

University food environment, an example of health inequality?

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Abstract

Background: Universities provide an influential life structure for students during their transition into adulthood through tuition as well as through the ground's environment. Ensuring a healthy and safe university environment forms the basis of health equity within such institutions. The objective was to evaluate the food environment through vending machines situated across the grounds of the only state university in Malta, whilst acquiring students' perspective on these facilities.

Method: An audit was conducted on the food and beverage items available within vending machines across university grounds. This was re-evaluated a year later. Students' perceptions and use of such facilities were gathered through electronic-distributed questionnaires.

Results: All machines were stocked with identical sugary items. 71.03% of responders purchased from machines due to their easy accessibility, while 61% considered items as "too unhealthy", with 74.60% showing enthusiasm for healthier choices. 60% reported a willingness to pay more in exchange for healthier options.

Conclusion: Limited consumable options leave students without healthier options on campus. Provision of a healthier food environment is a prerequisite in addressing health inequalities. Action is required to tackle this situation urgently especially due to the growing obesity epidemic.

Keywords

Epidemiology; Environment health; Food policy; Malta; Obesity

Introduction

Universities are educational hubs that should provide empowerment to students not only through academic education but also by contributing to a 'Fair society healthy lives'.¹ A six-policy objective was set out to ensure that society provides a healthy environment for individuals to live in. A university is an example of a social setting and fits into five out of the six reported policy objectives. Therefore a university should ensure a healthy standard of living, while creating and developing a healthy sustainable place as well as strengthening its role and impact of ill health prevention.¹ The university food environment is encountered daily by students and employees alike and forms part of their living space. Hence, the university food environment may influence the eating habits and behaviours of students.² The university period is an important transition from student to adult life. Consequently, all influences encountered by university students will set the stage for lifelong choices that might even have an effect on their health status.

Non-communicable diseases are a growing global concern, among which is the obesity epidemic. Such diseases have been associated with the manufacturing, marketing and consumption of readily available commercial food and beverages, which contain elevated levels of salt, sugar and trans unsaturated fats.³ Vending machines are well known sources of high fat, sugar and salty foods, with healthy food hardly ever offered.⁴ In order to verify such claims on the vending machines' consumables variety, the vending machines food environment within the only public university in

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Malta was examined. While simultaneously obtaining personal perspectives on vending machines' food and beverage choices by those exposed (students) to such an environment. Malta, a European country situated in the middle of the Mediterranean Sea, has been reported to have the highest obesity rates in school children and one of the highest adult obesity rates in Europe.^{5,6} Despite the high obesity rates, little is known about the food environment within the University of Malta. The University of Malta is the highest teaching institute in Malta hosting around 11,500 students annually, with an approximate 1,000 students being international students. Therefore, the University of Malta contributes an important role in the life of the majority of aspiring Maltese professionals as well as a being the workplace to a number of residential staff. Other International Universities especially those pertaining similar cultural and social characteristics, including high obesity rates, can also benefit from such information.

Materials and Methods

An observational audit of the items available for purchase within the vending machines across the grounds of the University of Malta was conducted between October and November 2016. The same audit was re-conducted a year later. The vending machines were observed every Tuesday morning for four consecutive weeks. Tuesday was chosen to ensure that the vending machine had been stocked following the weekend. The vertical display buttons for beverage machines were noted. All data was gathered electronically and later analysed using the statistical software IBM SPSS version 21.

An electronic questionnaire, adopted from the literature covering students' perception and use of the vending machine facilities, was distributed electronically in October 2016 through the University of Malta e-mail system, with the help of the Information Technology (IT) services.⁷

Permission to conduct this audit was granted from the University of Malta Registrar Office and from the University of Malta Research Ethics Committee (UREC). Informed consent was

obtained from all students participating in the questionnaire.

Results

The University campus has a total area of 194,452 square meters, within which 22 vending machines (13 beverage, 9 food) were identified, spread over 13 different University sites at the time of the observations. These were located at easy access open spaces and in prominent areas such as just outside the canteen area and near the library. A beverage vending machine was found within all the different 13 sites, although food vending machines were found in the most prominent sites only.

Each beverage vending machine sold cold soft drinks (both regular and diet), iced teas, juices, energy drinks, sports drinks and water. The 'water selection button' was always found at the bottom of the vertical display, while the 'regular soft drinks selection buttons', were at eye level to the consumer.

The food vending machines were all packed with the same chocolate bars (18 different types and varieties), candy (4 varieties), snack bags (3 varieties), Crips bags (3 varieties), biscuits (2 varieties), wafers (2 varieties) and chocolate-based cereal bar (1 variety). Packed salted nuts packages were found in 5 out of 9 vending machines. No fruit (fresh or dried), dairy products such as yogurts or vegetable items were available at the time of the observations. No change in product choice was noticed a year later.

A total of 298 students (Female $n=202$) responded to the electronic questionnaire, with the majority reporting purchasing items ($n=222$), as seen in Figure 1. Meanwhile Figure 2 illustrates the reasons for purchasing from the vending machines.

