacy and developing effective interventions is critical to advancing public health initiatives and promoting equitable access to health care services.

Definitions of Health Literacy

The American Medical Association (AMA) (1999) defines health literacy as “a constellation of skills, including the ability to perform basic reading and numerical tasks required to function in the health care environment. Inadequate health literacy contributes to poor compliance, uncontrolled chronic disease, and rising health care costs. And also defined as health literacy is the ability to read understand and use health information to make appropriate health decisions and follow instructions for treatment (Alshura et al., 2023; Mohammad et al., 2024a; Barry, Weiss, 2003).

Nutbeam (2000) defines health literacy as "the personal, cognitive and social skills which determine the ability of individuals to gain access to understand and use information to promote and maintain good health". Although The WHO (1998) defines the health literacy as health literacy "the cognitive and social skills which determine the motivation and ability of individuals to gain access to understand and use information in ways which promote and maintain good health". The Impact of health literacy on health outcomes : Extensive research underscores the profound impact of health literacy on health outcomes. Individuals with low health literacy often face challenges in understanding prescription instructions, interpreting medical labels, and making informed decisions about their health. This is associated with higher rates of hospitalization, poorer management of chronic conditions, and increased healthcare costs (Berkman et al., 2011).

The Dimensions of Health Literacy

Functional Literacy: Refers to basic reading and writing skills necessary for understanding health information. Functional literacy is associated with better adherence to medical instructions and improved

self-management of chronic conditions (Al-shanableh et al., 2024a; Al-shanableh et al., 2024b; Berkman et al., 2011).

Interactive Literacy: Involves communication skills to actively participate in healthcare interactions, ask questions, and seek clarification. Interactive literacy facilitates effective communication between healthcare providers and patients, contributing to shared decision-making and improved treatment adherence (Mohammad et al., 2024b; Schillinger et al., 2004).

Critical Literacy: Encompasses the ability to evaluate health information critically, discerning its reliability and relevance. Critical literacy empowers individuals to critically assess health information, make informed decisions, and participate in preventive health behaviours (Mohammad et al., 2023a; Paasche-Orlow et al., 2005).

Cultural Literacy: Recognizes the influence of cultural factors on health beliefs and practices, emphasizing the importance of cultural competence in health communication (Mohammad et al., 2024c; Pleasant, 2014). Cultural literacy aids in addressing health disparities by acknowledging and incorporating diverse cultural perspectives into health communication and interventions (Mohammad et al., 2023b; Zyoud et al., 2023; Sørensen et al., 2012).

Health Literacy Disparities

Health literacy disparities refer to variations in the ability to comprehend and apply health information, influenced by factors such as socioeconomic status, education, ethnicity, language proficiency, and cultural background (Al-Shanableh et al., 2024c; Kutner et al., 2006). These disparities contribute to differential health outcomes and hinder equitable access to healthcare services.

Health literacy disparities are magnified among vulnerable populations, including the elderly, minority groups, and those with lower socioeconomic status. Tailoring health communication to the specific needs of these populations is imperative. Culturally sensitive interventions that consider language, beliefs, and social determinants of health can bridge existing gaps (Al-shanableh et al., 2024d; Shamaileh et al., 2023; Sarram et al., 2024; Sentell & Braun, 2012).

In the field of health literacy, often defined as the “degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions”, one does frequently find the underlying assumption that health literacy might explain some of the variation in health disparities that would be otherwise linked to other socioeconomic factors, such as education or income for example indeed health literacy has been found to be associated with many of the drivers of health disparities. Studies in the US have shown that non-whites have more often limited health literacy than whites. Also factors such as lower income or education have been found to be associated with lower levels of health literacy. Thus, suggesting that individuals likely to fall victim to social disparities, which in turn lead to worse health outcomes, are also more likely to have lower levels of health literacy (Peter J. Schulz, 2015).

Factors Contributing to Health Literacy Disparities

Socioeconomic Status: Low socioeconomic status is consistently linked to limited health literacy, as individuals with fewer resources may face challenges in accessing quality education and health information (Paasche-Orlow et al., 2005).

Educational Attainment: Lower levels of education are associated with diminished health literacy, as education serves as a foundational factor in developing literacy skills critical for understanding health information (Berkman et al., 2011).

Cultural and Linguistic Diversity: Cultural and linguistic factors significantly impact health literacy, with disparities arising due to language barriers, varying cultural health beliefs, and limited availability of culturally appropriate health materials (Sørensen et al., 2012).

Theoretical Framework

The scientific literature has repeatedly demonstrated that socioeconomic factors are powerful determinants of health-related outcomes, and socioeconomic status (SES) may be considered as one of the main causes of health disparities between different population groups (Adler NE, Newman K, Mackenbach JP, 2002, 2012). However, SES does not directly affect health status, rather it represents a proxy of other proximal and intermediate causal factors. Several competing factors and mechanisms have been proposed to explain the chain of events linking SES to health outcomes (Adler NE, Newman K, 2002). However, the entire pathway by which SES exerts its effect on health has not yet been completely elucidated (Cutler DM, Lleras-Muney A, 2010).

Recently, health literacy (HL) has been proposed as one of the potential links between SES and health (Paasche-Orlow MK, Wolf MS, 2007). According to Sørensen and colleagues (2012), HL is linked to literacy and can be defined as the “people’s knowledge, motivation and competences to access, understand, appraise and apply health information in order to make judgments and take decisions in everyday life concerning healthcare, disease prevention and health promotion to maintain or improve quality of life during the life course” (Sørensen K. et al, 2012). Therefore, HL appears to be in close correlation with both socio-economic determinants and health outcomes. In a recent study that assessed both antecedents and consequences of HL in the same sample, Bonaccorsi et al. (2019) found that less educated and poorer population groups have more often limited or inadequate HL and that low HL skills are associated in turn with worse self-reported health status. Indeed, on one hand, disadvantaged socio-economic groups have been reported to have a greater risk of limited HL compared with more advantaged socio-economic groups (Paasche-Orlow MK, et al., 2005). On the other hand, a limited HL has been shown to be associated with unhealthy lifestyle behaviors and several negative health-related outcomes.

