



Health Literacy Measurements with The Newest Vital Sign Instrument Among Adolescents from Dubai, United Arab Emirates

Birleşmiş Arap Emirlikleri, Dubai’de Adöloşanlar Arasında En Yeni Vital Bulgular Aracı ile Sağlık Okuryazarlığı Ölçümü

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ABSTRACT

Introduction: Assuring high quality health literacy for adolescents is important in the United Arab Emirates to facilitate government’s Vision 2021 objectives of superior health and intellectual attainment of young people, as well as to reduce very high prevalence of adolescent obesity and other behavioural and dietary risk factors for health. **Methods:** In mid-2016, the authors applied the validated Newest Vital Sign Health Literacy instrument to 440 Emirati nationals and Non-Emirati (expatriate) high school students in grades 7 to 12 with mean age of 14 years in Dubai, UAE. **Results:** This study indicates that the mean literacy score was 2.7/6 and that 27.95% were highly likely to suffer from limited health literacy, 38.64% of respondents were possibly literate, and while 33.41% were highly literate. Emirati females demonstrated higher health literacy compared with males (3.26, 95% CI: 2.94 – 3.57 Vs 2.67, CI: 3.30 – 3.04). Non-Emirati male (2.73, 95% CI: 2.43 – 3.02) demonstrated higher health literacy compared with Emirati male. In contrast, Emirati female demonstrated higher health literacy compared with Non-Emirati female (2.36, 95% CI: 2.07 – 2.65). There was no significant difference in health literacy scores related to school grade. **Conclusion:** These findings indicate a low percentage of highly health literate UAE adolescents, highlighting the need to improve health literacy training among UAE adolescents, and especially among Emirati males.

Key words: Health literacy, adolescents, gender, newest vital sign, United Arab Emirates

ÖZET

Giriş: Birleşmiş Arap Emirlikleri’nde adöloşanlar için sağlık okuryazarlığında yüksek kalitenin sağlanması, hükümetin 2021 Öngörü hedefleri’nde genç insanların üstün sağlığa ve entellektüel kazanımına olanak sağlaması için önemli olduğu kadar yüksek olan adöloşan obezitesi prevalansının , diğer davranışsal ve diyet risk etmenlerinin azaltılması için de önemlidir.

Yöntem: 2016 yılının ortasında, yazarlar tarafından geçerliliği onaylanmış En Yeni Vital Bulgular Sağlık Okuryazarlığı ölçümü 440 Emirlik vatandaşı olan ve olmayan sınıfları 7-12 arasında değişen, yaş ortalaması 14 olan lise öğrencisine Dubai’de (BAE) uygulanmıştır. **Bulgular:** Bu çalışmada okuryazarlık ortalama puanı 2.7/6 ve %27,95’si ise sınırlı sağlık okuryazarlığından zarar gördüğünü göstermektedir. Yanıt verenlerin %38.64 olası okur-yazarken %33.41 ise yüksek okuryazardı. Emirlik vatandaşı kadınlar, erkeklere oranla daha yüksek sağlık okuryazarlığı (3.26, 95% CI: 2.94 – 3.57 Vs 2.67, CI: 3.30 – 3.04) gösterdiler. Emirlik vatandaşı olmayan erkekler (2.73, 95% CI: 2.43 – 3.02) ise Emirlik vatandaşı olan erkeklere göre daha yüksek sağlık okuryazarlığı gösterdiler. Karşıt olarak Emirlik vatandaşı kadınlar (2.36, 95% CI: 2.07 – 2.65), Emirlik vatandaşı olmayan göre daha yüksek sağlık okuryazarlığı gösterdi. Okula göre sağlık okuryazarlığı puanında belirgin bir farklılık yoktu. **Sonuç:** Bu bulgular yüksek sağlık okuryazarlığı olan adöloşanların BAE’teki oranlarının az olduğunu, özellikle Emirlik vatandaşı olan erkekler arasında olmak üzere BAE’de yaşayan adöloşanlara sağlık okuryazarlığını geliştirmeye gerek olduğunu göstermektedir.

