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The responsibility of the intellectual

Academic Graduation Oration delivered

29 November 2017

Charles Savona Ventura

Few things help an individual more than to place responsibility upon him, and to let him know that you trust him. – Booker T. Washington [educator: b.1856; d.1915]

Chancellor – Rector – Honourable Minister –
Fellow academics – Graduates and parents –
Distinguished guests – ladies and gentlemen.

I am honoured to be asked by the Senate of the University of Malta to deliver today's oration on the occasion of the conferment of doctoral and master degrees from various Faculties of our Alma Mater. Graduates, you may not quite appreciate the historical significance of this occasion, but today you walk in a proud tradition that stretches back over four-and-a-half centuries – to the setting up by the Society of Jesus of the *Collegium Melitense* authorised by Pope Pius IV on the 29th August 1561 and confirmed by Pope Gregory XIII in 1578. The institution that incorporated the church we are gathered in was finally built in 1602 and its doors were opened “*in the interest of youth, for the common weal and in honour of the City of Valletta*”. After Grandmaster Pinto expelled the Jesuits from Malta, Pope Clement XIV on the 20th October 1769 granted approval for the institution to be changed to a *Pubblica Università di Studi Generali* “*with the privileges, prerogatives, pre-eminences, favours and honours granted to other public Universities*”.

The degree you will receive today is more than just a piece of paper to decorate your study's walls. It is a symbol – a symbol of the hard work you have successfully undertaken during the last years, and a symbol of your accomplishment and your capabilities. However, you should remember that you have not been alone along the path you have followed in your quest for knowledge. Others have walked the path with you. Those who have sacrificed and supported you without hesitation – your family and friends, your tutors, your faculty – share in your accomplishment. I hope that you will look back on your time spent at the University with fondness. Here, you have forged friendships that should last you a lifetime. You have made friends and strengthened relationships with fellow faculty students, with students following courses in other faculties, and with your teachers. Today you will formally be confirmed alumni of the University of Malta. The diploma you will receive today should serve as a covenant between you and this university – a permanent home that invites you back whenever you please.

Responsibility to self

The attainment of knowledge brings responsibilities. Graduation is an important milestone towards becoming financially independent and striking out on your own. Many of today's graduates will go out into the work market offering their services for financial gain; others will continue to further their academic careers, only to enter the work market later.

Yes – the professional intellectual does deserve fair remuneration for his or her services. After all, in the words of the eighteenth century Scottish moral philosopher Adam Smith [b.1723; d.1790], “*It is not from the benevolence of the butcher, the brewer or the baker, that we expect our dinner, but from their regard to their own self interest. We address ourselves, not to their humanity but to their self-love, and never talk to*

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them of our own necessities but of their advantages.”¹

Today our society subscribes to the principle of a Free Market Economy – an economy where all markets are unregulated by any party other than the players within the market. In such an economic philosophy, the price for a service is set through a process of free competition between the vendors of products and services. In theory with this economic philosophy in action, prices should tend to decrease, while quality should tend to increase. However, this price balancing will only fairly take place if no price-setting cartel or monopoly influences the market.

This economic system is only fair if the principle of Perfect Competition is really in play. This assumes that the service buyer has truly been given the complete information about his options and full freedom of choice. The service buyer must not be coerced in any way through being presented with asymmetric information. The individual in need is very susceptible to emotional blackmail that can act as an external influence affecting his perception of options available.

The balance between fair remuneration for services rendered has long been a contentious issue, especially in the field of community health care services. In the past, the issue was resolved by having a government-controlled market economy in this field. In 1724, the consultation fee for doctors attending patients in the community was fixed at one *taro* during the day and four *tari* for a night consultation.^{2,3} A hundred years later in 1821, a revised list of tariffs for physicians and surgeons established the consultation fees at 30 *tari* during the day and 60 *tari* during the night. Other fees were set for other specific instances and procedures.⁴ Further revisions in tariffs for consultations were made throughout the subsequent decades, the last being made in 1960.⁵ Today the fee-controlling mechanism is controlled in part by the private medical insurance providers.

Such regulatory control is unthinkable in the sphere of a free market economy. To temper out a free-for-all mentality, one can only promulgate the wisdom of the Old Testament that states “*He that makes haste to be rich shall not be innocent*” [Proverbs 28:20] for in the words of the third century AD Saint Cyprian of Carthage [b.208; d.258], the individual who falls into “*The deep and profound darkness of avarice has blinded* [his

carnal heart. [He is a] captive and slave of [his] money; [he is] tied by the chains and bonds of avarice....”⁶

Many of the graduates today belong to the health care fraternity. They are familiar with the traditional Hippocratic Oath historically taken by doctors swearing to practice medicine ethically. Believed to have been written by the Hippocratic School in the fourth century B.C.E., the Hippocratic Oath outlines facets of the responsibilities of the individual practitioner that can be extended to the intellectual graduate. The University of Malta Medical School has formulated a modern version of the Hippocratic Oath that will be read by the medical graduates during their graduation ceremony. This includes the statement “*I will take care of all patients equally, irrespective of social, racial, political or ideological differences. I will not put profit or advancement above my duty and service to patients.*” It may be high time for other Faculties to emulate the Faculty of Medicine and Surgery and ask their graduates to take a corresponding ethical practice oath at graduation.

Responsibility to clients

However, responsibility of balancing self-interest with the needs of the clients is only a small facet to the responsibilities brought on by the attainment of knowledge. The classical Hippocratic Oath particularly emphasizes the responsibility towards the client served by the physician. “*In every house where I come I will enter only for the good of my patients, keeping myself far from all intentional ill-doing and all seduction I will prescribe regimens for the good of my patients according to my ability and my judgment and never do harm to anyone. I will not give a lethal drug to anyone if I am asked, nor will I advise such a plan; But I will preserve the purity of my life and my arts. I will not cut for stone, even for patients in whom the disease is manifest; I will leave this operation to be performed by practitioners, specialists in this art.*”

In other words, the graduate intellectual is morally obliged to be a true competent professional. Professionalism is not a straightforward concept to define. The word “profession” is, today, almost synonymous with occupation. Robin Downie, Professor emeritus of Moral Philosophy at the University of Glasgow, in 1990 defined the professional as an educated individual having a

wide cognitive perspective who provides a service based on a special relationship with his or her clients. This relationship involves a special attitude of beneficence tempered with integrity that includes fairness, honesty, and clear understanding of the limits of his or her capabilities.⁷ I can only encourage you to strive for excellence in all of your professional activities and that *“Patients [or clients] will be [your] first concern. [You] will be honest, respectful and compassionate towards patients [or clients] and [you] will ensure that their rights are fully respected,”*⁸

The responsibility towards clients must include also the need to maintain full confidentiality, bearing in mind that the relationship between the professional and his client is based on mutual trust and respect. The buzz-word today is Data Protection. The medical profession has long identified the need for confidentiality with the classical Hippocratic Oath stating: *“All that may come to my knowledge in the exercise of my profession or in daily commerce with men, which ought not to be spread abroad, I will keep secret and will never reveal.”* The concept of professional secrecy relating to the health care professions was so strongly felt that it was long before the promulgation of the Data Protection Act incorporated within the Criminal Code of Malta [Ch.9:257]. The law reads as follows: *“If any physician, surgeon, obstetrician or apothecary or, in general, any other person who, by reason of his calling or profession, becomes the depository of any secret confided to him, shall, except when compelled by law to give information to the public authority, disclose such secret, he shall, on conviction be liable to a fine.”* Furthermore, any conviction under this heading may also involve disciplinary action on the part of the Medical Council.

Responsibility to society

The attainment of knowledge thus puts increased responsibility for the individual to maintain an ethical professional behaviour in all his or her relationships with clients; carefully balancing self-interest and the interests of the client. The Nobel Prize winner Albert Camus [b.1913; d.1960] wrote that *“An intellectual is someone whose mind watches itself.”* We are therefore bound to maintain the highest of ethical standards in our practice. The leadership that you provide must be exemplary.

However, the intellectual must do more than watch him or herself; he or she must also serve as a watchdog for society. By virtue of the learning attained, the graduate professional attains a standing within the community he or she lives in. The knowledge you have attained grants you certain privileges and power in society. Knowledge frees the mind and in the words of the songwriter Bob Dylan [b.1941] *“a hero [is] someone who understands the degree of responsibility that comes with his freedom.”*⁹

The graduate intellectual has the moral obligation to go beyond the duties to specific clients and speak out on broad matters affecting public policy and justice. The physicist Albert Einstein [b.1879; d.1955] believed that *“The world is a dangerous place, not because of those who do evil, but because of those who look on and do nothing.”* Remember the words of the 16th century protestant reformer Martin Luther [b.1483; d.1546] – *“You are not only responsible for what you say, but also for what you do not say.”* If you have the knowledge to foresee the possibility of an outcome that can be harmful to society, then you have the ethical and moral responsibility to share that knowledge with the people at risk and with those in power who could take steps to prevent the outcome. Treat your privileged status in society with humility and respect, and so continue to live within the deepest traditions of this university. Speak out whenever you have a well-informed concern about any aspect relating to the welfare of society – but importantly do so intelligently without any bias, political or otherwise.

The Hippocratic Oath taken by the medical graduates promises that the graduate *“will try to influence positively authorities whose policies harm public health and oppose policies which breach internationally accepted standards of human rights, [and] will strive to change laws which are contrary to patients’ interests or to professional ethics.”* In order to discharge the responsibility towards society, graduate professionals should appear to really be acting independently from any influence placed upon him or her by politicians, industrials or any other policy-making body. The Whistle-blower Act promulgated in 2013 makes *provision for procedures in terms of which employees in both the private sector and the public administration may disclose information regarding improper practices by their employers or other employees in the*

employ of their employers and to protect employees who make said disclosures from detrimental action. It thus recognises the obligation of coming forward to reveal truthful information and grants protection to whoever comes forward – a concept that is diametrically opposite to the past Estacode Regulations concerning the employment of public sector employees enforced by the Public Services Commission. These regulations required permission from the administration before publicly making comments about any matters relating to one's work in the public sector.

Responsibility to knowledge

To be a leader in society, you must be comfortable with initiating and responding to change. Your education does not end today; your learning must be lifelong; after all, *“Real knowledge is to know the extent of one's ignorance”* [Confucius – philosopher: b.551; d.479 BCE]. Do not become passive or complacent, or you will slide into mediocrity. Many professions have joined the bandwagon of Continuing Professional Education and the respective professional associations encourage their members to keep up to date with advances in their fields. They have realised that to succeed in this changing world, one must constantly strive for higher performance, higher standards, higher competencies and higher ethics. In the words of the 20th century American philosopher, psychologist and educator John Dewey [b.1859; d.1952] *“the aim of education is to enable individuals to continue their education.... [and] the object and reward of learning is continued capacity for growth.”* The true lover of knowledge must adopt Socrates' outlook that *“one thing only I know, and that is that I know nothing”*. Do not be overtly close-minded to believe that your knowledge is absolute and infallible. Be open to criticism and adopt the mentality promulgated by the Italian cardinal Cesare Baronius [b.1538; d.1607] who wrote that *“I shall love with a special love the man who most rigidly and severely corrects my errors.”* That same cardinal in conversation with Galileo was to show intellectual open-mindedness in the Inquisitional Age when he remarked that *“The Bible teaches us how to go to heaven, not how the heavens go.”*

The clients we serve are also better informed. The proliferation of knowledge-at-the-fingertip brought on by the advent of the World Wide Web

presents new challenges to the practicing professions. These new technologies and the globalisation of information has created a *meritocratic* culture where status and success can no longer be inherited or bought, but must be earned and held on to through merit. The advent of the internet has opened new vistas to knowledge sources. The libraries of great universities are no longer the domain of the few privileged scholars. In the past, it was access to information that helped determine success of the individual or of a community. Now access is often not the limiting constraint – the constraints are accessing that knowledge and sieving the good from the bad and the ugly. This brings up the issue of differentiating between gathering information, amassing knowledge and acquiring wisdom, for *“knowledge is a process of piling up facts [or gathering information]; wisdom lies in their simplification.”* [Martin H. Fisher - physician and author: b.1879; d.1962]. In the words of the poet laureate Lord Alfred Tennyson – *“Knowledge comes, but wisdom lingers”* [b.1809; d.1892].

However, the responsibility towards knowledge itself does not simply refer to continuing one's professional education. The university graduate does have a responsibility towards the propagation and advancement of knowledge itself. The graduate is obliged to aggressively, passionately and untiringly seek new wisdom and extend the boundaries of human knowledge. The extent of human knowledge today has only been achieved through the constant contributions by questioning individuals who allowed their imaginations to roam the limits of their perceptions and go beyond the confines of contemporary beliefs. We are after all *“like dwarves perched on the shoulders of giants, and thus we are able to see more and farther than the latter. And this is not at all because of the acuteness of our sight or the stature of our body, but because we are carried aloft and elevated by the magnitude of the giants”* [Bernard of Chartres - French Neo-Platonist philosopher: d.1124]. We therefore must appreciate the knowledge gathered by our predecessors and work to extend the boundaries to new horizons without fear. In the words of the theologian Tyron Edwards – *“He that never changes his opinion, never corrects his mistakes, will never be wiser on the morrow than he is today”* [b.1809; d.1894]. Remember that *“in questions of science, the*

authority of a thousand is not worth that humble reasoning of a single individual” [Galileo Galilei - physicist and astronomer: b.1564; d.1642].

The intellectual is also responsible to pass on the knowledge down to future generations for “*education is the transmission of civilization*” [William James Durant - writer and philosopher: b.1885; d.1981]. The philosopher and orator Marcus Tullius Cicero showed his appreciation of the value of knowledge to the development of the community when he wrote: “*What greater or better gift can we offer the republic than to teach and instruct our youth?*” [b.106; d.43 BCE)]. However, remember that educators “*cannot teach anybody anything, [they should] only make them think.*” [Socrates – philosopher: b.469; d.399 BCE].

Graduates – today, you embark on a road filled with the promise of high adventure. Be agents of change first within yourselves, but also within the institutions and societies in which you live. However, while keeping an open mind, remember that not everything is meant to change. Hold fast to your ethics, be aware of your responsibilities, and strive for excellence within the framework of these values in all your professional activities. I am well aware that today I have placed a significant responsibility on your shoulders. I challenge you to not merely accept these expectations, but to exceed them.

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Cover Picture:

‘Valetta sunset’

Acrylic on canvas

By Pierre Mallia

Pierre Mallia is a Professor of family medicine and patients' rights, moreover, he still works part time as a GP. Apart from painting, in his free time he does woodwork and enjoys writing.

An evaluation of the Tele-Consultation and Triage system at a primary health centre in Malta

Martha Grima, Jurgen Abela

Abstract

Introduction: The telephone triage and advice service (TTAS) operates within Malta's Primary Health system. The aim of this study is to evaluate the TTAS at Mosta health centre (MHC). Three parameters were studied, namely service usage, patient satisfaction and patient outcome.

Methods: All adult patients who phoned MHC from their home asking for a doctor between February and April 2018 were included. Data was collected from the TTAS sheets available at MHC. A sample of patients was involved in a questionnaire via telephone to assess their experience with the service.

Results: 2,013 patients were included in the study. The mean patient age was 54.85 years (95%CI: 54.04-55.67). There was no significant gender mean age difference ($p=0.813$). Females (67.46%) significantly called more often than males, ($p<0.001$). The majority of calls were from Mosta (24.64%). Most of the patients called asking for advice and their outcome predominantly involved advice over the phone ($p<0.001$). Using the ICPC-2, most complaints were of category A (General/unspecified), the commonest being fever. Advice over the phone (53.5%) was the major outcome. The 80+ age group had a higher house visit percentage outcome (48.58%) compared to the overall population (34.72%). Patients involved in the questionnaire showed an overall satisfaction with this service.

Conclusions: This is the first study evaluating the service in the local setting. Results are promising, showing that TTAS is being used as a means of healthcare provision. A structured approach for doctors taking calls is recommended for more consistent outcomes.

Keywords

primary care, triage, telephone interview, house calls, consultation.