Overall the participating students considered the choices to be "too unhealthy" ($n=182$). Interestingly, more than half of the responders ($n=179$) reported to be willing to pay more than the usual typical vending machine item in return for a healthier option.

Figure 1: Reported purchases frequency from a vending machine, by responders

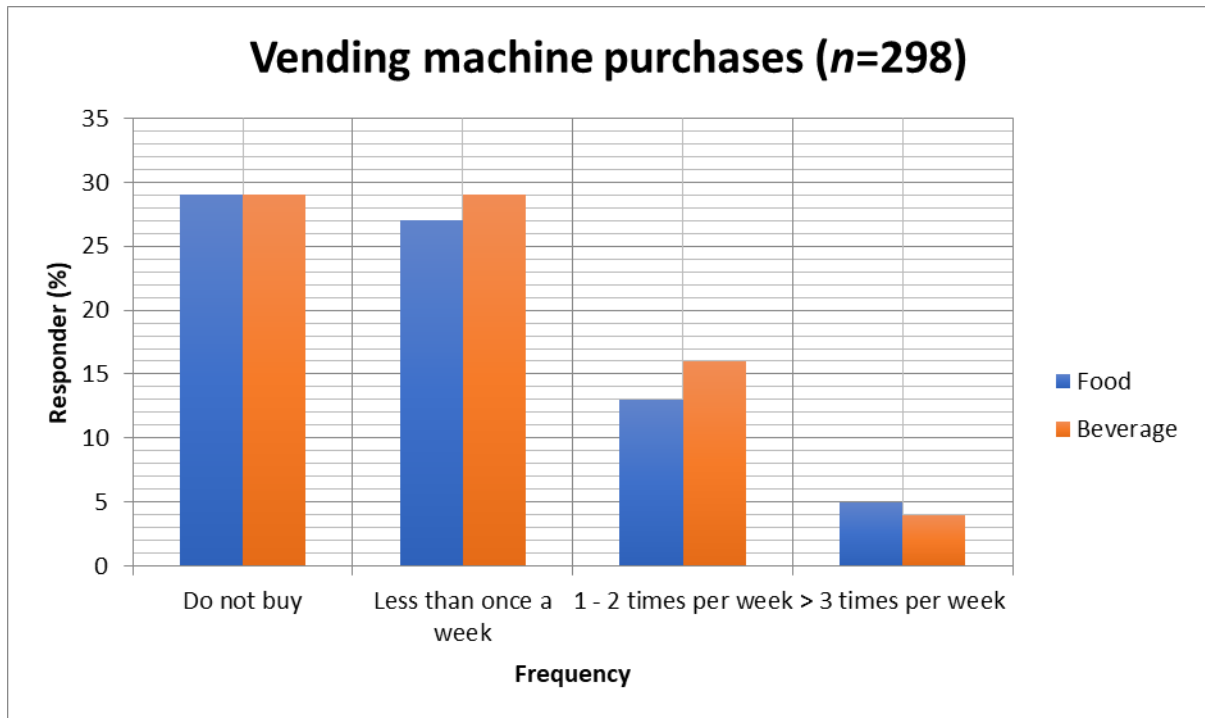
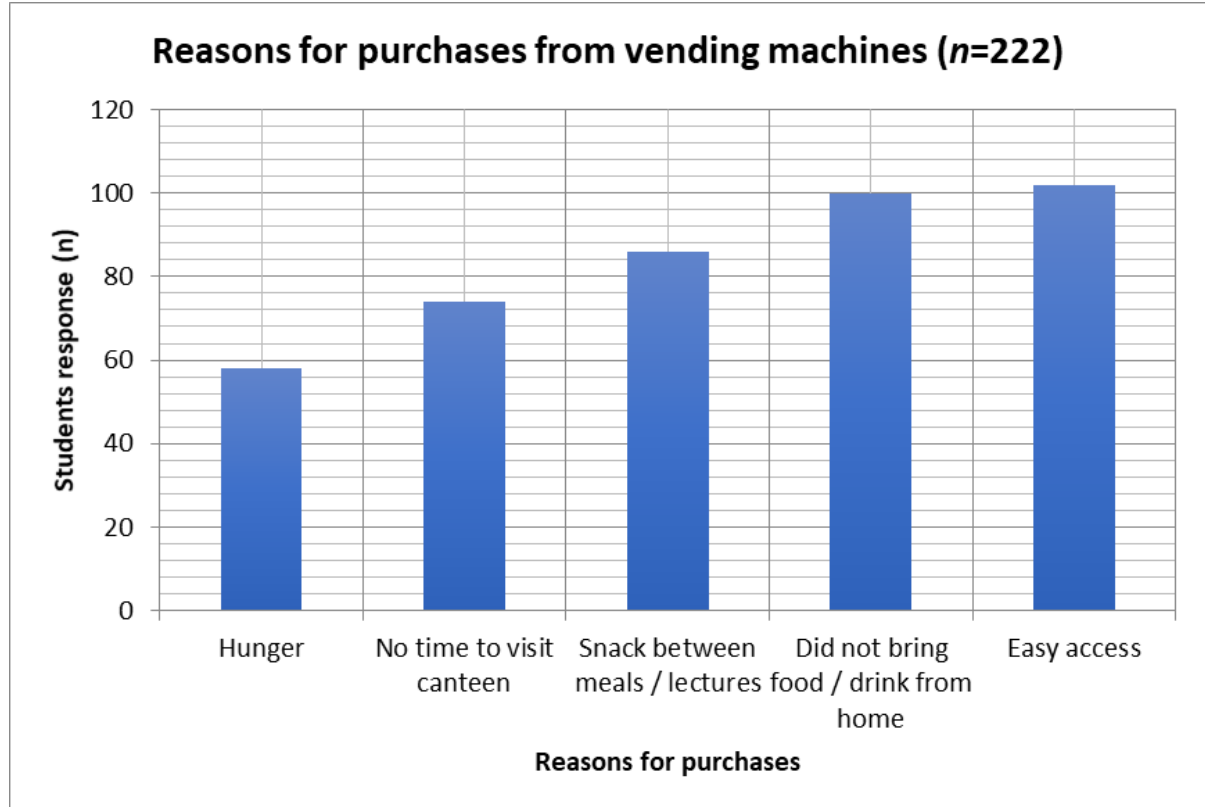