Methodology

Study Design: The study was conducted a cross-sectional design using quantitative data. this study conducted by using a questionnaire.the questions are designed to assess the impact of health literacy on community health.

Sample and Sampling Method: The study involves a random sampling method, ensuring representation from various demographics. This approach aims to promote the dissemination of study findings and provide a comprehensive understanding of the impact and importance of health literacy in different population groups.

Sample Size: The sample size was (413) samples and it was a convenience (random) sample.

Instruments and Measurements: In this study, an electronic questionnaire distributed on sample representing the population of Amman.

While the form has been modified and the number of questions has been reduced because some

of them are unused and are not suitable for study with modifications have become acceptable

the areas it includes are “sense of understanding and support by health care providers”,

“assessment of health information”, “ability to find good health information”, “social support for

health”, “mobility in the health care system”, “understanding health information well enough to

know what to do”.

Data Collection Procedure: The primary data of this study was collected by randomly sending a questionnaire to the various residents of the capital Amman via Internet by sharing and sending the survey link on social media. The questionnaire consists of 28 multi-choice questions.

Research Result and Data Analysis

we will present and discuss the results of the study, 413 samples of the residents of

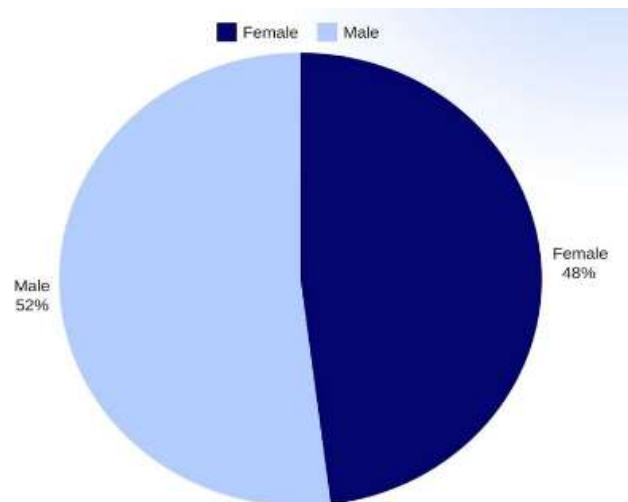
Amman who participated in the study by answering the study questions.

Descriptive Statistics

Health Literacy: The level of health literacy for sample 413 of residents in Amman was between 3-4 which is considered good.

Demographic Data

Gender Gender 413 Sample of Amman residents who participated in the study were 52% male and 48% female.



Age

As for the age of the population in Amman

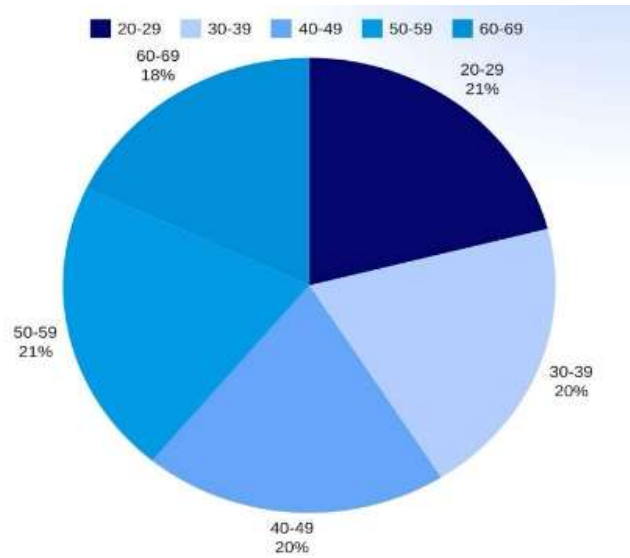
21% of the participants surveyed were found to be in the 20-29 age group,

20% aged 30-39,

20% aged 40-49,

21% were aged 50-59

18% aged 60-69.



Educational Level

The educational level of the participants was :

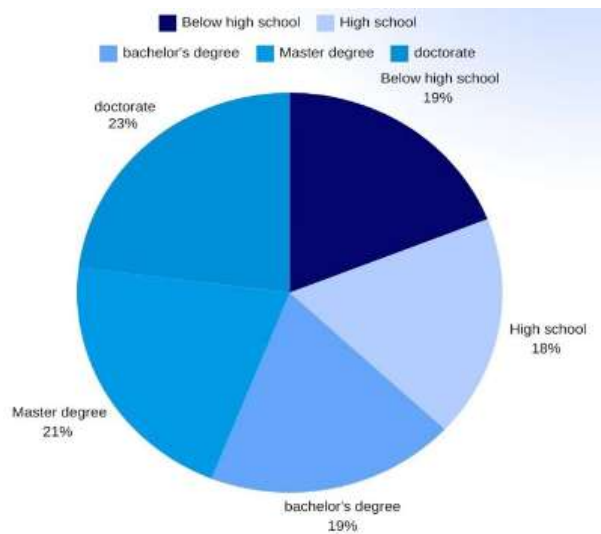
19% for those who are below high school

18% high school

19% have a bachelor's degree

21% have a master's degree

23% have a doctorate.