Anahtar Sözcükler: Sağlık Okuryazarlığı, adöloşanlar, cinsiyet, en yeni vital bulgular, Birleşik Arap Emirlikleri

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INTRODUCTION

Health literacy among adolescents refers to their ability to understand and interpret health information and to understand that actions taken in youth affect health later in life, combined with the ability to access valid health information. Through achieving optimal health literacy competencies, adolescents are enabled to make appropriate health decisions, and to consider influences on their own and others' health chances. Developing a structured approach to enable adolescents acquire a high level of health literacy will facilitate acquisition of accurate health information and enhance appropriate interactions with the health system, thus increasing the likelihood of optimal health outcomes later in life.¹

Globally, while public health policymakers strive to facilitate healthy behaviours and counter the promotion of unhealthy lifestyles, wayfinding in health care systems is increasingly difficult, and formal education systems too often fail to provide young people with adequate skills to access, understand, assess and use information to improve their health. Poor health literacy is highly correlated with unhealthy choices, high-risk health-related behaviours, poorer health, less self-management and more hospitalization. This is particularly important in relation to adolescents with chronic illnesses such as asthma and diabetes, who require frequent contacts with the health system to optimally manage their disease. Education and health operate in a virtuous cycle – individuals with quality education are less likely to develop adverse health outcomes, while individuals who minimize adverse impacts of behavioural and dietary risks to their health are more likely to achieve high educational outcomes.² According to the World Health Organization, health literacy is positively related to formal literacy, and entails people's knowledge, motivation and competences to access, understand, appraise and apply health information in order to make judgements and take decisions in everyday life concerning health care, disease prevention and health promotion to maintain or improve quality of life during the life course.³ Both health and literacy are critical resources for everyday living. Health literacy requires basic literacy and a grasp of health-related vocabulary, in addition to developing necessary competencies for finding, evaluating and integrating health information from a variety of contexts. Nutbeam⁴ identified three levels of health literacy:

- Functional: basic skills in reading and writing necessary for effective functioning in a health context;
- Interactive: more advanced cognitive literacy and social skills that enable active participation in health care; and

- Critical: the ability to critically analyze and use information to participate in actions that overcome structural barriers to health.

Sorensen et al⁵ suggested that the core role of health literacy is to equip individuals with the ability to access, understand, appraise, and apply health information to make decisions in everyday life in disease prevention, healthcare access, and health promotion. A 2012 health literacy survey of 7795 individuals in eight European Union countries (European Health Literacy Survey) revealed that limited (inadequate plus problematic) health literacy varied between 29% for the Netherlands and 62% for Bulgaria.⁶

Currently, several useful tools exist for measuring health literacy among adolescents.^{7,8} This important cohort warrants enhanced health literacy focus as many unhealthy choices made in adolescents, such as tobacco smoking, tend to persist through adulthood. Furthermore, increasing media use among adolescents and regulatory requirements for food nutrition labelling have significant influence on health behavior among adolescents, and thus warrants in-depth understanding of their response to media content and food labels.^{9,10}

The United Arab Emirates (UAE) Vision 2021 document includes 10 health indicators. The first five indicators require above average health literacy to achieve expected targets.¹¹ There are currently no published studies on the level of health literacy in UAE. Nevertheless, it is noteworthy that basic illiteracy rate dropped significantly from 16% in 1995 to 7.3% in 2015. With UAE's epidemiologic and nutrition transitions, which have resulted in high prevalence of diabetes, obesity, and cerebrovascular disease complications occurring on average 15 years earlier compared with trends in European nations, the need to assess and where appropriate scale up health literacy rate of adolescents and adults is self-evident.^{12,13} High levels of health literacy strongly correlate with prevention and self-management of non-communicable diseases.¹⁴ Especially among adolescents, health literacy interventions constitute an evidence-based approach for health promotion and reduction of non-communicable disease risks in adulthood.¹⁵

In this study, we examined health literacy among high school students in Dubai, UAE.