Figure 2: Reported reasons for purchasing from vending machines, by responders



Discussion

The vending machine food environment of the University of Malta provides limited options for purchase with predominance for sugary items. Students utilize such modalities due to their convenient locations and lack of pre-prepared snacks from home. However, students yearned for healthier options. Organizational changes, like moving healthier choices closer to eye-level while providing healthier options will ensure a better food environment.⁸ In fact, food policies targeting the type and variety of food and beverage available to students and staff within the campus is recommended.⁹⁻¹⁰ Providing fresh and healthier options like fruit and vegetables through a vending machine may be considered economical not viable. However, large countries like the US, Japan and Australia have managed to implement such vending machines within public places. In the Netherlands, following a three phase study, it was reported that both fruit and vegetables products stored in a refrigerated vending machine with a storage life of at least 5 days can be viable.¹¹

Recently the University of Malta has initiated a health initiative to promote a healthy lifestyle to students and resident staff. Nutritionist services are being provided on a one-to-one basis by the Health Promotion and Disease Prevention Directorate. It is a well-established fact that peer education, provided by trained health promotion officials, play an important and effective role in influencing students' vending machine food choices.⁹ However, providing a healthy food environment is a prerequisite contributing to social determinants of health.¹² Items available for purchase should be varied and include healthier options such as fresh fruit, fresh vegetables and salads or dried fruit and nuts. Other approaches to enhance a better food environment could be provided through nutritional educational tips alongside vending machines, nutritional education on the university's official website and nutritional educational activities during the academic year catered for both students and resident staff. It has been reported that nutritional promotional emails sent out to students were associated with an increased fruit and vegetable consumption.¹³⁻¹⁴

This is the first study to explore the food environment of the only public university in Malta. The vending machine audit was only conducted for a period of four weeks, one day a week. The

observations were conducted for four weeks in order to try to optimize the observations, variations and quantity of items for sale, but item variations may still have taken place on other days of the week. The audit was only performed between October and November; any seasonal variations in vending machine items could not be counted for. The food environment was only assessed through vending machines located within the University's grounds. The University's canteen, stalls and takeaways, bars and restaurants found just outside the University's grounds were excluded. Information on the amount of sales performed during the study period was not recorded. The questionnaire was distributed electronically to the registered students only once, on the second Monday of October as per University of Malta protocol for studies conducted electronically. Therefore, students missing the email alert or mistakenly deleting the email alert would render them as ineligible to participate and lead to a negative effect on the response rate. The time period chosen for this study covered the start of the new academic year, during which students receive multiple electronic mail (e-mail) notifications through their university account, which may have hindered the response rate. The small participation number may have affected the statistical power of the study. There were more female students that responded to our survey, which might have had an effect on the overall results. However, the fact that the respondents were mainly female may strengthen the results as one would expect females to be more aware of unhealthy options than males. One may argue that students not regularly bringing healthier options from home may not opt to choose a healthier option from a vending machine anyway. It is recommended that the study be repeated involving a larger student cohort as well as observing all the various food outlets available within the University grounds.

Conclusion

University food environment impacts on students' dietary behaviour, which may be adopted for life with potential serious health consequences. Establishing a good and healthy snacking choice within the convenient vending machines may have behavioural impact on the new adult generation, while enhancing the global combat against the obesity epidemic.

Summary Box:

- University food environment influences the students' behaviour during their transition to adulthood
- Vending machines are well known sources of high fat, sugar and salty foods
- Students pursue vending machine items for their convenience and easy access
- Students recognize that vending machines items are mainly unhealthy
- Students exhibit an enthusiasm for a change to a healthier food environment
- Food environment policies should be set in place by universities to establish a healthy environment for both students and staff alike

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