Employment Status

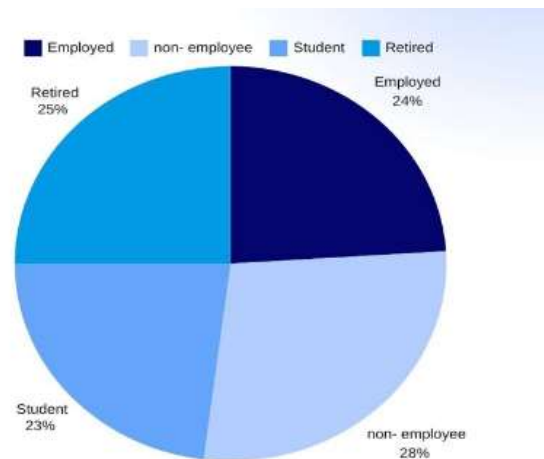
For the employment case :

24% was employed

28% non-employee which is the largest percentage

23% student

25% retired.



Monthly Income

The largest percentage of participants had an income of less than 350 Jordanian dinars, which is

24%

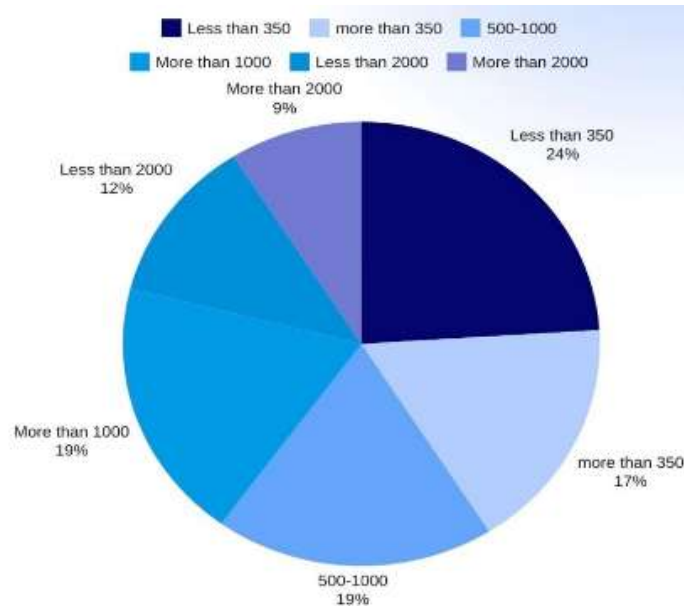
while more than 350 Jordanian dinars was 17%

19% for those who were from 500-1000,

19% were more than 1000 dinars

12% less than 2000

The lowest percentage was for those who were more than 2000, which is 9%.



Statistical Analysis

Analysis of the average to know the level of health literacy in Amman through points from 1-5

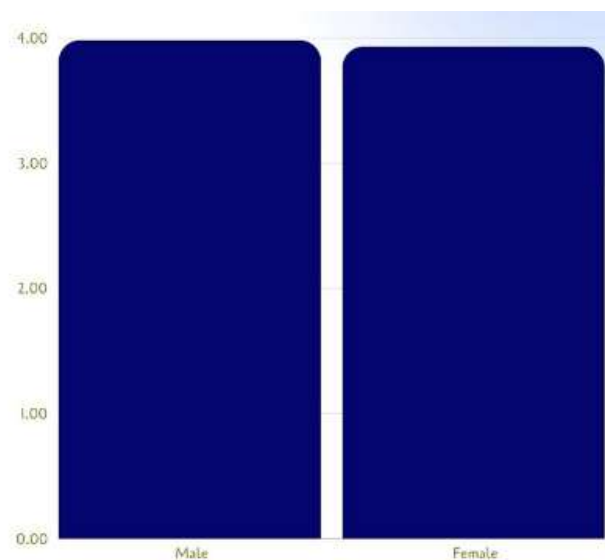
Mean between 1-2: very low.

Mean between 2-3: bad.

Mean between 3-4: good.

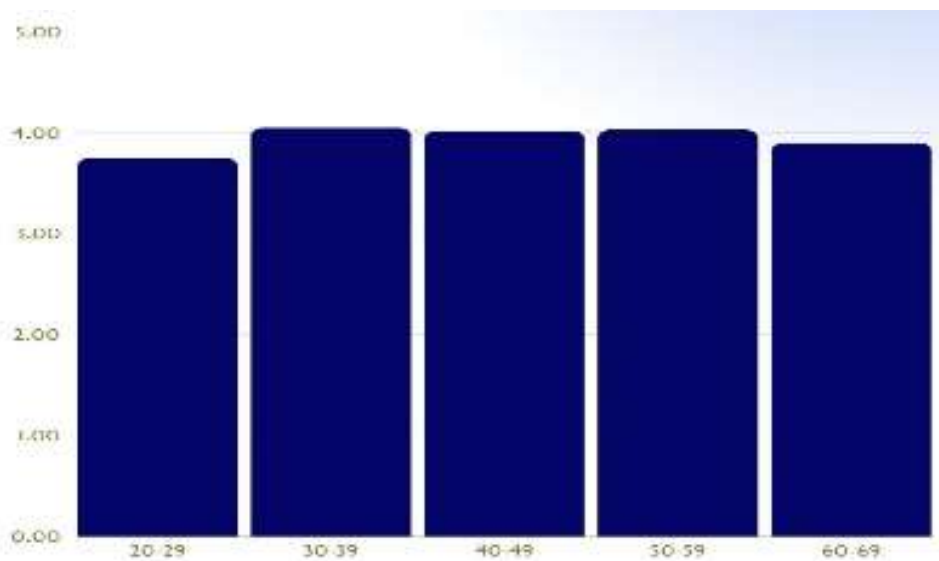
Mean between 4-5: very good.