Introduction

Background

The telephone triage and advice service keeps gaining popularity worldwide¹ and many countries are adopting this care plan.² In Malta, this service operates within the primary health department. Despite the fact that many citizens use it, this area of research remains an uncharted territory. Mosta health centre (MHC) is one of three main governmental health centres in Malta, covering the Northern area of the country. It is the only centre providing a 24/7 radiography service. Therefore, it is of no surprise that tele-consultation is regularly

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sought for by patients.

Aim

This study pertains to a pressing issue. Various articles in other countries have assessed the value of this service in primary care, with multiple conflicting results.¹ The aim of this study was to evaluate three important factors associated with telephone triaging, including:

- 1) An overview of service usage
- 2) The effect of this service on patient safety
- 3) Patient satisfaction

Method

Study design

The design of this study was structured in two parts.

The first part consisted of a cross-sectional study where adults who phoned MHC asking for a doctor from 1st February to 30th April 2018, were included. Data was collected retrospectively from the data collection sheet available at MHC which included: patients' age, gender, locality, month and time of calling. The latter was grouped into different time shifts in accordance with the doctors' shifts, ie. 08:00-12:59, 13:00-16:59, 17:00-19:59 and 20:00-07:59 shifts. Ages were also grouped into: 18-39 years, 40-59 years, 60-79 years and 80 years plus. Other data included the reason for calling, the doctor's degree of training, as well as the outcome of the call. The patients' reasons for calling were grouped into main headings according to the International Classification of Primary Care, Second edition (ICPC-2).³ Outcome of the call involved one of the following three: a) advice over the phone, b) advice to refer – to primary care or emergency, and c) house visit.

For the second part of the study, a 10% sample of the population was taken. The subjects in this sample were chosen by stratified random sampling (according to outcome of the call) to participate in a telephone questionnaire. Four questions assessed different aspects of the patients' experience with the service. For availability of the questionnaire the corresponding author can be contacted via email provided.

For patients who took part in the questionnaire it was assessed whether they visited any health care services within two weeks following their call to MHC. This was done using iSoft Clinical manager. Data input and analysis was carried out using

Microsoft Excel. A flow diagram (see Appendix 1) outlines the structure of the study.

Exclusion criteria

Patients below the age of 18 were excluded, as well as calls coming from institutions. Patients whose demographic details could not be fully retrieved were also excluded.

Study approval and Data protection

This study was approved by the Department of Primary Health, Malta and by the Departmental Data Protection officer. Ethics approval was obtained from the Research Ethics Committee of the University of Malta.

Statistical tests

The two-tailed T test was used to compare the mean male and female ages. Chi-squared test was used for categorical data. A significance level of 0.05% was maintained.

Results

A total of 4225 telephone calls were registered in MHC during the study period. After excluding the calls mentioned, the total number of subjects included was 2013.

Demographics

The overall mean age of subjects was 54.85 years (95% CI: 54.035-55.669), median 56 years and mode 45 years. The female mean age was 54.78 years (95% CI: 53.826-55.736) whilst that of males was 55 years (95% CI: 53.451-56.549). There was no significant difference between the gender mean ages ($p=0.813$). Females significantly called more often than males in all age groups (see Figure 1) ($p<0.001$).

As expected most calls came from people living in the North catchment area ($p<0.001$); most came from Mosta ($n=496$, 24.9%) and Birkirkara ($n=368$, 18.5%). Subjects from Mosta significantly called more frequently than other localities in all time shifts ($p<0.001$).

Calls reached their peak during the doctors' night shift. However, if one were to assess the standardised ratio of calls per time shift calculated as a fraction from a 24-hour day, the busiest shifts were the 08:00-12:59 followed by the 17:00-19:59 shift (see Figure 2). When considering monthly variation in calls there was a significant rise in March ($p<0.001$).

Figure 1: Males vs Female who called across different age groups

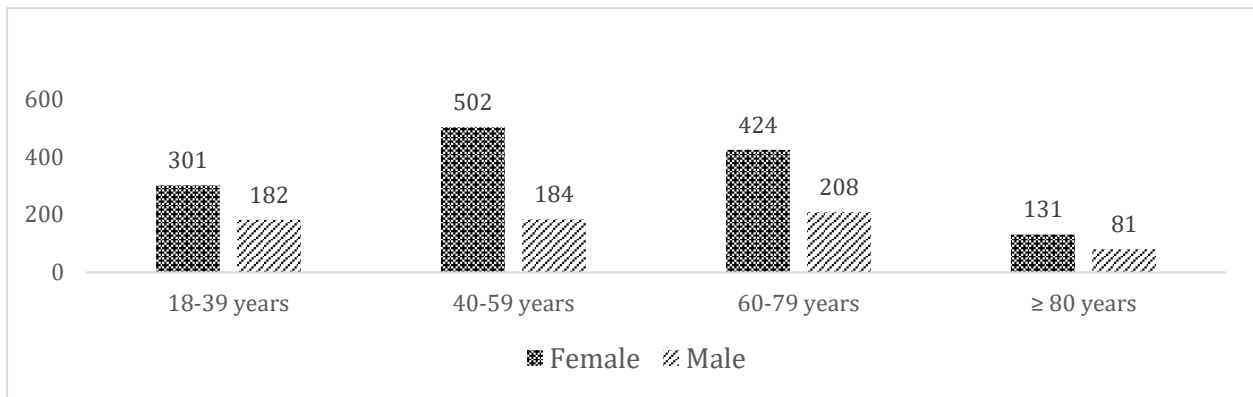


Figure 2: The number of patients who called per shift and the calculated standardised ratio of patients calling in each shift expressed as a fraction of a 24-hour day

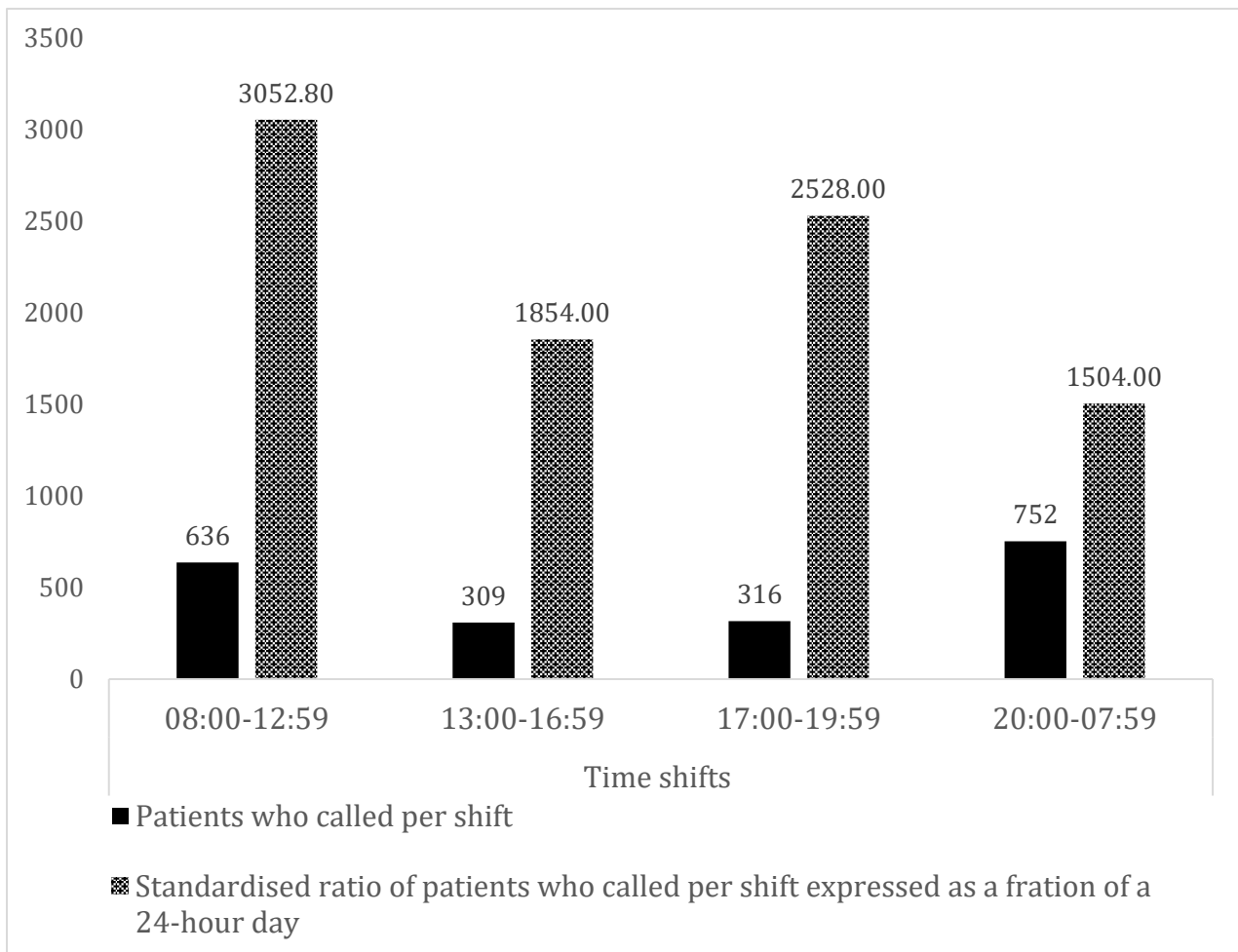


Table 1: Top four call requests per Month classified according to ICPC-2 classification system.

February	March	April
Other (n=344)	Other (n=440)	Other (n=388)
R: Respiratory (n=89)	A: General (n=82)	A: General (n=81)
A: General (n=63)	R: Respiratory (n=79)	D: Digestive (n=73)
D: Digestive (n=56)	D: Digestive (n=70)	R: Respiratory (n=54)

Figure 3: Outcome of calls

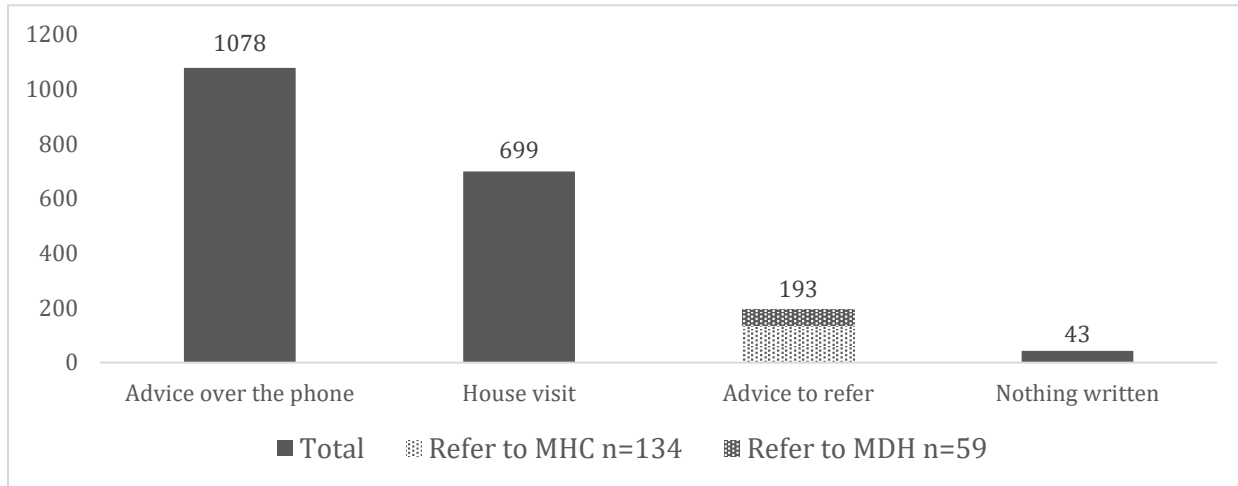


Table 2: Outcome of calls vs other variables. This table compares the outcome of the calls (ie. Advice vs House visit vs Referral vs Nothing written) for each categorical variable seen in the second column.

		Advice %	House visit %	Referral %	Nothing written %	p value
Time shifts	08:00-12:59	39.9	49.8	9.3	0.9	3.823
	13:00-16:59	54.4	31.7	11	2.9	3.101
	17:00-19:59	63.9	20.3	12.7	3.2	2.493
	20:00-07:59	60.4	29.3	8	2.4	2.841
Age	18-39 years	53.2	33.1	12	1.7	6.890
	40-59 years	60.2	31.2	7.1	1.5	9.378
	60-79 years	54.4	35.1	8.4	2.1	1.123
	80 or above	30.2	48.6	15.6	5.7	9.645
Reason for calling	A: General	8.4	72.6	15	4	6.643
	D: Digestive	14.6	73.4	9	3	1.063
	K:	2.5	37.5	57.5	2.5	7.203
	Circulatory/Cardiovascular	8.2	87.8	4.1	0	6.159
	L: Musculoskeletal	13.4	71.6	13.4	1.5	9.806
	N: Neurological	26.3	68.4	0	5.3	0.031
	P: Psychological	10.4	76.1	13.1	0.5	5.804
	R: Respiratory	0	80	20	0	0.085
	S: Skin	84.2	7.3	6.4	0	<0.001
	Other					

Reasons for calling

Out of 2013 subjects, 841 (41.8%) were categorised using the ICPC-2 classification whilst 1172 (58.2%) had requests which did not fit in with any ICPC-2 heading and were classified as 'Other'. Most of the latter ($n=1000$, 85.3%) phoned requiring advice without specifying the reason for calling, making this the commonest complaint in the study. The second commonest call fitted the A:General/unspecified category ($n=226$) of which the majority complained of fever ($n=100$, 44.2%). Some month to month variation was present. Table 1 illustrates the top four presentations according to month.

Doctors taking the call

General practitioners received the majority of calls ($n=1568$, 77.9%); followed by GP trainees ($n=400$, 19.9%) and Principal GP's ($n=14$, 0.7%) whilst the remaining had no data available.

Outcome of the call

The commonest outcome was advice over the phone ($n=1078$, 53.6%), followed by house visit ($n=699$, 34.7%) and advice to refer ($n=193$ calls, 9.6%) ($p=4.101$). From the latter, the majority were advised to go to the health centre. Figure 3 summarises these results.

Table 2 illustrates the outcome of the calls in association with other variables. Of note the reason for calling category 'Other' was significantly associated with an outcome of advice over the phone ($p<0.001$). Calls related to psychological issues significantly led to house visits ($p=0.031$). The 80+ age group had a higher percentage of house visits compared to the other age groups ($p=9.645$).

The questionnaire

A total of 195 patients were asked to participate in the questionnaire, 131 of whom completed it. Most questionnaires (45%) were completed by patients in the 60-79 years age group. The average female score (4.393 CI 4.290-4.496) was slightly lower than that of males (4.438 CI 4.291-4.584) ($p=0.988$). In both genders the average score was lowest in those who were referred to primary care. The average score given by the 18-39 age group was less than the rest ($p=0.989$).

Question 1.

When asked about the doctor's understanding during the call, the average score was 4.412 out of 5 (CI= 4.3248-4.575, median 5, mode 5). Patients who commented in this part of the questionnaire were mostly positive, such as:

- Patient no. 60 (female): "*The doctor was a good listener and seemed to understand my needs.*"

Question 2.

The average patients' score about the time provided during the call was 4.267 (CI 4.084-4.450, median 5, mode 5). Reflecting the slightly lower mean, two patients commented negatively:

- Patient no. 4 (female): "*I felt rushed...*".
- Patient no. 20 (male): "*Sometimes doctors ask direct questions to see if you need a visit or not*".

Question 3.

The average score on the usefulness of the call was 4.427 (CI 4.256-4.6, median 5, mode 5). Patients who commented here were:

- Patient no. 7 (female): "*The call was very useful during the night hours when my doctor wasn't available*"
- Patient no. 24 (female): "*I avoided the need to go to MHC.*"
- Patient no. 90 (female): "*It was not useful because I still had to go to MHC when I wanted a house visit.*"

Question 4.

The mean score for overall satisfaction was 4.504 (CI 4.324-4.684, median 5, mode 5). Patients generally praised the system.