MATERIALS AND METHODS

As at June 2016, there were 173 private schools and 15 public schools in Dubai, training students from Kindergarten to year 12, with a combined population of almost 300,000. Based on this data as well as the Dubai Statistics centres' 2016 census data of

children aged between 10 and 19 years (n= 214,755), we estimated that there were 170,000 pupils in Dubai enrolled in grades 7 – 12. Using the Checkmarket.com sample size calculator for 95% confidence interval (CI) and 5% margin of error, we required at least 384 participants for the survey. Two schools were selected based on the heterogeneity of the student populations with 16 – 33 % of the student populations being Emiratis and remaining students at least from 30 different nationalities in each school.

Following approval from the schools' authorities to conduct the survey, 440 high school students (227 males and 213 females) in grades 7 – 12 (i.e. ages 12 – 17) were recruited from Dubai schools for this study in June-2016. The selection of the schools was determined by the researchers to be representative of Emirati citizens and non-Emiratis in UAE. Learners in each surveyed class were informed about the survey and it was emphasized that participation is voluntary. All learners were informed about the survey. Hamdan Bin Mohammed Smart University Institutional Review Board involvement in this study was not required as the study was low risk and all data were de-identified. Respondents' confidentiality was preserved throughout the study, as they did not include their names in the answered survey papers. The study was designed to accept or reject the following research hypotheses:

- (a) Over 80% of study participants will be at least possibly literate and over 50% will be highly literate.
- (b) Emirati males will demonstrate significantly higher health literacy compared with Emirati females.
- (c) Emirati males will demonstrate significantly higher health literacy compared with non-Emirati males.
- (d) Emirati females will demonstrate significantly higher health literacy compared with non-Emirati females.
- (e) Health literacy will be significantly higher in proportion to years of education (e.g. scores for students in grade 12 will be higher than for grade 11, which will in turn be higher for grade 10, and so on).

Given that adolescent and youth literacy levels in UAE currently exceed 90%²⁰, we expected at least 50% of any UAE adolescent cohort to be highly health literate. Although general literacy level of female adolescents in UAE is higher, than that of male adolescents (97% vs. 94%)²⁰. We hypothesized that males are socialized to be more extroverted and probably more likely to develop higher social skills in interpreting food labels. Based on the greater financial privileges of children of UAE citizens to acquire high quality formal and informal education, we hypothesized that Emirati adolescents will probably demonstrate higher health

literacy, compared with their non-Emirati adolescent counterparts. We also hypothesized a linear relationship between duration of formal education and level of health literacy.

A particularly efficient and validated measure of health literacy among adolescents is the Newest Vital Sign (NVS) Instrument. It is a nutrition label accompanied with 6 questions and requires 3 - 5 minutes for administration. It is reliable (Cronbach α >0.76 for English version) and correlates with the Test of Functional Health Literacy in Adults. Patients with more than four correct responses are unlikely to have low literacy, whereas fewer than 4 correct answers indicate the possibility of limited literacy.¹⁶ The original version of the NVS tool (in English) instrument was selected for our study for several reasons. First, it is validated, reliable, culturally appropriate, and was applied in dozens of health literacy studies globally over the past decade¹⁷. Second, it enhances comprehensiveness of health literacy ascertainment by assessing reading, interpretation, and numeracy. Third, it relates to nutrition labels with which most adolescents are familiar, and it takes only 3 – 5 minutes to complete.^{18,19} Participating learners in each class took time off regular school activities to complete the survey at the same time over 6 minutes. Participating learners in each class took time off regular school activities to complete the survey at the same time over 6 minutes.

The data were analysed on STATA© version 12 using descriptive analysis (frequency) and two-sample t test with equal variances to test the study hypotheses.²¹

RESULTS

More than half (54%) of participants were non-emirate and 46% emirate; and 52% were male and 48% female respectively. The mean age of the participants was 14 years, with a range of 12 to 17 years. The first hypothesis, that over 80% of study participants will be at least possibly literate, and over 50% will be highly literate was rejected, because only 72% of respondents were at least possibly literate and only 33.4% were highly literate (Table 1).