Gender: The study found that the level of health literacy is not related to sex because the female ratios were 3.93 and the males were 3.98, which are close as shown in the figure.



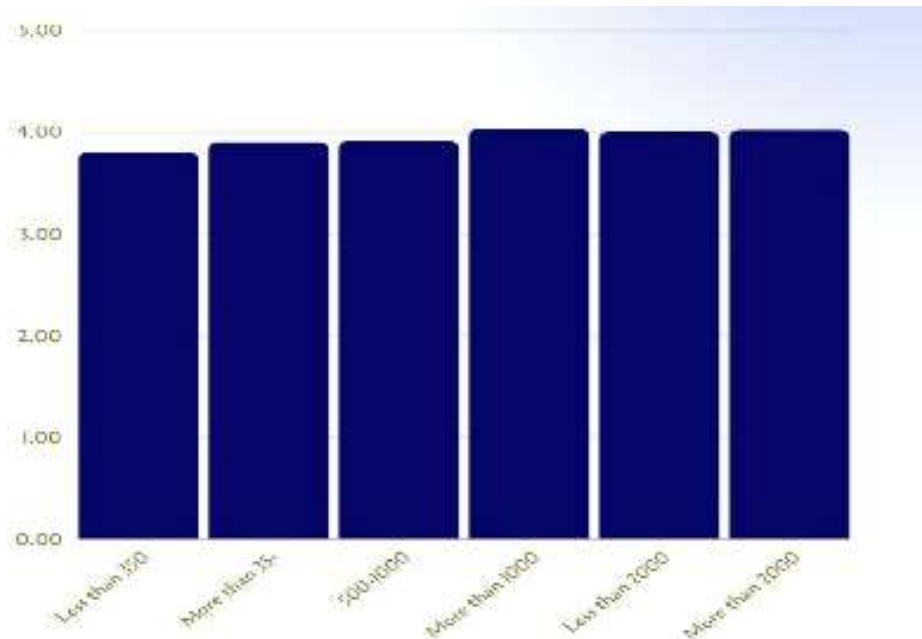
Age

As for the age, it was found that the age groups 20-29 have the lowest level of health literacy, which is 3.75, the category 30-39 was 4.05, the group 40-49 was 4.02, and the category 50-59 was 4.03, and these three age groups are very close in the literacy level and the level was high for them. As for the 60-69 category, it was lower than them, which is 3.9 as shown in the figure.



Monthly Income

The level of literacy is related to the level of income is related to a direct relationship. Every time the income level increased, health literacy increased, so the lowest health literacy rate was at less than 350 Jordanian dinars which is 3.8 and it was at more than 350 Jordanian dinars 3.9, and at 500-1000 Jordanian dinars 3.91, and at more than 1000 it was 4.03, and in less than 2000 it was 4.00 and at more than 2000 4.02



Employment Status

The lowest literacy rate for employment cases was for non-employee 3.74, the student ratio was 3.908 the ratio of the retired 3.94 and the employee 4.02.

Educational Level

The level of education is related to the level of health literacy with a direct relationship. The higher the level of education, the higher the health literacy rate in the human being.

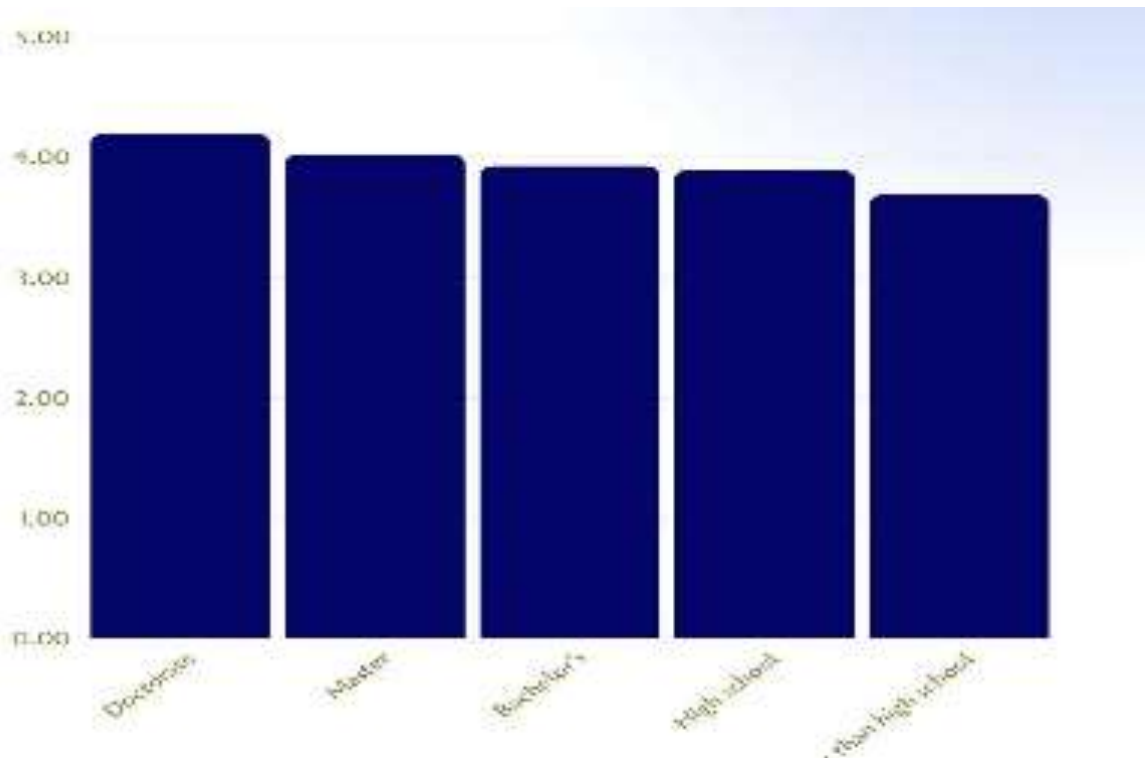
The largest percentage of health literacy was for a doctoral degree holder, which is 4.2.