Other common comments were:

- Patient no. 46 (female): "*Sometimes it takes long to reach a doctor via telephone*"
- Patient no. 91 (male): "*I wish there was a way to give results via telephone by some coding system.*"

Patient visits after the call

Table 3 summarises the findings. Each row represents a different outcome category that resulted from the call ie, referral to A&E or MHC, House visit arranged, or Advice given over the phone. The columns represent what happened to the patients in the two weeks following the call. None of those referred to emergency remained at home.

One fourth of those advised to go to MHC had no documentation of any health visit, whilst 16.7% went to hospital emergency department instead. Of those who had a house visit done, 36.6% still presented to a health care premises. From those given advice, 71.6% required no further reviews.

Discussion

This was the first ever study to review tele-consultation and house visits in primary health care. This therefore contributes to further understanding of the subject and should expand its knowledge base.

Demographics

The mean age of presentation, 54.85 years, differs from the quoted mean age of patients going to MHC (46 years)⁴ however, the latter study involved children as well. Our results indicate that the service is being used by all age groups. What is surprising is that patients in the 80 years+ age group called the least. Lack of knowledge about this service and the exclusion of elderly homes are possible reasons. In addition, patients above 75 years are entitled to a special card to decrease waiting times at their local health centre, an incentive which might be encouraging them to attend MHC in person. The significant female majority in this evaluation reflects the female dominance that is repeatedly observed in primary care.⁵⁻⁶

Although the least busy, a substantial number of calls came during the night shift. Patients might find it less convenient to come to MHC during the night whilst others might have problems accessing their private GP. Since MHC has imaging at night, it might also attract calls from patients outside the North concerned about injuries.

Reasons for calling and outcome of the call

The reasons for calling are compared to those in a study conducted in Norway⁷ on nurse-led telephone triaging and also to studies on GP face-to-face consultations in MHC last year⁸ and in 2012.⁴ Of note, certain ICPC-2 categories kept their popularity in the top 4 presentations (see table 4). Interestingly Musculoskeletal complaints were less frequent in the present study. A contributing factor might be that many patients who called for 'Advice' might have required advice on musculoskeletal issues which were not recorded.

Although not statistically significance, GP's were more likely to organise a house visit than trainees possibly because trainees were more keen to follow the local guidelines on triaging calls.¹⁰

'Advice over the phone' was consistently the commonest outcome and most resulted from patients requiring advice. The overall percentage of advice was similar in Denmark (56.5%).⁹ Table 5 compares the outcome for specific complaints in our study with those in Denmark.⁹ Patients in Malta were given much less advice and referral to MHC but were more likely to get a house visit for most complaints. The possibility of a house visit in Malta did not decrease emergency referrals when compared to Denmark. Unfortunately, various important data (such as reason for advice or being bed bound), were not inputted. This could have helped assess why many trivial complaints were managed with house visits. The local rate of emergency referral was high in the case of chest pain, reflecting the current local guidelines on telephone triaging.¹⁰

Table 3: Presentation of patients to health care services in the two weeks following their call, stratified by outcome of the call.

	A&E only within 2 weeks		MHC only within 2 weeks		A&E+MHC within 2 weeks		None within 2 weeks	
	n	%	n	%	n	%	n	%
Referred MDH	3	75	1	25	0	0	0	0
Referred MHC	2	16.7	5	41.7	2	16.7	3	25
House visit	6	14.6	5	12.2	4	9.8	26	63.4
Advice over phone	6	8.1	12	16.2	3	4.1	53	71.6

Table 4: The top four ICPC-2 categories of patient presentation in different studies.

Present study	Malta 2012	Malta 2017	Norway 2017
A: General R: Respiratory D: Digestive N: Neurological	L: Musculoskeletal A: General R: Respiratory K: Circulatory/Cardiovascular	R: Respiratory L: Musculoskeletal A: General B: Blood/ Immune	A: General L: Musculoskeletal D: Digestive S: Skin

Table 5: Outcome of the call for various complaints in Denmark vs Malta.

Reason for calling	Outcome							
	Advice of phone		Referral to MHC		Referral to A&E		House visit	
	Denmark (%)	Malta (%)	Denmark (%)	Malta (%)	Denmark (%)	Malta (%)	Denmark (N/A)	Malta (%)
Fever	43.6	9.5	55.1	7.4	0.9	0	N/A	83.2
URTI/throat symptoms	30.2	11	38.8	6.7	1	0	N/A	82.3
Abdominal Pain	41.3	11.1	56.1	7.4	2.6	3.7	N/A	77.8
Gastritis	56.9	9.4	41.3	7.2	1.9	2.1	N/A	81.3
Chest pain	30.4	0	40.2	25	29.4	58.3	N/A	16.7
Headache	59	20	38.9	20	2.1	6.7	N/A	53.3
Diarrhoea	75.6	28	34.4	4	0	0	N/A	68

House visits were more likely to be done in the 08:00-12:59 time shift. This may reflect a practice where during shifts with additional available doctors, more house visits are accepted compared to shifts with less doctors when house visits are reserved for those who really need it. Taking into consideration that house visits are increasing considerably, last year amounting to 23,612 in Malta, this study gives new light that can help evaluate and manage the rise in requests for house visits.

The questionnaire

The high scores obtained in this questionnaire reflect those in other studies.^{5,11,12} Although encouraging, responder bias might have affected this result. Having a larger number of patients could have yielded clearer results. Similar to the Esteem trial⁵ older patients reported better scores.

Though the average score was high for all questions, question 2 scored the lowest. A study by McKinstry et al., found that patients' concerns and expectations are less often elicited via telephone¹³ and this raises concerns at a time when patient-centred care is encouraged.

Patients' subsequent visits

▪ Patient safety

The system can be viewed as safe when considering those referred to casualty; all patients who went to emergency required admission. Similarly the majority of patients given advice did not require any further reviews. This differs from those referred to MHC (see Table 3). Since this part of the study concerned patients who completed the questionnaire, any deaths during the two-week follow up could not be identified.

▪ Service usage

In previous studies on telephone triage services there was always the uncertainty on whether such studies were reducing GP workload or whether they were just postponing consultations. The ESTEEM trial found a rise in primary care contacts following the call.⁵ The study by Jiwa et al, reported a 39% decrease in GP visits¹² while the study by McKinstry et al, showed a significant reduction in immediate visits with an increase in return consultations.¹³ In the present evaluation it can be appreciated that a substantial percentage of patients presented to A&E and MHC when they were advised otherwise.

Strengths and limitations

This is a large evaluation from a health centre covering a third of the Maltese population. It is the first study in Malta to assess the telephone triaging services in primary care. The use of statistical tests and sampling methods are other qualities which give strength to this evaluation. The questionnaire involved a qualitative analysis with attention to patient satisfaction; evaluation of their answers and comments should be an incentive for further thorough appraisals in primary care.

A foreseen limitation is the lack of objective instruments validated to assess the service. The patients completing the questionnaire were mostly above 60 years of age. Contacting them using other forms of media might have yielded a wider response. The possibility of response bias has been mentioned as a potential contributor to good scores. Recall bias was minimized by calling patients within a few weeks of their call. In addition children and the elderly living in care homes formed a large part of the population at start and their inclusion might have influenced our results.

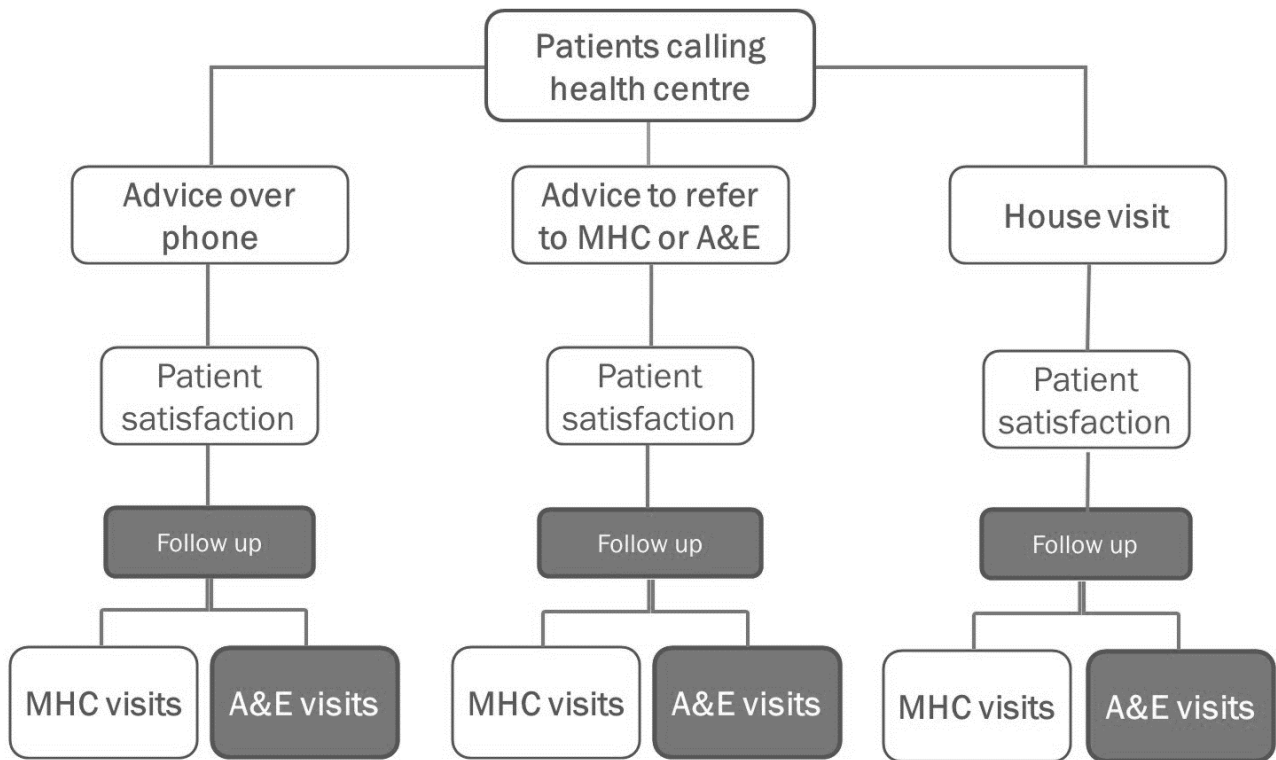
Conclusion

This evaluation proves that the telephone triage and advice service is being used locally with good patient satisfaction. Caution still needs to be taken to ensure guideline adherence and consistent outcomes. There needs to be better documentation of patient calls; the introduction of a digital system would be ideal. In conclusion this study sheds light on the local situation of telephone triage in primary care and should encourage further research in the other health centres in order to obtain a comprehensive picture on the subject.

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Appendix 1: Flow Diagram of patients involved in the study.



Follow-up of Solitary Pulmonary Nodules at Mater Dei Hospital

Tiziana Parnis, Jonathan Gauci, Adrian Mizzi, Josef Micallef

Abstract

Background: Solitary Pulmonary Nodules (SPNs) are a very common diagnostic challenge. Under-evaluation may delay the diagnosis of early lung cancer whilst over-evaluation increases expenditure and radiation, as well as increases patient concerns and anxiety. The aim of this audit was to evaluate whether the Fleischner Society Recommendations¹ are adhered to in the follow-up of SPNs locally.

Methodology: This retrospective study included SPNs diagnosed incidentally on Computed Tomography (CT) between January 2013 and December 2014, excluding patients with a history of malignancy. The follow-up of the nodules was compared with Fleischner Society Recommendations (FSR) as the gold standard, which stratifies nodules based on size and smoking history.

Results: From a cohort of 100 patients, guideline-concordant care was identified in 48%. SPNs were under-evaluated in 32% of cases, while over-evaluation occurred in 20% of the total. From the patient cohort, lung malignancy was diagnosed in 31%. The risk of malignancy increased with increasing nodule size (0% in ≤ 4 mm, 1% in $>4-8$ mm, and 30% in >8 mm). The risk of malignancy was 39.5% in current smokers, 47.8% in ex-smokers and 29.4% in non-smokers.

Conclusion: Our data confirm that the risk of malignancy increases with the size of the nodule, and this reflects international figures. It is the responsibility of the ordering physician to include the correct smoking history when requesting imaging. Appropriate specific booking request information and standardised medical imaging reporting systems should be implemented to ensure adequate follow-up of SPNs according to international recommendations.

Introduction

A Solitary Pulmonary Nodule (SPN) is defined as a discrete, well-marginated, rounded pulmonary opacity less than or equal to 3 cm in diameter that is completely surrounded by lung parenchyma, does not touch the hilum or mediastinum, and is not associated with adenopathy, atelectasis or pleural effusion.²

SPNs are an increasingly common radiological finding on Computed Tomography (CT) since the improvement in spatial resolution of CT scanners has led to the detection of smaller and smaller nodules. The reported incidence of SPNs on CT is up to 51% in smokers aged 50 years or older.¹ Such incidental lung nodules represent a diagnostic challenge to physicians. Most pulmonary nodules are not malignant, however follow-up is essential since suspicious lesions may be biopsied early, leading to timely intervention. Radiological features of the SPN, including size, morphology, and rate of growth, help to determine the likelihood of malignancy.¹

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Both under-evaluation and over-evaluation of SPNs are potentially harmful. Under-evaluation may delay the diagnosis of early lung cancer. On the other hand, over-evaluation may increase expenditure and radiation. This may also increase patient anxiety, leading to unnecessary physical and emotional damage.³⁻⁵ The Fleischner Society is an international, multidisciplinary medical society for thoracic radiology, dedicated to the diagnosis and treatment of diseases of the chest, which was founded in 1969.⁶ The society first issued recommendations for the management and follow-up of solid SPNs in 2005, focusing on nodules which were solid, <8mm in size, in individuals above 35 years of age, and which were found on CT scans requested for non-screening purposes.¹ In 2013, the society published guidelines for the management of sub-solid nodules, which refers to both non-solid nodules (ground glass) and partly solid nodules (part solid, part ground glass).⁷ In

2017, the society updated their guidelines for both solid and sub-solid nodules.⁸ At the time of our data collection, the 2005 Fleischner Society Recommendations (FSR) were the mostly widely used guidelines in the follow-up of incidental lung nodules. The FSR 2005 stratify SPNs based on size of nodule and patient risk, and suggest the appropriate follow-up time-frame for each category of patients (Table 1). A high risk patient signifies the presence of smoking history, history of lung cancer amongst first-degree relatives, and/or exposure to asbestos, uranium or radon. A low risk patient is defined by minimal or absent smoking history and pollutant exposure, and absence of family history of lung cancer. The 2005 recommendations refer to completely solid nodules, while noting that sub-solid nodules may require longer follow-up to exclude indolent adenocarcinoma.¹

Table 1: Fleischner Society Recommendations

Size of Nodule (mm)	Low Risk Patient	High Risk Patient
≤4mm	No follow-up required	CT in 12 months. No further investigations if CT remains unchanged.
>4-6mm	CT in 12 months. No further investigations if CT remains unchanged.	First follow up in 6-12 months then in 18-24 months if CT scan remains unchanged
>6-8mm	First follow up in 6-12 months then in 18-24 months if CT scan remains unchanged	First follow up in 3-6 months then in 9-12 months and 24 months if CT scan remains unchanged
>8	CT scan in 3, 9 and 24 months, dynamic contrast-enhanced CT, PET +/- biopsy	CT scan in 3, 9 and 24 months, dynamic contrast-enhanced CT, PET +/- biopsy

Excluding:

- individuals younger than 35 years
- History of intrathoracic or extra-thoracic malignancy
- Those with hilar lymph nodes
- Masses larger than 3cm
- Immunocompromised individuals

Adapted from: Guidelines for Management of small pulmonary nodules detected on CT scans: a statement from the Fleischner Society, MacMahonH, Austin JH, Gamsu G, Herold CJ, Jett JR, Naidich DP, Patz EF Jr, Swensen SJ, Radiology, 2005 Nov; 237(2):395-400.