Table 1. Scores of 440 participating UAE adolescents in the Newest Vital Sign health literacy survey

Score	Frequency	Percent
0	41	9.32
1	82	18.64
2	78	17.73
3	92	20.91
4	61	13.86
5	67	15.23
6	19	4.32
Total	440	100.0

Table 2. Mean comparative scores based on nationality and gender for the second, third and fourth hypotheses

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% CI]	
E-Mal	101	2.673267	.1856799	1.86606	2.304884	3.041651
E-Female	100	3.26	.1573903	1.573903	2.947703	3.572297
Combined	201	2.965174	.1232596	1.747507	2.722119	3.208229
*diff		-.5867327	.243616		-1.067133	-.1063326
<i>*significant at 0.017<0.05</i>						
Non-EmirM	126	2.730159	.1471044	1.651243	2.439021	3.021297
E-Mal	101	2.673267	.1856799	1.86606	2.304884	3.041651
Combined	227	2.704846	.115908	1.746329	2.476447	2.933244
**diff		.0568914	.2337216		-.4036719	.5174547
<i>**insignificant at 0.808>0.05</i>						
Non-EmirF	113	2.362832	.1455525	1.547244	2.074438	2.651225
E-Female	100	3.26	.1573903	1.573903	2.947703	3.572297
Combined	213	2.784038	.1109699	1.619553	2.565292	3.002783
*diff		-.8971681	.2141519		-1.31932	-.4750167
<i>*significant at 0.000<0.05</i>						
<i>E-Mal = Emirati male participants; E-Female = Emirati female participants; Non-EmirM = Non-Emirati male participants; Non-EmirF = Non-Emirati female participants.</i>						

Data on the second, third and fourth hypotheses are shown in Table 2. The second hypothesis, that Emirati males will demonstrate significantly higher health literacy compared with Emirati females was rejected as Emirati female participants ($0.017 < 0.05$; mean value 3.26, CI: 2.94 – 3.57) demonstrated higher health literacy compared with male Emirati participants (mean value 2.67, CI: 2.30 – 3.04). The third hypothesis, that Emirati males will demonstrate significantly higher health literacy compared with non-Emirati males, was rejected as non-Emirati male participants demonstrated higher health literacy scores compared with Emirati male participants, although the difference was not significant. Based on the mean value, the result shows that Non-Emirati male participants ($p = 0.81$; mean value 2.73, CI: 2.43 – 3.02) demonstrated higher health literacy compared with Emirati male (2.67, CI: 2.30 – 3.04). The fourth hypothesis, that Emirati females will demonstrate significantly higher health literacy compared with non-Emirati females was accepted as Emirati female participants demonstrated significantly higher average health literacy scores compared with non-Emirati female participants. Based on the mean value, the result shows that Emirate female ($0.001 < 0.05$; 3.26, CI: 2.94 – 3.57) demonstrated higher health literacy compared with Non-Emirati female (2.36, CI: 2.07 – 2.65). The fifth hypothesis, that health literacy will be significantly higher in proportion to years of education, was rejected as there is no observable linear relationship between school grade and NVS test scores among participating students. For example, a third of participants scored 1-2/6, another third 3-4/6 and the last third 5-6/6 in grade 12, while in grade seven, the

corresponding scores were 21% for 1-2/6, 57% for 3-4/6 and 21% for 5-6/6. This finding may be attributed to the fact that the six NVS questions are of a level that can be competently answered by any individual that has undergone at least six years of quality formal education. Further education beyond six years of formal education may therefore not confer significant advantages in correctly answering the survey questions. A 2006 report on the USA National Assessment of Adult literacy survey which sampled 19000 adults found that 45% of high school graduates had basic or below basic health literacy.²²