As for the master's, it was 4.03.

and the bachelor's degree was 3.93.

and the high school was 3.9.

The lowest percentage of health literacy for those who are less than a high school, which is 3.69.



Discussion

Research Key Findings

The study shows Amman's population has good health literacy. It highlights demographic factors like age, income, employment, and education affecting health literacy. Gender isn't significant, but age, income, employment, and education strongly correlate with health literacy levels.

The highest and best score should be 5 followed by 4 the arithmetic average between 4-5 is very good followed by the arithmetic average 3-4 which is considered good accordingly.

The results of the study were between the arithmetic average between 3-4 which is considered good.

Gender

Gender doesn't make a big difference in health literacy; both males and females have similar levels. This suggests that gender isn't a significant factor influencing health literacy in people living in Amman city.

Age

Older age groups in Amman generally have slightly better health literacy skills than younger ones, which is promising for the future. People aged 30-39 have the highest mean health literacy scores, slightly higher than those aged 40-49 and 50-59. This contradicts previous studies suggesting lower health literacy in the elderly due to cognitive decline, but it aligns with the idea that older individuals accumulate health knowledge and experiences over time.

Income

People with higher incomes tend to have better health literacy. This shows how income affects access to health knowledge and services. It highlights that highly income people generally benefit more in terms of health literacy due to better access to education, information, and healthcare.

Employment Status and Education Level

Education level is crucial for health literacy, with higher-educated individuals showing better understanding. Employment status also affects health literacy, with employed and higher-educated people scoring higher. This suggests that education equips individuals with critical thinking skills to understand complex health information. Additionally, socio-economic factors like income and job status influence health literacy levels

Conclusion

The study highlights that health literacy is crucial for both individual and societal health. By analyzing various demographic factors, we can better understand their relationship with health literacy levels. It's important to recognize that health literacy greatly influences health outcomes and access to healthcare services.

Health literacy is a very vital aspect that helps individuals to comprehend and navigate through the complexities of the health care system, the ability to make wise health decisions, safely adhere to treatments that are prescribed and also participates in disease prevention and health promotion.

The study found that people with higher health literacy, often indicated by higher education, employment status, and income levels, understand healthcare services better, comprehend medical information, and adhere to medical recommendations more effectively.

References

- Adler, N. E., & Newman, K. (2002). Socioeconomic Disparities In Health: Pathways And Policies. *Health Affairs*, 21(2), 60–76. <https://doi.org/10.1377/hlthaff.21.2.60>
- Al-Adamat, A. M., KassabAlserhan, M., Mohammad, L. S., Singh, D., Al-Hawary, S. I. S., Mohammad, A. A. S., & Hunitie, M. F. A. (2023). The Impact of Digital Marketing Tools on Customer Loyalty of Jordanian Islamic Banks. In *Emerging Trends and Innovation in Business and Finance* (pp. 105-118). Singapore: Springer Nature Singapore.
- Al-Batah, Mohammad Subhi, Enas Rezeg Al-Kwaldeh, Mutaz Abdel Wahed, Mazen Alzyoud, and Najah Al-Shanableh. "Enhancement over DBSCAN Satellite Spatial Data Clustering." *Journal of Electrical and Computer Engineering* 2024, no. 1 (2024a): 2330624.
- Al-Batah, Mohammad Subhi, Mowafaq Salem Alzboon, Mazen Alzyoud, and Najah Al-Shanableh. "Enhancing Image Cryptography Performance with Block Left Rotation Operations." *Applied Computational Intelligence and Soft Computing* 2024, no. 1 (2024b): 3641927.
- Aldaihani, F. M. F., Mohammad, A. A. S., AlChahadat, H., Al-Hawary, S. I. S., Almaaitah, M. F., Al-Husban, N. A., ... & Mohammad, A. (2023). Customers' perception of the social responsibility in the private hospitals in Greater Amman. In *The effect of information technology on business and marketing intelligence systems* (pp. 2177-2191). Cham: Springer International Publishing.
- Al-Fakeh, F. A. A., Al-Shaikh, M. S., Al-Hawary, S. I. S., Mohammad, L. S., Singh, D., Mohammad, A. A. S., ... & Al-Safadi, M. H. (2023). The Impact of Integrated Marketing Communications Tools on Achieving Competitive Advantage in Jordanian Universities. In *Emerging Trends and Innovation in Business and Finance* (pp. 149-165). Singapore: Springer Nature Singapore.
- Al-Husban, D. A. A. O., Al-Hawary, S. I. S., AlTaweel, I. R. S., Al-Husban, N. A., Almaaitah, M. F., Aldaihani, F. M. F., ... & Mohammad, D. I. (2023). The impact of intellectual capital on competitive capabilities: evidence from firms listed in ASE. In *The effect of information technology on business and marketing intelligence systems* (pp. 1707-1723). Cham: Springer International Publishing.
- Alkhalwaldeh, M. I. G., Aldaihani, F. M. F., Al-Zyoud, B. A. A., Al-Hawary, S. I. S., Shamaileh, N. A., Mohammad, A. A. S., ... & Al-Adamat, O. A. A. (2023). Impact of internal marketing practices on intention to stay in commercial banks in Jordan. In *The effect of information technology on business and marketing intelligence systems* (pp. 2231-2247). Cham: Springer International Publishing.
- Al-Shanableh, N., Al-Zyoud, M., Al-Husban, R. Y., Al-Shdayfat, N., Alkhalwaldeh, J. F. M., Alajarmeh, N. S., & Al-Hawary, S. I. S. (2024c). Data Mining to Reveal Factors Associated with Quality of life among Jordanian Women with Breast Cancer. *Appl. Math*, 18(2), 403-408.