Method

Study Design

Approval was obtained from the Data Protection Office at Mater Dei Hospital, and the University Research Ethics Committee (UREC) at the University of Malta. A search was performed on PACS® for the keyword ‘nodule’ in the reports of all CTs performed during the years 2013 and 2014. SPNs diagnosed incidentally on CT (both thoracic and non-thoracic) between January 2013 and December 2014 were included in the study. The following nodules were excluded: age less than 35 years, sub-solid nodules, known history of malignancy or immunosuppression, presence of hilar lymph nodes, pulmonary lesions above 3cm (this is defined as a mass). FSR criteria 2005 do not apply to patients younger than 35 years, and to sub-solid nodules. Patients with a history of malignancy or with hilar lymph nodes were excluded because the risk of the nodule being malignant is much higher in these cases, while immunocompromised patients were excluded because SPNs are most likely to be viral in origin if less than 10mm in diameter.⁹ A sample of 100 nodules which fit the inclusion criteria and did not meet any of the exclusion criteria, was analysed.

Data was collected from PACS®, iSoft Clinical Manager® and Electronic Case Summary® relating to patient age, nodule size, smoking history, initial and follow-up CTs, and final diagnosis (benign vs malignant) based on the final radiology report and/or histology.

Gold Standard

The Fleischner Society Recommendations from 2005 were used as the gold standard, based on size of nodule and patient risk (mostly referring to positive smoking history). The follow-up of each pulmonary nodule was analysed according FSR criteria and hence classified as either guideline-concordant, under-evaluated or over-evaluated. Nodules classified as guideline-concordant were timely followed-up according to FSR, and received the correct number of follow-up CTs. Under-evaluated SPNs received a lower number of follow-

up CTs when compared to FSR, when considering their size and smoking history, and/or follow-up was stopped prematurely. Over-evaluated nodules on the other hand received a higher number of follow-up CTs when compared to FSR, and/or follow-up was continued beyond the time frame suggested by FSR.

Results

From a sample of 100 patients, 61% had a positive smoking history: 38% current smokers and 23% ex-smokers (Figure 1). A total of 35% of SPNs were found in patients aged between 56-65 years (Figure 2). Figure 3 shows the distribution of the SPNs according to size, with more than half measuring more than 8mm. 31% of SPNs were found incidentally on CTs performed for non-thoracic purposes such as post pacemaker insertion, in patients with abdominal pain and in trauma scans.

The management of solitary pulmonary nodules (SPNs) was guideline-concordant in 48%. Thirty two percent of SPNs were under-evaluated and 20% were over-evaluated as seen in Figure 4. Radiographic surveillance lasted a median of 24 months in patients with nodules with a size of >8mm, 12 months in nodules measuring >4-8 mm and 18 months in nodules ≤ 4mm. In 26% of radiology reports, the recommended follow-up was optimal, where the radiologist’s report included both the recommended investigation as well as the correct time interval (Figure 5). 46% of radiology reports were sub-optimal – this included 33% with absent time frame recommendations, 10% with absent investigation recommendations, and 3% where the radiologist included the term ‘follow-up’ without giving a specific time frame. In 28% of radiology reports, there were no follow-up recommendations.

From the total cohort, lung malignancy was diagnosed in 31%, and the risk of malignancy increased with the size of the nodule (Figure 6). Tobacco smoking also increased the risk of malignancy as seen in Figure 7.

Figure 1: Smoking Status of Patients with Pulmonary Nodules

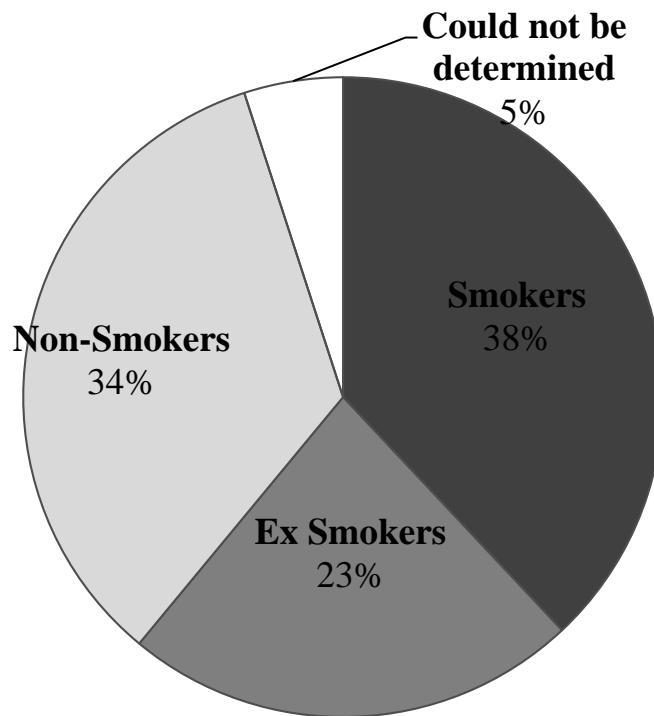


Figure 2: Age of Patients with Pulmonary Nodules

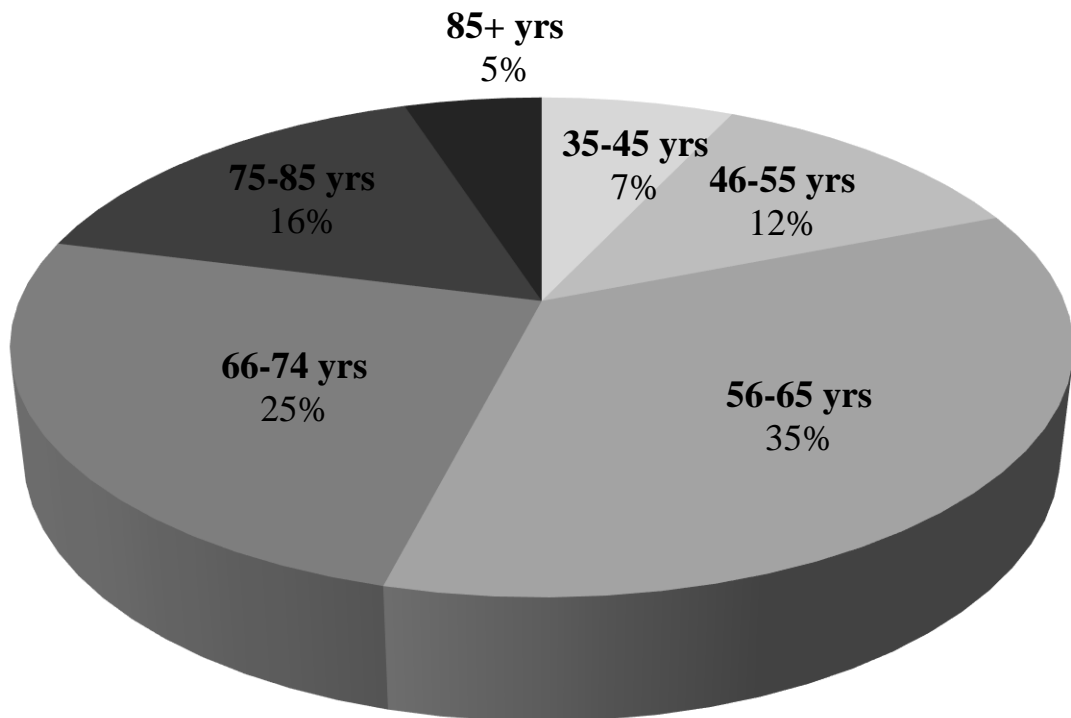


Figure 3: Size of Pulmonary Nodules

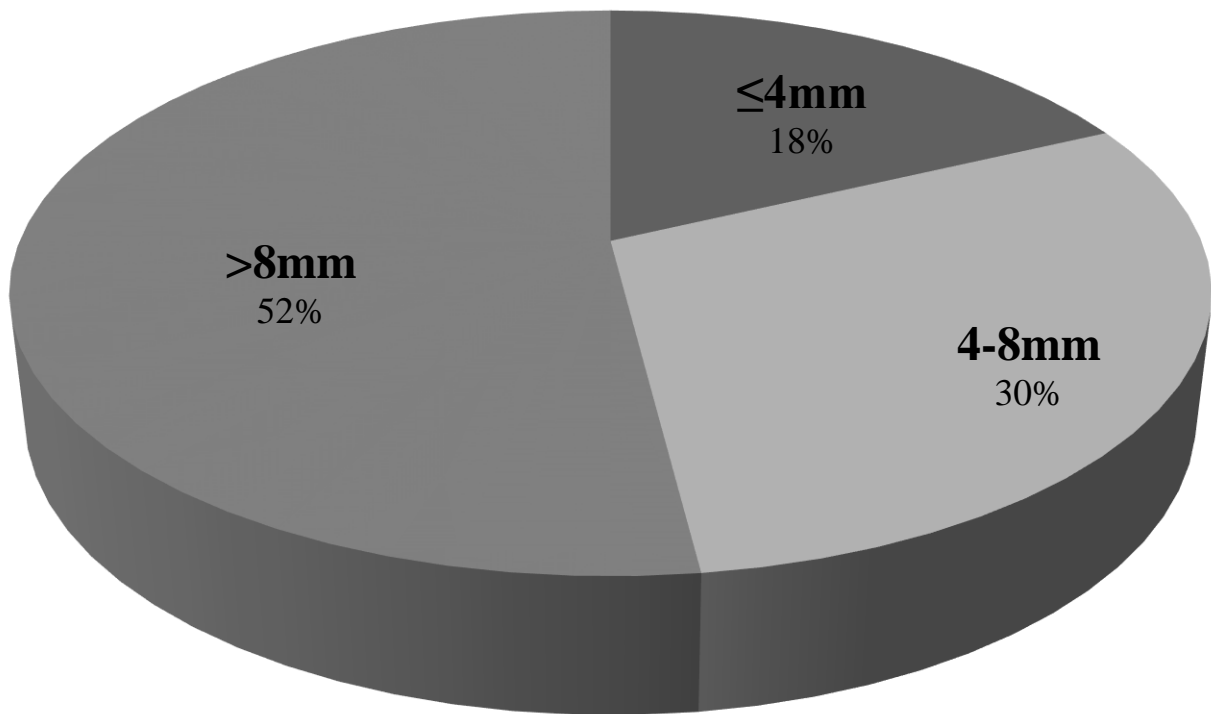


Figure 4: Are We Following the Fleischner Criteria?