DISCUSSION

Results from our study indicate that mean literacy score is 2.7/6, and that 38.64% of respondents were possibly literate, while 33.41% were highly literate. Emirati females demonstrated higher health literacy compared to males (3.26, 95% C.I. 2.94 – 3.57 Vs 2.67, CI: 2.30 – 3.04). Non-Emirati males (2.73, 95% CI: 2.43 – 3.02) demonstrated higher health literacy compared with Emirati male. In contrast, Emirati female demonstrated higher health literacy compared with Non-Emirati female (2.36, 95% CI: 2.07 – 2.65). There was no significant difference in health literacy scores relative to school grade. Health literacy in adolescents is described in the literature as comprising variable sets of key dimensions – clusters of related abilities, skills, commitments, and knowledge; that enable a young person to approach health information competently and effectively and to derive at health-promoting decisions and actions. The health literacy of adolescents has major implications for their health outcomes into adulthood. From a policy perspective,

it is important to ascertain important antecedents (e.g. parental socio-economic status) and consequences (e.g. capacity to improve one's own health and the health of others) of health literacy among adolescents, and to implement interventions to align such influences to optimize health literacy.^{23,24}

To the best of our knowledge, this is the first study to systematically examine health literacy among adolescents in the Middle East and North Africa region. Unfortunately, a recently proposed instrument for assessing health literacy in this region, the Eastern-Middle Eastern Adult Health Literacy (EMAHL13) screening instrument²⁵, focusses mainly on comprehension, but not numeracy, an important skill in health promotion and disease management. The survey participants in our research study in schools, where English is the main language of instruction and any difficulty in understanding the survey questionnaire was clarified by two of the authors (ZA & AA) who personally administered the survey. A limitation of this study is the relatively small sample size and lack of randomization of the students who participated in this survey. A much bigger study with a smaller margin of sampling error will provide further information on the extent of health literacy among adolescents in Dubai as well as the wider UAE community.

As health literacy skills are best developed early in life, intersectoral collaboration between the education and health sectors is vital if the risks of low health literacy are to be minimized. One such collaboration is the health promoting schools' concept, which entails incorporating a structured curriculum in health studies as part of the school curriculum.²³ Use of the NVS survey instrument (translated into respective languages) for measuring health literacy among adults in European nations showed that 47% of the population were at risk of low health literacy with mean health literacy scores varying widely from 26/6 in Spain to 4.5/6 in the Netherlands.⁶ The average score of 2.7/6 in this survey is particularly disappointing as adolescent students are not normally included in the category of disadvantaged learners.

The significantly higher NVS health literacy test scores among Emirati females compared with Emirati males as well as non-Emirati females illustrates the effectiveness of UAE's gender equality strategies in the past two decades which has defied modest projections on female literacy. Article 14 of the UAE constitution states that; "Equality, social justice, ensuring safety and security and equality of opportunity for all citizens shall be the pillars of the Society." Also, article 32 of the UAE federal labour law of 1980 states that; "A woman

shall be paid the same wage as a man if she performs the same work.".²⁶ Females currently constitute about 77% of total university enrolments, and they outperform males at every level of the UAE educational sector. Less than 3% of UAE females are illiterate, compared with 6% illiteracy rate among Emirati males, and about 30% illiteracy rate among Arab women.²⁵ UAE's inclusive education system has facilitated the emergence of female Emiratis who not only outperform their male fellow citizens educationally but also outperform females from other Middle East and North African nations where cultural norms still put females at a disadvantage vis-à-vis access to quality education.²⁷ As the UAE and other Gulf Cooperation Council nations' health systems progresses into the digital age, the need for highly health literate citizens cannot be over-emphasized if optimal returns on impressive investments in health are to be realized.

CONCLUSION

Low levels of health literacy among populations with at least post-primary education (such as the participants in this study) undermine the quality of individual and family life. Low health literacy adversely influences health status, which impacts negatively on educational achievement, setting into motion a vicious cycle of declining human development. It will be very useful to conduct a nationwide study on health literacy among adolescents in UAE in order to provide a basis for consistent policies on improving adolescent and youth health literacy. To date integrated health literacy related curriculum and activities are integrated into public schools in in Abu Dhabi as part of Schools for Health program. Monitoring and evaluation of this initiative for effectiveness may provide one of many options for nationwide implementation of health education and health literacy programs. In an increasingly complicated health system and with epidemiological transitions, which require greater understanding of health-related issues, significant improvements in school curricula, and public education activities are required to enhance the level of health literacy among adolescents in the UAE.

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