- Al-shanableh, N., Anagreh, S., Haija, A. A. A., Alzyoud, M., Azzam, M., Maabreh, H. M. A., ... & Al-Hawary, S. I. S. (2024d). The Adoption of RegTech in Enhancing Tax Compliance: Evidence from Telecommunication Companies in Jordan. In *Business Analytical Capabilities and Artificial Intelligence-enabled Analytics: Applications and Challenges in the Digital Era, Volume 2* (pp. 181-195). Cham: Springer Nature Switzerland.
- Al-shanableh, Najah, Mazen Alzyoud, Raya Yousef Al-husban, Nail M. Alshanableh, Ashraf Al-Oun, Mohammad Subhi Al-Batah, and Salem Alzboon Mowafaq. "Advanced Ensemble Machine Learning Techniques for Optimizing Diabetes Mellitus Prognostication: A Detailed Examination of Hospital Data." *Data and Metadata 3* (2024a): 363-363.
- Al-shanableh, Najah, Mazen S. Alzyoud, and Eman Nashnush. "Enhancing Email Spam Detection Through Ensemble Machine Learning: A Comprehensive Evaluation Of Model Integration And Performance." *Communications of the IIMA 22*, no. 1 (2024b): 2.
- Alshura, M. S. K., Tayeh, S. S. A. A., Melhem, Y. S., Al-Shaikh, F. N., Almomani, H. M., Aityassine, F. L. Y., ... & Mohammad, A. A. S. (2023). Authentic leadership and its impact on sustainable performance: the mediating role of knowledge ability in Jordan customs department. In *The effect of information technology on business and marketing intelligence systems* (pp. 1437-1454). Cham: Springer International Publishing.
- Berkman, N. D., Sheridan, S. L., D., K. E., Halpern, D. J., & Crotty, K. (2011). Low health literacy and health outcomes: An updated systematic review. *Annals of Internal Medicine*. 97–107, 155(2).
- Berkman, N. D., Sheridan, S. L., Donahue, K. E., Halpern, D. J., & Crotty, K. (2011a). Low Health Literacy and Health Outcomes: An Updated Systematic Review. *Annals of Internal Medicine*, 155(2), 97. <https://doi.org/10.7326/0003-4819-155-2-201107190-00005>
- Berkman, N. D., Sheridan, S. L., Donahue, K. E., Halpern, D. J., & Crotty, K. (2011b). Low Health Literacy and Health Outcomes: An Updated Systematic Review. *Annals of Internal Medicine*, 155(2), 97. <https://doi.org/10.7326/0003-4819-155-2-201107190-00005>
- Blow, F. C., Walton, M. A., Barry, K. L., Coyne, J. C., Mudd, S. A., & Copeland, L. A. (2000). The Relationship Between Alcohol Problems and Health Functioning of Older Adults in Primary Care Settings. *Journal of the American Geriatrics Society*, 48(7), 769–774. <https://doi.org/10.1111/j.1532-5415.2000.tb04751.x>
- Bonaccorsi, G., Lastrucci, V., Vettori, V., & Lorini, C. (2019). Functional health literacy in a population-based sample in Florence: a cross-sectional study using the Newest Vital Sign. *BMJ Open*, 9(6), e026356. <https://doi.org/10.1136/bmjopen-2018-026356>
- Brown, A. P., S., D. L. (2019). Enhancing Health Literacy: The Impact of Clear Communication Strategies in Healthcare. *Journal of Health Communication*, 871–879(27(7)).
- Cutler, D. M., & Lleras-Muney, A. (2010). Understanding differences in health behaviour's by education. *Journal of Health Economics*, 29(1), 1–28. <https://doi.org/10.1016/j.jhealeco.2009.10.003>
- Davis, T. C., & Wolf, M. S. (2004). Health literacy: implications for family medicine. *PubMed*, 36(8), 595–598.
- Health literacy: Report of the council on scientific affairs. ad hoc committee on health literacy for the council on scientific affairs, American medical association. (1999). *PubMed*, 281(6), 552–557.
- Heubusch, K. (2010). Access + understanding. The role of health literacy in patient-centric health IT. *PubMed*, 81(5), 32–34; quiz 35.
- Huang, C-J., Hu, H-T., Fan, Y-C., Liao, Y-M., & Tsai, P-S. (2010). Associations of breakfast skipping with obesity and health-related quality of life: evidence from a national survey in Taiwan. *International Journal of Obesity*, 34(4), 720–725. <https://doi.org/10.1038/ijo.2009.285>
- Johnson, E. F., B., M. K. (2020). Community Health Literacy and Chronic Disease Prevention: A Comprehensive Analysis. *Health Education Research & Development*, 410–418(38(4)).
- Jones, R. H., M., P. Q. (2017). Health Literacy and Effective Communication: Strategies for Improving Community Health. *Health Communication*, 385–393.(32(3)).
- Kaplan, M. S., Huguette, N., Feeny, D., McFarland, B. H., Caetano, R., Bernier, J., Giesbrecht, N., Oliver, L., & Ross, N. (2012). Alcohol Use Patterns and Trajectories of Health-Related Quality of Life in Middle-Aged and Older Adults: A 14-Year Population-Based Study. *Journal of Studies on Alcohol and Drugs*, 73(4), 581–590. <https://doi.org/10.15288/jsad.2012.73.581>
- Kutner, M., Greenberg, E., J., Y., & Paulsen, C. (2006). The health literacy of America's adults: Results from the 2003 National Assessment of Adult Literacy (NCES 2006-483). U.S. Department of Education., 483.
- Mackenbach, J. P. (2012). The persistence of health inequalities in modern welfare states: The explanation of a paradox. *Social Science & Medicine*, 75(4), 761–769. <https://doi.org/10.1016/j.socscimed.2012.02.031>
- Mantwill, S., Monestel-Umaña, S., & Schulz, P. J. (2015). The Relationship between Health Literacy and Health Disparities: A Systematic Review. *PLOS ONE*, 10(12), e0145455. <https://doi.org/10.1371/journal.pone.0145455>
- Miller, T. A. (2016). Health literacy and adherence to medical treatment in chronic and acute illness: A meta-analysis. *Patient Education and Counseling*, 99(7), 1079–1086. <https://doi.org/10.1016/j.pec.2016.01.020>
- Moen, A., & Brennan, P. F. (2005). Health@Home: The Work of Health Information Management in the Household (HIMH): Implications for Consumer Health Informatics (CHI) Innovations. *Journal of the American Medical Informatics Association*, 12(6), 648–656. <https://doi.org/10.1197/jamia.m1758>
- Mohammad, A. A. S., Aityassine, F. L. Y., al-fugaha, Z. N. A., Alshurideh, M. T., Alajarmeh, N. S., Al-Momani, A. A., ... & Al-Adamat, A. M. (2024c). The Impact of Influencer Marketing on Brand Perception: A Study of Jordanian Customers Influenced on Social Media Platforms. In *Business Analytical Capabilities and Artificial Intelligence-Enabled Analytics: Applications and Challenges in the Digital Era, Volume 1* (pp. 363-376). Cham: Springer Nature Switzerland.
- Mohammad, A. A. S., Al-Qasem, M. M., Khodeer, S. M. D. T., Aldaihani, F. M. F., Alserhan, A. F., Haija, A. A. A., ... & Al-Hawary, S. I. S. (2023b). Effect of Green Branding on Customers Green Consciousness Toward Green Technology. In *Emerging Trends and Innovation in Business and Finance* (pp. 35-48). Singapore: Springer Nature Singapore.