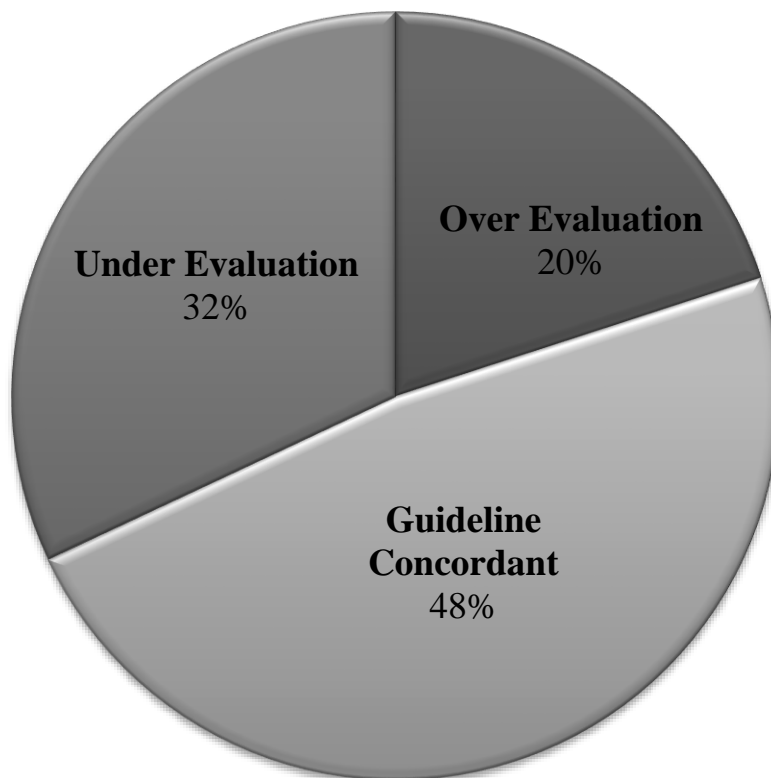


Figure 5: Documented Recommended Follow up Investigation by Radiology

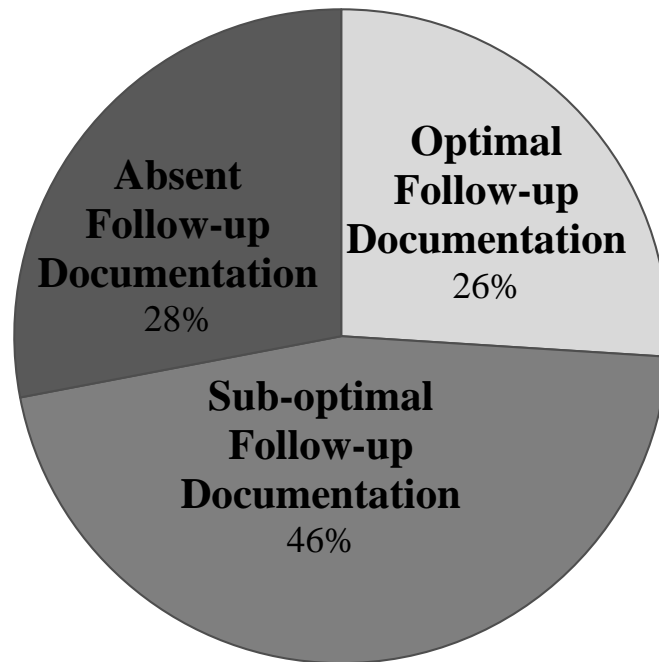


Figure 6: Risk of Malignancy of Lung Nodule In Relation to Size

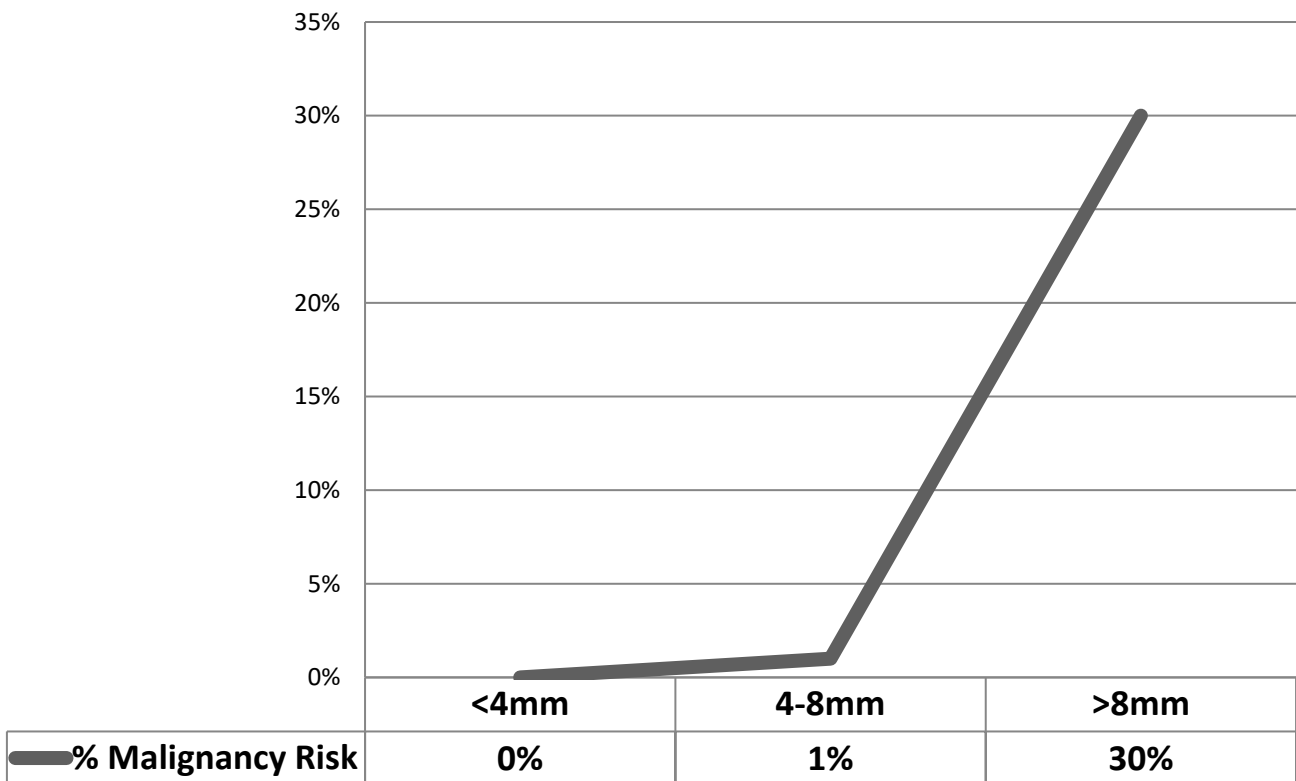
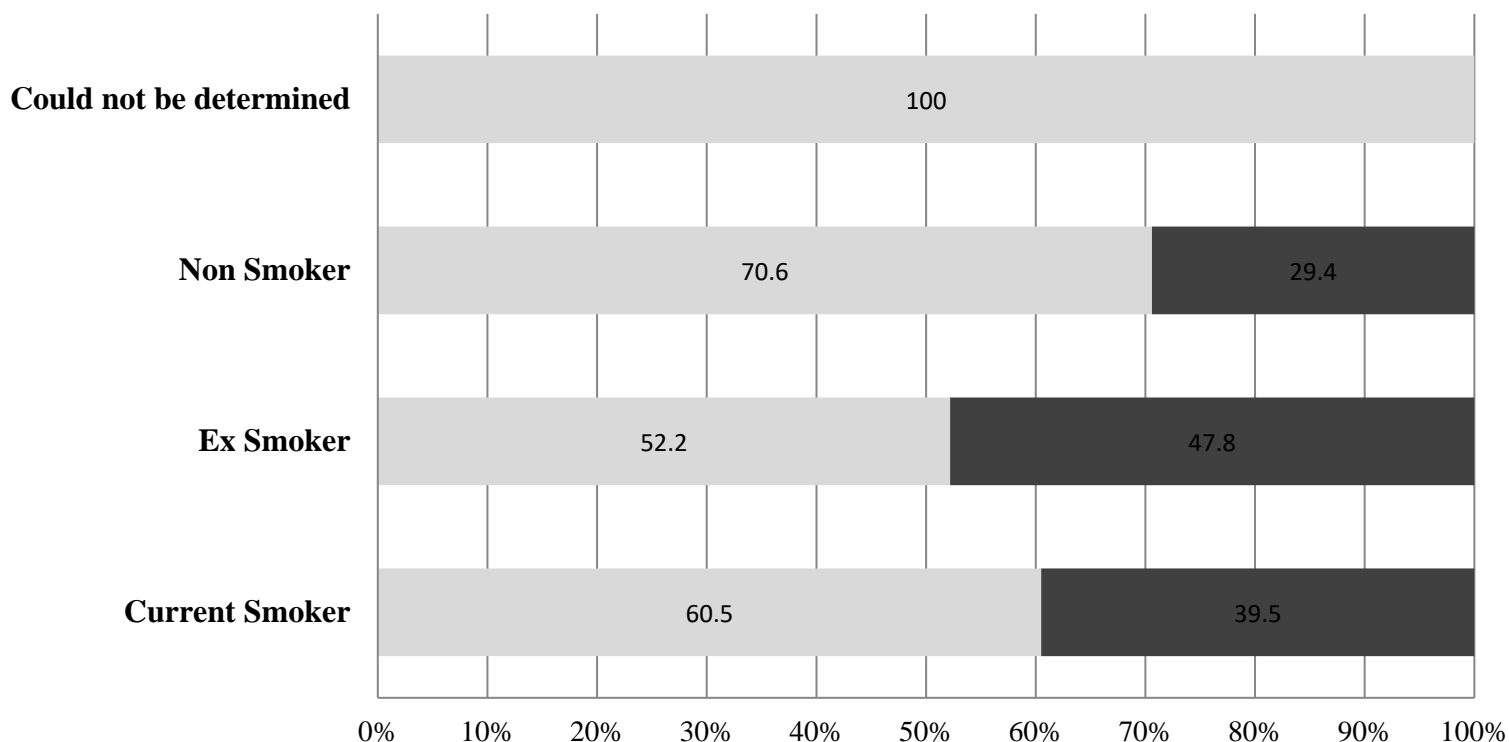


Figure 7: Risk of Malignancy of Lung Nodule In Relation to Smoking Status



	Current Smoker	Ex Smoker	Non Smoker	Could not be determined
■ Benign %	60.5	52.2	70.6	100
■ Malignant %	39.5	47.8	29.4	0

Discussion

Detection and follow up of SPNs is essential in the early diagnosis of lung cancer, which remains the most effective way of managing and potentially curing such an aggressive cancer. Lung cancer is often diagnosed late in view of late symptomatology and delay in seeking medical attention by the patient. From the total cohort in this study, lung malignancy was diagnosed in 31%, concordant with international data for malignancy risk in SPNs quoted at 30 to 40%.³ The size of the nodule is strongly related to malignancy risk with US data from 2005 showing a 0% risk of malignancy in nodules measuring <4mm, 1% risk in nodules 4-8mm, 15% risk in nodules 8-20mm, and 75% risk in nodules 20-30mm.¹⁰ Our study has comparable results, with a 0% risk of malignancy in nodules <4mm, 1% risk in nodules 4-8mm, and 30% risk in nodules 8-30mm.

Our data show that nodules in patients with a positive smoking history are more likely to be malignant (47.8% in ex-smokers, and 39.5% in

current smokers). Positive smoking history has been reported in other studies as a risk factor for malignancy in SPNs, along with increasing age, size and number of nodules, and reduced FEV₁ and FVC on spirometry.¹¹

Strict adherence to FSR was observed in just under half of the diagnosed SPNs (Figure 4). Possible reasons for under-evaluation of the SPN included lack of awareness on the Fleischner recommendations, patient co-morbidities, patient refusing follow-up, patient being lost to follow-up, or patients undergoing further investigations privately. SPNs were over-evaluated in 20% of cases, possibly due to lack of awareness or due to patient and/or physician anxiety. A similar study conducted in the USA in 2014 revealed similar data, with 55% of SPNs receiving guideline-concordant care, 27% being under-evaluated and 18% being over-evaluated.⁵ In order to improve adherence to guidelines, the radiologist should make recommendations in the CT report, giving clear documented advice on follow-up. Optimal

recommendations were made in 26% of our cohort. Impaired communication between different specialties undermines the delivery of good quality of care and ultimately delays the diagnosis of lung cancer at a stage where it can be potentially curable.⁵ Clear communication between the reporting radiologist and the ordering doctor is essential. A common problem is that the requesting physician is not a respiratory physician, and may not be familiar with the FSR. Negotiating a management plan over the phone is not always possible, and is associated with lack of documentation; therefore, standardised medical imaging reporting systems should be implemented to prompt the radiologist to make recommendations for follow-up. A further proposal is the initiation of a logbook for the entry of all patients found to have SPNs, which would be then forwarded to the respiratory multidisciplinary team. As these patients are often referred across specialties, documented hand-over should always be made in the case notes and on the referral ticket. Discussion at multidisciplinary team meetings is to be encouraged and this will lead to better decisions regarding follow-up and timely intervention.

It is the responsibility of the requesting physician to include all the clinical details in the CT request, particularly the smoking history. Appropriate radiology recommendations are not possible without the smoking history, as this forms the basis for the FSR. The authors propose the addition of more specific clinical data fields on the standard CT thorax booking request, prompting the ordering doctor to include the smoking history, as well as the presence of a history of lung cancer amongst first-degree relatives, and exposure to other lung carcinogens such as asbestos, uranium or radon. A similar system of specific clinical data fields is already in place in the online request form for High Resolution CT Thorax.

The most recent Fleischner Society Guidelines from 2017⁸ and the British Thoracic Society Guidelines from 2015¹² include nodule volume as well as nodule diameter for more precise assessment of malignant potential. The 2017 criteria have since been adopted as standard of care at Medical Imaging Department, Mater Dei Hospital, Malta. More importance is being given to subsolid (ground glass) nodules, since they have a higher risk of malignancy than solid nodules.¹³ More emphasis is also being placed on the prognostic

implications of nodule location, contour, morphology and doubling time. Upper lobe nodules, nodules with an irregular border and nodules with a doubling time <400 days have a higher incidence of malignancy. Peri-fissural and subpleural nodules that have a triangular or polygonal shape and a fine linear extension to the pleura are consistent with benign intrapulmonary lymph nodes.⁸

Limitations of the Study

One of the limitations of our study is that the smoking status could not be determined in 5% of the patients from the available online sources of data. Furthermore, there was limited data available on family history and exposure to asbestos, uranium or radon.

A second limitation is that the study focused on recommendations made in the official radiology report; there may have been verbal discussion of the nodule between the radiologist and the referring physician.

Investigations done in the private sector that were not uploaded on PACS® might have also led to the erroneous conclusion that patient was either not followed up or under-evaluated.

Conclusion

We recommend more accurate and streamlined implementation of Fleischner Society Recommendations for follow-up of lung nodules through standardisation of online CT booking request forms; standardisation of medical imaging reports; and documentation of multidisciplinary discussion in patient case notes. We also recommend re-auditing of local practice within two years of implementation of the new 2017 Fleischner Society Recommendations.

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University food environment, an example of health inequality?

Sarah Cuschieri, Ryan Camilleri, Stephan Grech

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

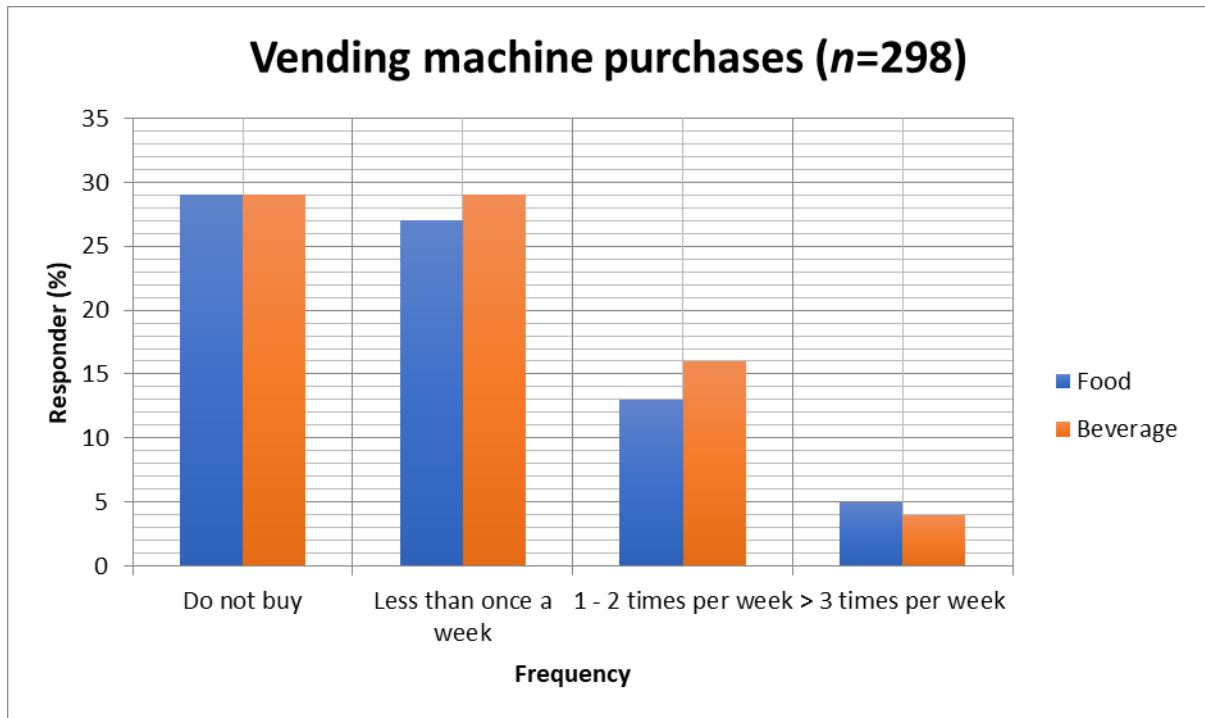
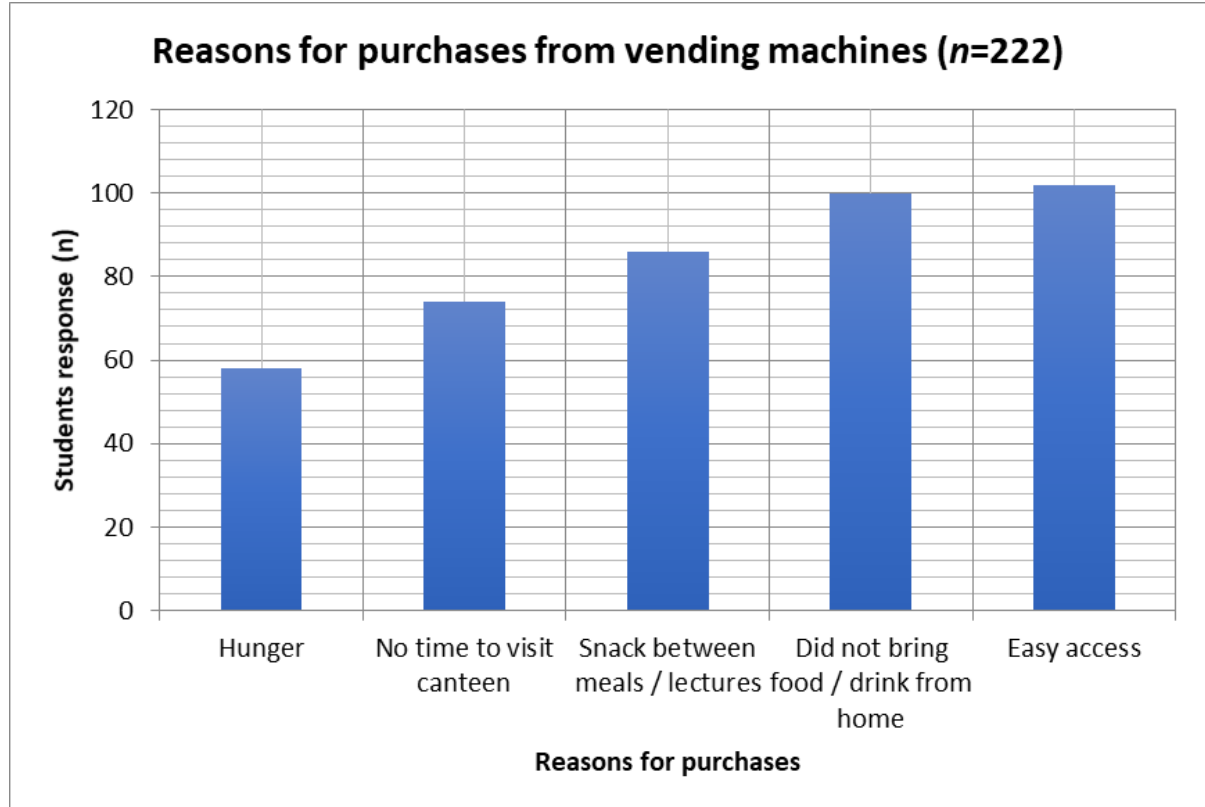


Figure 2: Reported reasons for purchasing from vending machines, by responders



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

Acknowledgments

We would like to express our gratitude to the students that took part in our online questionnaire as well as the University of Malta Registrar Office and IT services for their help.

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Return to work after hernia repair

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Abstract

Background: The development of mesh repairs and the introduction of laparoscopic techniques have decreased recurrence rates of inguinal hernia and made the return to usual activities faster. Provided the surgery is uncomplicated and the patient does not need to lift more than 10kg at work, it appears safe to encourage a return to work soon after surgery.

Methods: The study involved obtaining data of patients that had open, primary unilateral elective inguinal hernia repair surgery from January to June 2015. These patients were operated by all the surgical firms working at Mater Dei Hospital and all were performed by experienced specialists. 100 patients were interviewed over the phone.