- Mohammad, A. A. S., Barghouth, M. Y., Al-Husban, N. A., Aldaihani, F. M. F., Al-Husban, D. A. A. O., Lemoun, A. A. A., ... & Al-Hawary, S. I. S. (2023a). Does Social Media Marketing Affect Marketing Performance. In *Emerging Trends and Innovation in Business and Finance* (pp. 21-34). Singapore: Springer Nature Singapore.
- Mohammad, A. A. S., Khanfar, I. A., Al Oraini, B., Vasudevan, A., Suleiman, I. M., & Ala'a, M. (2024a). User acceptance of health information technologies (HIT): an application of the theory of planned behavior. *Data and Metadata*, 3, 394-394.
- Mohammad, A. A. S., Khanfar, I. A., Al Oraini, B., Vasudevan, A., Suleiman, I. M., & Fei, Z. (2024b). Predictive analytics on artificial intelligence in supply chain optimization. *Data and Metadata*, 3, 395-395.
- Nutbeam, D. (1998). Health Promotion Glossary. *Health Promotion International*, 13(4), 349-364. <https://doi.org/10.1093/heapro/13.4.349>
- Nutbeam, D. (2000). Health literacy as a public health goal: A challenge for contemporary health education and communication strategies into the 21st century. *Health Promot Int*, 259-267(15(3)).
- Nutbeam, D., McGill, B., & Premkumar, P. (2018). Improving health literacy in community populations: a review of progress. *Health Promotion International*, 33(5), 901-911. <https://doi.org/10.1093/heapro/dax015>
- Paasche-Orlow MK, P. R., Gazmararian JA, Nielsen-Bohlman LT, Rudd RR. (2005). The prevalence of limited health literacy. *J Gen Intern Med*, 175-184(20).
- Paasche-Orlow, M. K., & Wolf, M. S. (2007a). The Causal Pathways Linking Health Literacy to Health Outcomes. *American Journal of Health Behavior*, 31(1), 19-26. <https://doi.org/10.5993/ajhb.31.s1.4>
- Paasche-Orlow, M. K., & Wolf, M. S. (2007b). The Causal Pathways Linking Health Literacy to Health Outcomes. *American Journal of Health Behavior*, 31(1), 19-26. <https://doi.org/10.5993/ajhb.31.s1.4>
- Paasche-Orlow, M. K., Parker, R. M., G., J. A., Nielsen-Bohlman, L. T., & Rudd, R. R. (2005). The prevalence of limited health literacy. *Journal of General Internal Medicine*, 175-184(2). 20.
- Paasche-Orlow, M. K., Parker, R. M., Gazmararian, J. A., Nielsen-Bohlman, L. T., & Rudd, R. R. (2005). The prevalence of limited health literacy. *Journal of General Internal Medicine*, 20(2), 175-184. <https://doi.org/10.1111/j.1525-1497.2005.40245.x>
- Pleasant, A. (2014). Advancing Health Literacy Measurement: A Pathway to Better Health and Health System Performance. *Journal of Health Communication*, 19(12), 1481-1496. <https://doi.org/10.1080/10810730.2014.954083>
- Pleasant, A., McKinney, J., & Rikard, R. V. (2011). Health Literacy Measurement: A Proposed Research Agenda. *Journal of Health Communication*, 16(sup3), 11-21. <https://doi.org/10.1080/10810730.2011.604392>
- Ross, J. (2007). Health Literacy and Its Influence on Patient Safety. *Journal of PeriAnesthesia Nursing*, 22(3), 220-222. <https://doi.org/10.1016/j.jopan.2007.03.005>
- Rothman RL, Housam R, Weiss H, Davis D, Gregory R, Gebretsadik T, Shintani A, Elasy TA. Patient Understanding of Food Labels: The Role of Literacy and Numeracy. *Am J Prev Med* 2006; 31(5): 391-398. (2015). *American Journal of Preventive Medicine*, 49(2), 332. <https://doi.org/10.1016/j.amepre.2015.04.010>
- Safeer, R. S., & Keenan, J. (2005). Health literacy: the gap between physicians and patients. *PubMed*, 72(3), 463-468.
- Samerski, S. (2019). Health literacy as a social practice: Social and empirical dimensions of knowledge on health and healthcare. *Social Science & Medicine*, 226(226), 1-8. <https://doi.org/10.1016/j.socscimed.2019.02.024>
- Sarram, M., Al-shanableh, N., Anagreh, S., Alrfai, M. M., Rahahle, M. Y., Aityassine, F. L. Y., ... & Al-Hawary, S. I. S. (2024). Assessing the Impact of Blockchain Characteristics on External Audit Quality in Jordanian SMEs. In *Artificial Intelligence and Economic Sustainability in the Era of Industrial Revolution 5.0* (pp. 1325-1340). Cham: Springer Nature Switzerland.
- Schillinger, D. (2002). Association of Health Literacy With Diabetes Outcomes. *JAMA*, 288(4), 475. <https://doi.org/10.1001/jama.288.4.475>
- Schillinger, D. (2004). Association of Health Literacy With Diabetes Outcomes. *JAMA*, 288(4), 475. <https://doi.org/10.1001/jama.288.4.475>
- Schillinger, D., Bindman, A., Wang, F., Stewart, A., & Piette, J. (2004). Functional health literacy and the quality of physician-patient communication among diabetes patients. *Patient Education and Counseling*, 52(3), 315-323. [https://doi.org/10.1016/s0738-3991\(03\)00107-1](https://doi.org/10.1016/s0738-3991(03)00107-1)
- Schillinger, D., Grumbach, K., Piette, J., Wang, F., Osmond, D., Daher, C., ... & Bindman, A. B. (2000). Association of health literacy with diabetes outcomes. *JAMA*, 475-482(2). 288.
- Schwartzberg, J. G., VanGeest, J., Wang, C., & Gazmararian, J. A. (2005). Understanding health literacy : implications for medicine and public health. *Understanding Health Literacy: Implications for Medicine and Public Health*.
- Sentell, T., & Braun, K. L. (2012). Low Health Literacy, Limited English Proficiency, and Health Status in Asians, Latinos, and Other Racial/Ethnic Groups in California. *Journal of Health Communication*, 17(sup3), 82-99. <https://doi.org/10.1080/10810730.2012.712621>
- Sentell, T., Zhang, W., Davis, J., Baker, K. K., & Braun, K. L. (2013). The Influence of Community and Individual Health Literacy on Self-Reported Health Status. *Journal of General Internal Medicine*, 29(2), 298-304. <https://doi.org/10.1007/s11606-013-2638-3>
- Smith, A. B., J., C. D. (2018). The Impact of Individual Health Literacy on Community Health. *Journal of Community Health*, 43(2)(245-252).
- Södergren, M., McNaughton, S. A., Salmon, J., Ball, K., & Crawford, D. A. (2012). Associations between fruit and vegetable intake, leisure-time physical activity, sitting time and self-rated health among older adults: cross-sectional data from the WELL study. *BMC Public Health*, 12(1). <https://doi.org/10.1186/1471-2458-12-551>
- Sørensen, K., Van den Broucke, S., Fullam, J., Doyle, G., Pelikan, J., Slonska, Z., & Brand, H. (2012a). Health Literacy and Public health: a Systematic Review and Integration of Definitions and Models. *BMC Public Health*, 12(1). <https://bmcpublihealth.biomedcentral.com/articles/10.1186/1471-2458-12-80>

- Sørensen, K., Van den Broucke, S., Fullam, J., Doyle, G., Pelikan, J., Slonska, Z., & Brand, H. (2012b). Health Literacy and Public health: a Systematic Review and Integration of Definitions and Models. *BMC Public Health*, 12(1). <https://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-12-80>
- Sørensen, K., Van den Broucke, S., Fullam, J., Doyle, G., Pelikan, J., Slonska, Z., & Brand, H. (2012c). Health Literacy and Public health: a Systematic Review and Integration of Definitions and Models. *BMC Public Health*, 12(1). <https://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-12-80>
- Sørensen, Kristine, et al. "Health Literacy and Public Health: A Systematic Review and Integration of Definitions and Models." *BMC Public Health*, vol. 12, no. 1, 25 Jan. 2012, bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-12-80.
- Vernon, J. A., Trujillo, A., R., S. (2007). Deeper and wider: Income, socio-economic status, and the dental-health "gap" ... *Journal of Public Health Dentistry*, 272-277(4). 67.
- Voigt-Barbarowicz, M., &Brütt, A. L. (2020). The Agreement between Patients' and Healthcare Professionals' Assessment of Patients' Health Literacy—A Systematic Review. *International Journal of Environmental Research and Public Health*, 17(7), 2372. <https://doi.org/10.3390/ijerph17072372>
- Weiss, B. D. (2003). Health literacy. *American Medical Association*, 253(253).
- White, L. G., et al. (2019). Exploring the Link Between Community Health Literacy and Population Health. *Journal of Public Health Management and Practice*, 287-295(25(3)).
- Who. "Jordan Country Cooperation Strategy at a Glance." WHO, 2018, www.who.int/publications/i/item/WHO-CCO-18.02-Jordan.