Results: Age of patients ranged from 20 to 84 years with a median age of 65 years. The majority of patients were males (90%). 43% of patients were given information about return to work after hernia repair by a senior doctor where 51% advised to return to work 6 weeks after hernia repair. 69% of patients adhered to the advice that they were given. 39% of self-employed patients returned to work earlier than advised as opposed to 26.3% of employed who returned to work before advised.

Key words

Herniorrhaphy, Return to Work, Inguinal

Introduction

With the introduction of mesh repairs and laparoscopic techniques, patients undergoing inguinal hernia repair have been returning to their usual activities earlier than before. Moreover, recurrence rates after inguinal hernia repair have decreased significantly.¹

In the past, these patients were advised to spend a long period of bed rest after inguinal hernia repair, to ensure an uneventful recovery. In 1890, Bassini recommended 6 weeks of bed rest followed by a prolonged period of recovery.² In the 1940s, strict bed rest for 3 weeks was advised, followed by a convalescence of 9 weeks, in spite of the fact that research had already demonstrated that early return to usual activities had no harmful effects on recovery post-inguinal hernia repair.³⁻⁴

The most common approach for inguinal hernia repair adopted at our local hospital is still the open inguinal hernia mesh repair. The recovery process following inguinal hernia mesh repair involves 2 phases. Initially, the mesh is kept in place only by the strength of sutures that are used to secure the mesh during surgery (first phase). Then, eventually, the tissue around the mesh starts growing and fixes the mesh into place (second phase).

Therefore, advice regarding activity after inguinal hernia mesh repair depends on the time it takes for the tissue to grow around the mesh and imparts stability as well as the force that is required to prevent the sutures and in-growth of tissue to provide support to the mesh repair. Less force is required to disrupt mesh repair during the first few days post-operatively as the recovery is still in the first phase.

Several studies have shown that patient may return to usual activities of daily living as soon as they are comfortable. With regards to return to work after inguinal hernia mesh repair, patients should be advised to return to work after 1 to 2 weeks in case of little or no lifting requirements at work; 2 to 4 weeks in cases where lifting does not exceed 10 kg and 6 to 8 weeks in cases where lifting exceeds 10kg.⁴⁻⁶

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Methods

The study involved obtaining data of all the patients that had open primary unilateral elective hernia repair surgery from January to June 2015. This data was obtained after Clinical consultants, Ethics Committee and the Data Protection Officer approved the study and gave permission to use the data.

Hundred patients were contacted *via* phone and were asked the following questions:

- Age
- Date of Surgery
- What information was given pre-operatively regarding return to work after hernia repair?
- Who gave you the information?
- When did you feel comfortable carrying out activities of daily living?
- When did you return to work after surgery?
- What is your job?
- Are you employed, self-employed or un-employed?

Patients who had emergency surgery, bilateral hernia repair and recurrent hernia repair, as well as laparoscopic hernia repair were excluded from the

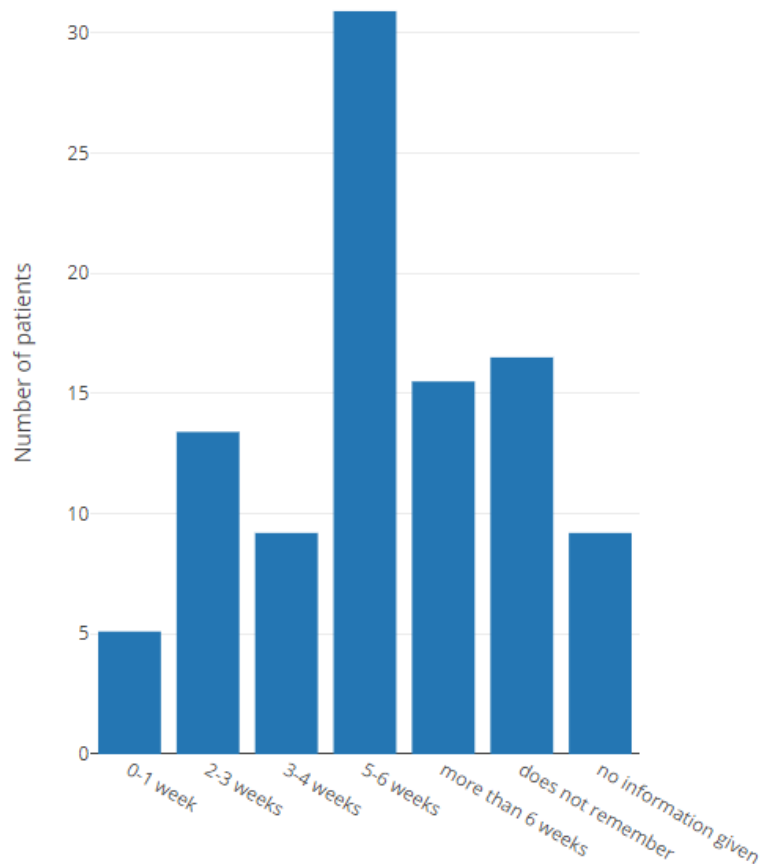
study. From the 100 patients contacted 3 underwent emergency surgery so they were excluded from the study.

Results

This study includes 97 patients who underwent elective open inguinal hernia repair. Age ranged from 20 to 84 years with a median age of 65 years. The absolute majority of interviewed patients were male, 87 patients (90%) while 10 patients (10%) were female.

The patients mentioned a lot of different sources of information regarding return to work after hernia repair. This included nurses, junior and senior doctors including consultants. There was a case where the patient relied on his family as the source of information while another one was given a leaflet of information with no explanation. No information was given to 9% of patients (9 patients), while 8% (8 patients) did not remember what advice they had been given at the time of questioning. (Figure 1)

Figure 1: Advice given to patients on returning to work after hernia repair



In most cases (43% of patients), a senior doctor explained to the patients about the procedure and information about post-operative care and return to work. Different advice was given to the patients where 31% (30 patients) were advised to return to work after 5-6 weeks, 16% (15 patients) were advised to return to work after more than 6 weeks, 13% (13 patients) were advised to return to work after 2-3 weeks, 9% (9 patients) were advised to return after 3-4 weeks and 5% (5 patients) were advised to return to work after 1 week.

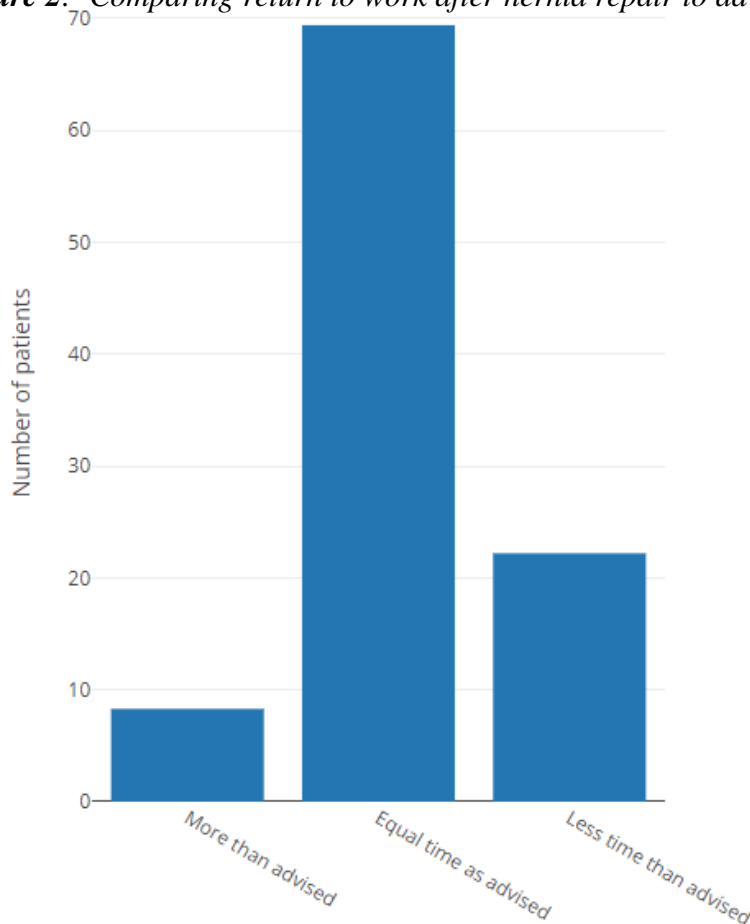
Patients who were given advice by nurses were advised to return to work after inguinal hena repair after more than 6 weeks in 58% of patients (11patients) while 16% (3 patients) were advised to return to work after 2-3 weeks and 4-5 weeks. Similar advice was given by doctors (excluding consultants) where 51% (23 patients) were advised to return to work after more than 6 weeks, 16% (7patients) were advised to rest for 2-3 weeks, 11% (5 patients) were advised to return to work after 1 week, 9% (4 patients) were advised to return to work after 4-5 weeks and 13.3% (6 patients) do not remember the information given by doctors

(excluding consultants). Those patients who were given advice by their consultant were advised to return to work after more than 6 weeks in 43% (6 patients), 2-3 weeks in 29% (4 patients), 4-5 weeks in 14% (2 patients). No patients were advised to return to work by their consultant after 1 week while 2 patients (14%) do not remember the information.

The majority of the patients interviewed were retired so 60 patients (62%) did not return to work after hernia repair which included retired and unemployed patients. Taking into consideration, the rest of patients, 51%% (19 patients) returned to work after more than 6 weeks, 24% (9 patients) returned to work after 2-3 weeks, 19% (7 patients) returned after 4-5 weeks and 5% (2 patients) returned after 1 week.

The majority of patients did not return to work as advised by health care professionals as 21.6% (8 patients) returned to work before expected while another 27% (10 patients) took more time to recover after inguinal hernia repair than expected (Figure 2).

Figure 2: Comparing return to work after hernia repair to advice given



When taking into consideration self-employed patients 38.9% (7 patients) took less time to return to work than advised, 33.3% (6 patients) took more time to return to work than advised while 27.7% (5 patients) took the same amount of rest after hernia repair as advised. Regarding employed patients 47.3% (9 patients) took the advice given and returned to work at the same time they were advised to while 26.3% (5 patients) took less time of rest than advised and more time to return to work respectively.

Regarding patients who carry out manual work (73% of employed patients), 37% (10 patients) returned to work as per advice given, 33.3% (9 patients) took longer to recover than advised while 29.6% (8 patients) returned to work before the time they were advised to. When taking into consideration patients with office work (27% of employed patients), 50% (5 patients) returned to work as per advice given, 30% (3 patients) returned to work earlier than advised while 20% (2 patients) returned to work later than advised.

Discussion

Advice regarding surgery and return to work after hernia repair should be given by the surgeon carrying out the surgery. Unfortunately, in some cases this job was delegated to junior doctors and/or nurses. In some cases information was not given at all. One patient mentioned that he was given a leaflet with relevant information. It would be a good idea to give out such leaflets following an explanation so that the patients would have a point of reference later on.

Most of the patients follow the advice given by health care professionals so it is important that accurate information to avoid complications or unnecessary time off work. Most patients were advised to return to work 6 weeks after hernia repair with little difference between consultants, doctors and nurses. This seems excessive and it is possible that although some patients were fit for work they took unnecessary time off work to follow the advice given. The majority of patients interviewed were retired, which is consistent with the mean age of 65. Self-employed patients returned to work earlier than advised when compared to employed patients. There was no difference in return to work between manual and office workers. Both adhered to the advice given by the healthcare professionals.

The patient information leaflet currently used at the local hospital advises patient to return to work after 2 weeks in the case of office work and 4 weeks in the case of manual work. This information is consistent with advice provided by literature review. This study shows that most health care professionals are not aware of this information and thus provide inaccurate information to the patients.

Conclusion

In conclusion, return to work after hernia repair should not follow a one-size-fits-all approach. It is mainly determined by the patient's occupational duties and individual pain experience.² Self-employed patients are found to return to work faster.³ Pre-operative expectation of time off work is a significant factor in prolonged convalescence.⁴

The authors propose better awareness on the time required to recovery after inguinal hernia repair so that accurate information is given to the patient. Explanation to the patient should be accompanied by information leaflet so that the patient would have the opportunity to read further about his/her procedure. Moreover, this information should be repeated on discharge and included in the discharge letter.

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Maternal Preconception intake of Folic Acid in Malta

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Abstract

Background: Neural tube defects (NTDs) are serious birth defects arising from abnormalities in neural tube development during early embryogenesis. Research shows that taking folic acid prior to and throughout the first 12 weeks of pregnancy will significantly decrease the occurrence of NTDs. The prevalence of NTDs in Malta is 10.0/10,000 births, yet this rate can be brought down to 5.0-6.0/10,000 births with preconception folic acid. This study aims to investigate the maternal intake of preconception folic acid in Malta.

Methods: The National Obstetric Information System (NOIS) collects detailed demographic, pregnancy, delivery and infant outcome data on all births in Malta. One of the variables recorded at the first antenatal visit is whether the mother took folic acid prior to pregnancy. NOIS data for 2015 was obtained, Excel and SPSS were used for analysis.

Results: 4385 women delivered a baby in 2015, of these 1125 (25.7%) reported taking folic acid before pregnancy. Both univariate and multivariate logistic regression showed that maternal age, parity, education, nationality, locality of residence, marital status, planned pregnancy and use of artificial reproductive technology were all significantly associated with taking preconception folic acid ($p < 0.001$).

Conclusion: Although preconception folic acid supplementation has been advised since the early 1990s, in Malta only a quarter of mothers are taking this before pregnancy. This low compliance is also documented in other countries. Several maternal factors have been found to be associated with better intake of preconception folic acid. Effective methods of increasing maternal preconception intake of folic acid are necessary to decrease the rate of NTDs in Malta.

Key words

folic acid, neural tube defects, preconception, pregnancy

Background

Neural tube defects, namely anencephaly and spina bifida, occur at an overall rate of 9.83/10,000 births in Europe with a livebirth rate of 2.61/10,000 livebirths.¹ These are severe, debilitating birth defects responsible for causing significant morbidity and mortality. Folic acid is known to be important for the normal development of the neural tube in early embryogenesis and its effects have been widely investigated. In 1991, a landmark multicentre double blind randomised control study conducted by the Medical Research Council conclusively showed that taking folic acid in the peri-conceptual period (i.e. from one month before conception through to 12 weeks after conception) effectively prevents the occurrence of neural tube defects by up to 50-70%.² It has since been documented in several other studies that taking folic acid at the correct time can significantly

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decrease the occurrence of neural tube defects.³

This knowledge prompted countries worldwide including the UK and USA to issue recommendations as early as 1992 for all women of childbearing age to take regular folic acid supplements.^{4,5} In spite of these recommendations and accompanying health promotion initiatives, it was found that whilst women's knowledge and awareness of the benefits of folic acid had increased significantly, its use in the peri-conceptional period had not increased to the desired levels and many mothers were still not taking preconception folic acid. More importantly, the occurrence of neural tube defects had not decreased significantly.⁶

Within this scenario, a number of countries introduced mandatory food fortification of flour to ensure that women were taking the required amounts of folic acid before and during the early weeks of conception. These initiatives have translated into a significant decrease in neural tube defects in those countries having implemented mandatory food fortification with folic acid, whilst these benefits have not been seen in countries without mandatory fortification.⁷

Europe has not introduced mandatory food fortification with folic acid for several reasons including reasons of protecting personal choice and fear of possible negative health effects associated with widespread population intake of folic acid, although the latter have not been confirmed.⁸ Europe, including Malta, therefore currently relies on initiatives such as recommendations, health promotion campaigns and women's voluntary supplementation with folic acid preconceptionally.

The total prevalence rate of NTDs in Malta is 11.14/10,000 births with a livebirth rate of 9.0/10,000,⁹ yet it has been documented that the rate of non-preventable NTDs can be brought down to 5-6/10,000 births when folic acid is taken correctly in the preconception period.¹⁰

Health professionals in Malta generally follow UK NICE guidelines in their practice. These guidelines recommend that women of childbearing age take *'400 micrograms daily before pregnancy and throughout the first 12 weeks, even if they are already eating foods fortified with folic acid or rich in folate'*.¹¹

This study aims to investigate the current maternal intake of preconception folic acid in Malta and the factors associated with an increased probability of the mother taking preconception folic acid.

Methods

Detailed medical birth data on all deliveries and births on the Maltese Islands are collected on a routine basis by the National Obstetric Information System (NOIS) of the Directorate for Health Information and Research (DHIR). This is the official medical births data source of Malta. Detailed demographic, pregnancy, delivery and outcome data for all births of 22 weeks gestation and over is collected at the obstetrics units from the hospital medical records and forwarded to the DHIR where the data is checked, validated and entered into the NOIS database.

At their first antenatal clinic visit at hospital, women are routinely asked whether they have been taking folic acid supplements and whether they started them before pregnancy. For the period between 1st January and 31st December 2015 this data was inputted into the NOIS database. Anonymous data on mothers' reported preconception folic acid intake together with maternal age, parity, marital status, education, nationality, locality of residence, planned pregnancy and use of assisted reproductive technology (ART) for the year 2015 was extracted from the NOIS database and used for this retrospective registry based study. Maternal nationalities were grouped into 5 categories reflecting the maternal geographic region of origin: i) Malta, ii) countries which joined the EU pre-2004 and EFTA countries, iii) other European countries, iv) Africa or Middle East and v) all others. Maternal locality of residence was categorised into 6 districts according to the system of Local Administrative Units (LAUs) created by EUROSTAT which is compatible with the Nomenclature of Territorial Units for Statistics (NUTS).¹²

Excel and SPSS were employed to analyse the data using chi-square and multivariate logistic regression analysis.

Table 1: Characteristics of mothers and their reported preconception folic acid intake

Maternal Characteristic	Categories	Total Number of mothers	Preconception Folic acid taken	% (95% CI) of mothers taking Folic acid preconception	Chi-Square value	Degree of freedom	P-value
Total		4385	1125	25.7 (24.4-27.0)			
Age	<25 25-35 >35	640 3126 619	45 908 172	7.0 (5.5 - 9.4) 29.0 (27.5-30.7) 27.8 (24.3-31.5)	92.6	2	p<0.001
Nationality	Maltese EU pre 2004 & EFTA Other European Africa & Middle East Others	3544 217 242 281 98	998 45 48 12 22	28.2 (26.7-29.7) 20.7 (25.7-26.9) 19.8 (15.1-25.5) 4.3 (2.3 - 7.5) 22.4 (14.9-32.2)	59.5	4	p<0.001
Locality of maternal residence	North Western N.Harbour S.Harbour South East Gozo	789 548 1332 719 705 292	216 196 307 132 210 64	27.4 (24.3-30.7) 35.8 (31.8-40.0) 23.0 (20.8-25.4) 18.4 (15.6-21.4) 29.8 (26.6-33.3) 21.9 (17.2-26.7)	37.2	5	p<0.001
Completed level of Education*	Tertiary Vocational/non-tertiary Secondary	1481 1047 1629	556 279 281	37.5 (35.1-40.1) 26.7 (24.0-29.5) 17.2 (15.5-19.2)	93.6	2	p<0.001
Marital Status	Married Single Separated/divorced	3009 1197 179	977 120 28	32.5 (30.8-34.2) 10.0 (8.4 -11.9) 15.6 (10.8-22.0)	150.8	2	p<0.001
Parity	Nulliparous Multiparous	2223 2162	703 422	31.6 (29.7-33.6) 19.5 (17.9-21.3)	50.0	1	p<0.001
Planned Pregnancy*	Yes No	2884 1216	1074 40	37.2 (35.5-39.0) 3.3 (2.4 – 4.5)	325.5	1	p<0.001
ART	Yes No	97 4288	63 1062	64.9 (54.5-74.2) 24.8 (23.5-26.1)	36.4	1	p<0.001

*Cases with maternal characteristic not reported excluded from analysis

Table 2: Odds Ratios for univariate and multivariate logistic regression for characteristics of mothers and associated preconception folic acid intake

Characteristic	Categories	UNIVARIATE OR (95% CI)				ADJUSTED OR (95% CI)			
		OR	Lower CI	Upper CI	p-value	Adj OR	Lower CI	Upper CI	p-value
Age	25-35yrs	1.00			<i>p</i> <0.001	1.00			<i>p</i> <0.001
	<25yr	0.18	0.14	0.25		0.44	0.31	0.63	
	>35yr	0.94	0.78	1.14		1.24	0.98	1.56	
Nationality	Maltese	1.00			<i>p</i> <0.001	1.00			<i>p</i> <0.001
	EU pre2004 & EFTA	0.67	0.48	0.93		0.78	0.53	1.15	
	Other European	0.63	0.46	0.87		0.54	0.38	0.78	
	Africa & Middle East	0.11	0.06	0.20		0.10	0.05	0.22	
	Others	0.74	0.46	1.19		0.55	0.32	0.94	
Locality of maternal residence	North	1.00			<i>p</i> <0.001	1.00			<i>p</i> <0.001
	Western	1.48	1.17	1.87		1.26	0.96	1.65	
	N.Harbour	0.79	0.65	0.97		0.99	0.79	1.26	
	S.Harbour	0.60	0.47	0.76		0.80	0.60	1.06	
	South East	1.13	0.90	1.41		1.18	0.91	1.54	
	Gozo	0.74	0.54	1.02		0.49	0.35	0.70	
Completed level of Education	Tertiary	1.00			<i>p</i> <0.001	1.00			<i>p</i> <0.001
	Vocational / non-tertiary	0.60	0.51	0.72		0.77	0.63	0.94	
	Secondary	0.35	0.29	0.41		0.62	0.51	0.75	
Marital Status	Married	1.00			<i>p</i> <0.001	1.00			<i>p</i> <0.001
	Single	0.23	0.19	0.28		0.46	0.36	0.59	
	Separated /divorced	0.39	0.26	0.58		0.51	0.32	0.81	
Parity	Nulliparous	1.00			<i>p</i> <0.001	1.00			<i>p</i> <0.001
	Multiparous	0.52	0.46	0.60		0.50	0.43	0.59	
Planned Pregnancy	No	1.00			<i>p</i> <0.001	1.00			<i>p</i> <0.001
	Yes	17.45	12.62	24.12		11.87	8.52	16.55	
ART	No	1.00			<i>p</i> <0.001	1.00			<i>p</i> <0.001
	Yes	5.63	3.69	8.59		2.67	1.67	4.29	

Results

A total of 4385 women delivered a baby of 22 weeks gestation or over in 2015, of these 1125 (25.7%) women reported having taken folic acid before pregnancy.

Table 1 presents a comparison of mothers having reported taking preconception folic acid and others not having taken preconception folic acid according to various maternal characteristics with the level of significance. Maternal age, parity, education, nationality, locality of residence, marital status, pregnancy planning and use of ART were all found to be very significantly associated ($p < 0.001$) with use of preconception folic acid supplementation.

Multivariate logistic regression showed that all parameters tested were independently associated with the likelihood of having or not having taken preconception folic acid (Table 2). Results showed that women having had a planned pregnancy or having undergone ART were the most likely to take preconception folic acid with adjusted odds ratios of 11.87 (95% CI 8.52-16.55) and 2.67 (95% CI 1.67-4.29) respectively (Table 2).

Low educational level, multiparity, unmarried mothers, mothers younger than 25 years and foreign mothers (i.e. Non-Maltese and non-EU pre-2004/EFTA nationality) were independently, significantly associated with a lower likelihood of taking preconceptional folic acid.

Analysis of maternal locality of residence by region was also significantly associated with taking supplemental folic acid preconceptionally, with Gozitan women reporting taking significantly less folic acid before pregnancy than women residing in other areas.

Discussion

In spite of the long-term knowledge of the benefits of preconception folic acid, only a quarter (25.7%) of the mothers delivering in Malta reported having taken folic acid before pregnancy. This rate is too low to avoid all potentially preventable NTDs. Similar undesirably low rates have been documented in several other European countries.¹³

In this study, higher maternal educational level was found to be significantly associated with increased preconception folic acid intake. Similar findings have been documented in other studies. A study from the Netherlands in 2008 found that while 31% of women with low educational level

had taken peri-conceptional folic acid supplements, 63% of women with a high educational level had taken preconception supplementation.¹⁴ A more recent Italian study of over 2189 women by Nilsson et al. (2016) reported that 9.4% of mothers with low educational level took preconception folic acid compared to 31.1% of mothers with a tertiary education level.¹⁵

Similar to other studies, young women were found to be the least likely to take folic acid supplementation preconceptionally, with only 7.0% of mothers in Malta aged less than 25 years taking preconception folic acid.¹⁶ Furthermore, nulliparous women were found to be more likely to take preconception folic acid than multiparous women as also found in other studies.¹⁷ In our study, mothers of African or European non-EU origin were associated with the lowest rates of preconception folic acid intake. This highlights the possibility of existent health inequalities and issues with health promotion messages and recommendations reaching foreign mothers and mothers of minority ethnic groups. In the UK, a study of nearly half a million pregnant women by Bestwick et al. (2014) also describes a troubling situation where non-Caucasian women were far less likely to take folic acid before pregnancy, a situation, they conclude, which is leading to health inequalities.¹⁸

Understanding the characteristics of women least likely to take folic acid preconceptionally can inform policy to better target initiatives aimed at increasing women's preconception folic acid intake. Any initiatives undertaken must ensure that they effectively reach those categories of women identified as being less likely to be taking folic acid in the recommended period, avoiding inequalities between women of different socioeconomic status.¹⁹

While Health Promotion campaigns are often considered the first line intervention to affect a change in behaviour, research has shown that non-targeted campaigns have been of limited success in increasing women's intake of folic acid. A systematic review investigating the rates of preconception folic acid uptake in various countries before and after health promotion campaigns shows that the rate of uptake following intervention varies and increased on average from 14 to 23%.²⁰ These disappointing results indicate that health promotion campaigns have not been successful in satisfactorily changing women's behaviours.^{14,21} It has been

suggested that alternative interventions including health-care based interventions such as making folic acid supplements easily available may be found more effective in the longer term than using mass media or printed resources in isolation.¹⁹

Pregnancy planning and undertaking assisted reproduction were found to be the characteristics most significantly associated with increased maternal intake of folic acid. These associations have also been described elsewhere and indicate that an effective way of increasing periconceptional folic acid intake might be to improve family planning by providing appropriate clinics.¹⁵

Women's knowledge and intake of folic acid supplements is influenced significantly by health care professionals' advice, namely general practitioners, obstetricians, paediatricians and pharmacists.²² General practitioners have an important role in increasing awareness and improving pre-conceptional folic acid intake. It is important that they are aware of this and give appropriate advice to all women of childbearing age even when they are attending clinics for other reasons. Unfortunately, it has been documented that a number of family doctors are themselves not fully aware of the benefits and correct timing and dosage of peri-conceptional folic acid intake.²³ Although obstetricians are fully aware and do provide folic acid supplementation advice, women generally present at the obstetricians' clinics following conception, at a time too late for prevention of potentially avoidable NTDs. Post-natal clinics could also provide a venue for educating and informing women of the benefits of folic acid for future pregnancies. Other sources of information on the importance of folic acid include the media, family and friends. Our data did not have data on maternal sources of folic acid knowledge and this could not be studied for the local scenario.

Preconception clinics have been implemented in several countries with the aim of improving pregnancy and infant outcomes.²⁴ The Italian study by Nilsen et al. (2016), reported that the adjusted prevalence ratio of taking preconception folic acid for women intending to get pregnant who attended a health visit prior to conception was 7.90 (95% CI 4.62-13.5), compared to 2.87 (95% CI 1.72-4.79) for women with pregnancy intention but not having attended a preconception health visit.¹⁵ Women suffering from diseases needing pregnancy planning have also been found to be significantly more likely

to take preconception folic acid with an adjusted odds ratio of 1.7 (95% CI 1.2-2.5).¹⁶ Preconception clinics are ideal venues that may educate and encourage women to take preconception folic acid supplements, however, such clinics are not available in Malta.

Limitations of this study include the fact that folic acid uptake relied on maternal reporting and the actual uptake of folic acid may be lower than that reported due to maternal non-compliance and their reluctance to report this. Additionally, the doses and exact timing of folic acid supplementation were not available and could not be assessed.

Conclusion

In the absence of mandatory food fortification, countries must be innovative and pro-active in undertaking initiatives to improve women's folic acid uptake with the aim of avoiding potentially preventable devastating birth defects as are neural tube defects. This is an area which undisputedly offers great public health potential. It is important to ensure that any initiatives undertaken reach all maternal categories including the more vulnerable women. Having local research determining women's views of the barriers and enablers to the uptake of preconception care and peri-conceptional folate supplementation may also go a long way in directing effective policy making in this area.

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The Department of Health Diabetes Mellitus Health Information Technology Database in Malta

A Basis for a Maltese Diabetes National Register

Joseph Azzopardi, Stephen Fava

Abstract

Government Diabetes clinics in Malta share a Web based computerised system that offers a user friendly Windows based approach to day to day diabetes care. The system can also produce research related data and administrative reports to help local health care providers identify problems and implement programs to improve standards of diabetes care. The database can be used as the basis for a National Maltese Diabetes Register.

The system has a dataset shared with the European Union DG-SANCO EUBIROD System. EUBIROD can create comparative reports on data aggregated from various centres across Europe.

This paper describes the function of the system and its evolution over a number of years. Some pending issues are discussed

Keywords

Malta, Diabetes Mellitus, Health Information Technology, Database, Web based

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Introduction

The medical record is crucial for proper clinical management; besides providing evidence of patient care it is also an important legal document. Traditionally, doctors have used paper records to keep patient data. The digital age brought with it the Electronic Health Record.

The benefits of Electronic Health Records (EHRs) over paper records include immediate access to authorized personnel of uniformly legible data, no physical storage space requirements and reduction in the number of personnel needed for record administration. Other advantages are improved clinical outcomes, optimised operational performance and improved ability to conduct research. The disadvantages of EHRs include installation and maintenance costs and potential patient privacy violations. Overall, however, experts and policymakers believe that significant benefits to patients and society can be realized when EHRs are widely adopted and used in a "meaningful" way.¹

In this paper we describe the Diabetes Electronic Health Record System being used in the Department of Health in Malta.

Background Information

The use of IT technology in Diabetes in Malta runs back several years. In the 1980's the World Health Organisation (WHO) donated an electronic medical record system called Computer STored Ambulatory Record (COSTAR).² In the late eighties one of the authors (JA), the clinical project coordinator of the system since 1987, thought out and planned a new system that was developed by the then Management Systems Unit with funds donated by the University of Malta, and the Health

Department in Malta; all developments done since then and to date have been according to clinical and layout requirement specifications conceived and requested by JA. The current system has an improved user-friendly interface that should help the process of managing clinic visits. The System has an inbuilt validation facility where validation on certain fields is carried out on input. The administrator has the facility to add maintenance data (e.g. Medications, pre-defined free text, etc.) that are used in the available dropdowns present in the system.

The development and technical description of the system is described in Annex A.

The System

The System offers a Windows Web based approach to day to day diabetes care and is used by the Department of Health Diabetes clinics at Mater Dei Hospital and Health Centres. The records include the History of Visits, Medications, Medical Laboratory Results, Complications and Diabetes Education. The standard format promotes equal care for all patients. The system has data extraction facilities that can generate administrative audit reports and data for research purposes.

As of December 2016 there were 26737 patients registered on the database and 129339 patient visits recorded.

The dataset in the database includes fields shared with the Best Information through Regional Outcomes (B.I.R.O.)³ and European Best Information through Regional Outcomes in Diabetes (EUBIROD) System⁴ datasets. B.I.R.O. was a European Union (EU) sponsored project under the Health Information Strand of the Public Health Program (DG-SANCO) that provided European health systems with an evidence and population-based diabetes information system. EUBIROD was another EU sponsored project that produced an open source program that can pool and analyze aggregated data securely transmitted from various diabetes databases. B.I.R.O. and EUBIROD include security and privacy protection mechanisms ensuring compliance with current legislative norms⁵. Malta, through the University of Malta, was a consortium founding member of both B.I.R.O. and EUBIROD.⁶

Using the System

The system can be accessed by navigating to

<https://diabetes.gov.mt> and logging in with the appropriate username and password. Patients can be added or searched for using the ID Card Number, Passport Number, Surname and Name or Patient Initials as filtering criteria.

Data entry and editing is Windows based and spread over 11 forms. Each form has a top panel containing the Name, Surname, Age, ID Card Number, Consultant in charge of patient, Waist, Height, BMI, Years since Diagnosis and Type of Diabetes. Any of the forms can be accessed by pressing the appropriate button from one of a series present on each screen See Figure 1.

Data can be added to or edited by pressing the New Record, the Edit Record or the Close Screen buttons. These three buttons are the only ones needed to manipulate data in the system.




In certain forms, e.g. the Diabetic History and Symptoms forms, only one new record can be added per patient per day. In some other forms, on adding a new record, the entry is populated with fields from the last previously filled record (if available). This allows the user to edit details without having to re-enter past valid data.

The following is a detailed description of the Clinic Visits & Drugs Form followed by a brief description of the other forms used in the system.

Clinic Visits & Drugs Form. See Figure 1. This is made up of four sub forms that contain routine parameters, diabetes and non-diabetes drugs and free text comments respectively recorded during clinic visits. The first sub form contains the routine parameters i.e. Date of Visit, Weight, Waist circumference, BMI, Blood Pressure, Fasting and/or Random Blood glucose, HbA1C, Glycosuria, Gross proteinuria, Acetonuria and Microalbuminuria. Clicking the **Add button (1)** opens a pop-up window to input new routine parameters. Only one routine parameter record can be added per patient for a particular day.

Clicking the **Add button (2)** and **Add button (Register)** opens pop-up windows to input Diabetic and non-Diabetic Medications respectively. There is a facility for viewing current as well as previously taken drugs.

Clicking the **Add Free Text button** in any window opens a popup that allows the user to enter free or pre-defined text from a drop-down list.

Figure 1: Clinic Visits & Drugs Form. This has four sub forms for routine parameters, diabetes and non-diabetes drugs and free text comments. Each form can be manipulated through the Add , Edit  or View  buttons. Only one routine parameter record can be added per patient for a particular day. The View Current button in the Drugs sub-form lists currently taken drugs and the View All Button lists current and previously taken drugs.

Patient MYNAME DIMECH ID 000002M Consultant Waist 85 Height 1.80 BMI 17.30
 DM since 10 yrs Diabetes Type Type 2 Age 65 F First Available 24 Weeks Finish Back

Status DM History **Clinic Visits & Drugs** Symptoms Medical History Physical Complications Diet Investigations Education

Clinic Visits & Drugs 1 + Add

			Date	Wt	Waist	BMI	SBP	DBP	FBC	RBC	HBA1c	Glycosuria	Alb	Ace	Mic
			07/03/2016	56.0	0	17.3	123	89	8.2	0.0	0.0	0	0	0	0.00
			06/03/2016	6.3	0	2.0	120	89	0.0	0.0	0.0	0	0	0	0.00
			19/11/2014	67.0	123	23.2	130	89	0.0	10.0	0.0	1	1	0	
			13/11/2014	56.0	67	19.4	178	56	8.0	0.0	9.0	0	0	0	
			23/10/2014	56.0	0	19.4	0	0	0.0	0.0	0.0	0	0	0	

Diabetes Medications Audit View All View Current 2 + Add

			Date	Drug	Action	AM	NN	PM	Bed	A/R	Date
			18/03/2016	Glibenclamide 5mg	Continued	10	0	69	0	0	19/11/2014
			23/10/2014	Metformin 500mg	Continued	500	500	0	500	0	23/10/2014

Non Diabetes Medications Audit View All View Current 3 + Add

			Date	Drug	Action	AM	NN	PM	Bed	A/R	Date
			23/10/2014	Atenolol	Adjusted	25	0	0	0	0	23/10/2014

Comments 4 + Add

			Date	Comments
			19/11/2014	To lose weight. Can be followed up at peripheral health centre.
			13/11/2014	Can be followed up at peripheral health centre.
			23/10/2014	Can be followed up at peripheral health centre.
			21/05/2009	to diet.

Other Forms

Other forms in the system contain the Patient Visit History, Patient Diabetes Status containing the result of Oral Glucose Tolerance Testing if performed, Type of Diabetes and Complications, Diabetes History, Diabetes complications related symptoms, Medical History, Physical examination, Complications, Diet, Investigation results and Education.

Generating Reports

The system can produce data for research and administrative reports in Microsoft Excel worksheet form. These reports include:

1. Data(B.I.R.O.) Export reports. These generate extracted data from the various tables in the database. Table 1 shows a sample of some of the data produced. The complete list of the data in the B.I.R.O. Export Reports include basic patient data, physical examination data, basic laboratory investigations, end stage complications, medications, modes of therapy, self-monitoring and education status.
2. User Audit reports. These list users, names and ID Card Numbers of patients, dates of visits, and the dates the records were created or updated
3. Patients as per Consultant Reports. These list patients as per Consultant, with names and ID cards.

Table 1: Some representative data taken from the Data (Biro) Export Report. The report can generate data from 48 clinical parameters, including Basic Patient Information, Risk Factors, Measurements, Assessment, Outcomes, Treatment and Education. Data for Type of Diabetes and OHA are coded. Patient identifiers have been left out.

Date	Type	Sex	Diag	BMI	SBP	DBP	HBA ₁ C	CHOL	SMKR	OHA	Laser	MI	CVA
6/4/13	EH11	M	2013	25.9	130	85	8.4	4.88	No	2	No	No	No
8/3/13	UNK	M	1995	29.6	129	90		5.21	No		No	No	No
3/3/13	EH11	F	2012	38.5	142	75	7.1	6.27	No	2	No	No	No
9/3/13	EH11	M	1999	30.6	130	80	7.8	4.16	No		No	No	No
1/7/13	EH11	M	2000	27.7	110	70	8.8	4.86	Yes	2	No	No	No
6/7/13	R73	M	2008	24.3	130	90	5.9		No	2	No	No	No

Type=Type of Diabetes; Diag=Year of Diagnosis; BMI=Body Mass Index; SBP=Systolic Blood Pressure; DBP=Diastolic Blood Pressure; CHOL=Total Cholesterol; Laser: Laser Therapy applied; MI: Acute Myocardial Infarction; CVA=Cerebrovascular Accident; EH11=Type 2 Diabetes; UNK=Unknown; R73=Impaired Glucose Tolerance

The present system and the Maltese Diabetes National Register

Disease specific registers are databases containing data from patients with specific types of diseases⁷. Public care providers use the registers to monitor standards in order to help identify patterns of care and prevention, verify best practice guidelines and to develop recommendations to policy makers for best care delivery. The diabetes problem cannot be dealt with effectively if comparable data on the disease are not widely available. The system we describe in this paper can easily form the basis for the Maltese National Diabetes Register.

The statistics on diabetes are overwhelming. In the European region alone, the number of people with diabetes is about 60 million; and rising. Half of these people do not know they have the disease. Diabetes is the cause of serious complications and often leads to premature death. Worldwide, the disease kills about 3.4 million people annually; almost half are people aged under 70 years⁸. Standards of care vary widely across regions, with a considerable number of people receiving sub optimal care.

Much as we know, the need for more information on diabetes is obvious. For example, representative longitudinal data on quality of care and on morbidity and mortality are lacking in

several countries. There is, in fact, a considerable amount of data that is often not easily available, fragmented, or poorly presented. This information can be much better utilized with better collaboration and sharing of information

A Diabetes register needs to include various data, including Patient Basic Identification data, Risk factors, Clinical Parameters, Measurements, Complications, Treatment, Self-monitoring and Patient Education.⁹ Facilities for entering this data are in place on our system and in fact a considerable amount of this data is already present on the database. This can easily be extracted either through currently available reports or other reports created as per specific requirements.

Discussion

The diabetes problem has become globally epidemic.¹⁰ Diabetes is the cause of serious complications and often leads to premature death. The disease is expensive to treat and complications are even more costly to treat.

Changes in care that improve the quality of diabetes care include implementing electronic health record tools. To deal with Diabetes effectively dependable data has to be available. This information is critical for problems to be recognized and resources used wisely to implement comprehensive strategies to correct these problems.

The World Health Organization(WHO) in 2016 urged nations to develop, maintain and strengthen a diabetes Register if feasible and sustainable, and include information on complications, noting that this can be more easily achieved when electronic medical files are used.¹¹

The European Parliament in 2011 called on the European Commission to draw up common, standardized criteria and methods for data collection on diabetes.¹²

In this paper we show how our system keeps full track of clinic diabetes visits and generates research and administrative reports. We have also shown that our database can form the basis for a National Diabetes Register. At present use of the system is restricted to personnel in the diabetes clinics at Mater Dei Hospital and the Peripheral Health Centres. This use should eventually be extended to any doctor or health care personnel, whether in public or private service, working with people with diabetes. As the system is web based, this should not raise any technical problems. This will allow the system to be truly nationally representative. The system has a dataset shared with the EU EUBIROD System allowing for comparison of results with those of other systems across Europe. The system is a product of years of work with the present version having been updated in 2016.

There are a number of pending issues with the system. The system is not linked directly to the departmental system that contains patient laboratory test results and laboratory data has to be entered into the system manually.

Another problem is that use of the system is entirely on a voluntary basis and manual data records are still being used for some patients. What is needed is a departmental policy decision to ensure that all patient data is entered into the database. It is only then that the system will reach its full potential and fulfil meaningfully all its functions.

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Annex A**Development and Technical Description of the Present System**

The COSTAR system mentioned in the paper used the MUMPS programming language and was used to gather diabetic data on a Burrows computer. In the early nineties a system running on a computer local area network (Novell, Inc, Provo, UT). and using a popular client-server database (FoxPro, Microsoft Corp, Redmond WA) was introduced and replaced the COSTAR system. This solution was later upgraded to a client-server application written in Visual Basic 6.0(VB6)ⁱ with a Microsoft SQL Server 2005 platform. This and the present system were developed by the Malta Information Technology and Training Services company (MITTS), later on the Malta Information Technology Agency (MITA)ⁱⁱ. The system is presently maintained by 2i Global Network Ltd,ⁱⁱⁱ The current system is a web-based application. The new web based application was built on the previous existing database schema but changes in the database structure were made. The underlying database platform was changed from SQL Server version 95 to an open source backend database – MariaDB version 10^{iv} running over Windows. The system was built using the ASP.NET MVC 5 programming model^v using Net 4.5 Framework^{vi}. Entity Framework 5 was used to facilitate the data access. The Business Logic was implemented entirely as a Web API (REST) solution.

This web based application brought with it a number of advantages i.e. wider accessibility, improved interoperability with third party products, easier software Installation and maintenance, increased cross platform compatibility, reduced development and licensing costs and easier integration of other strategic partners within the operations of the System

The Data Layer in the system communicates with the Common Data Repository (CDR)^{vii}; the CDR is a Government web service storing a citizen common dataset used across government departments in Malta.

The website layout and design of the new system makes use of bootstrap framework, making the system mobile friendly and easing the use of the system on mobile devices.

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The attainment of knowledge

Charles Savona Ventura

Writing two and a half millennia ago, Confucius stated that “*By three methods we may learn wisdom: First, by reflection, which is noblest; Second, by imitation, which is easiest; and Third by experience, which is the bitterest.*” The edict fully applies to modern medical education and training. The attainment of knowledge through experience may be the fruit of the personal and/or collective compilation of knowledge gathered by personal observation of individual cases or case series. It may also incorporate formal randomized clinical experimentation to compare outcomes attained from two or more different management options. Originally transmitted down the generations by oral tutor-student communication, it eventually was more widely made available by the publication of case presentations, case series, or randomized controlled trials. This compilation of knowledge by experience is the most bitter since for every success story documented, there would be several failures that would have fallen by the wayside or eventual successes that were only accepted after a pendular shift in attitudes towards their use. The importance of experiential knowledge in current practice can be best illustrated by Isaac Newton’s comment that “*If I have seen further it is by standing on the shoulders of giants.*” We are where we are today because of the giants that have preceded us. With their experiential, experimental and rational acquisition of knowledge throughout the ages, they have laid down the foundations of knowledge that we have developed and rely upon in modern practice.

A good example to illustrate the pendular nature of the acceptance of a discovery in medical therapeutics in western medicine based originally on oral tradition is that of the use of the plant foxglove (*Digitalis purpurea*) to treat cardiac failure. William Withering in the 18th century had become aware of the potential role of foxglove in treating cardiac dropsy after observing the effect of a 20-ingredient decoction prepared by a folk herbalist. Over the subsequent nine years, he carefully teased out the active ingredient, identifying this to be foxglove and carefully experimented to identify the best way to use this highly effective but toxic medication. He published his findings in 1785 in the work entitled “*An account of the foxglove and some of its medical uses; with practical remarks on the dropsy, and some other diseases*”. The use of this powerful cardiotoxic agent was quickly adopted and abused by his contemporaries leading to the realization that potentially serious and lethal side-effects accompanied its non-judicious application. Its general acceptance as a useful agent in the pharmaceutical armamentarium only took place when safety margins for use were redefined and generally adopted. The active ingredient digoxin, formally isolated in 1930, has since enjoyed over two hundred years of service, improving the lives of many cardiac sufferers. Many other such folklore remedies have been incorporated within the modern-day pharmacological armamentarium. Others remain to be identified, studied and potentially become important medicinals. In 1972, Dr. Tu Youyou extracted artemisinin from the plant sweet wormwood (*Artemisia annua*) and confirmed this to be a useful pharmacological agent for treating malaria – a fact that had been known through experiential knowledge within the Chinese Traditional Pharmacopeia. For her contribution in this field, Dr Youyou was awarded the Nobel Prize for Medicine in 2015, a clear example of how traditional knowledge can help develop and provide modern treatment options especially in an environment of increasing drug resistance being developed by microorganisms.

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In Confucian thought, the easiest way to learn is by imitation. This refers to the practitioners who simply imitate and apply the knowledge of others without themselves acquiring an integral understanding of the principles involved and without undertaking experimentation to expand on the corpus of knowledge of their predecessors. Imitational practice should be limited only to young trainee practitioners who need clear guidelines to ensure safe standard practice until such time that the trainee has acquired a sufficient foundational knowledge to empower him/her to better identify management options in the particular circumstances of each individual case. The rigid adherence to guidelines designed on general principles, often incorporating cost-effective considerations, may not be the best management option for a particular patient or situation. Guidelines present the practitioner with recipes that generally (but not invariably) result in a palatable meal. When accepted without a true understanding of the principles involved in drawing up the recipe, this imitational practice prevents professional cooks from developing their speciality. Unfortunately, in modern medical practice, imitational practice is often resorted to because it is an easy way of learning without the need to inquire, experiment and rationalize. To fully serve the needs of the individual, one must strive to practice 'patient-designed management' based on fundamental precepts rather than 'case-designed management' based on standard guidelines.

The most difficult but noblest learning process is that of rationalization. This involves attaining a deep understanding of the fundamental basic tenants on which the body of knowledge is based upon, and rationalizing the management options proposed by experiential or experimental knowledge. This type of learning should reflect the markings of a true master within the speciality. It is the true meaning of evidence-based practice. Evidence-based medicine has become quite a buzzword in modern medicine. However, the concepts of evidence-based medicine are based on the results of randomized controlled trials or meta-analysis of these studies. This definition of evidence-based practice continues to limit knowledge and practice to an experiential level without truly seeking the *rationale* behind that practice – the how and the why of any particular practice. In reality, evidence-based medicine should

be defined as the application of experimental medicine based on an understanding of the associated fundamental precepts following due consideration of all the components involved, thus building an overall picture of understanding from the jigsaw pieces available to us. When challenged about his/her choice of management, the true specialist should not respond by stating that management was chosen because the standard published guidelines advise this option. Such an attitude simply reflects a Confucian easy-way imitational form of practice rather than the noble mature rational form.