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Acceptability of Post-Mortem Imaging among Muslim and non-Muslim Communities

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Abstract:	Abstract Objectives: People's reactions towards autopsy vary according to their cultural and religious beliefs. This paper aims to determine the reaction towards this procedure among Muslims resident in Libya (Group 1) and Muslims (Group 2) and non-Muslims (Group 3) resident in the UK. Methods: 400 questionnaires were distributed to the three communities, interrogating belief about post-mortem investigations and after what type of death these were appropriate. Descriptive statistics and non-parametric statistics were used to analyse the data. Results: Of the 400 distributed questionnaires, there was a high return rate of 320 (80%). All groups felt that children should be buried sooner than adults ($p<0.001$) but 77% of Libyan Muslims thought that children should be buried within 12 hours of death compared to 16% of UK Muslims and only 7% of UK non-Muslims ($p < 0.001$). More non-Muslims were unconcerned about a negative impact of traditional autopsy on the dignity of the corpse than Muslims ($p < 0.001$) and more Muslims responded that autopsy has a negative emotional effect on the family ($p < 0.001$). Type of death altered what sort of investigations were desired. In the case of homicide, Libyan Muslims were less likely to prefer CT ($p<0.001$) or MRI ($p=0.001$). Sex had no effect on the results of the survey. Conclusion: Post-mortem imaging is acceptable to both Muslims and non-Muslims in Libya and the UK but Muslims have a significant preference for post-mortem imaging compared to autopsy, except in homicidal cases. Advances in knowledge: *The ability of post-mortem imaging to preserve the dignity of the corpse is independent of religion, however significantly more Muslims feel that autopsy has a negative emotional effect on the family of the deceased

	*A significant majority of Muslims in Libya prefer to bury children within 12 hours of death, while a delay of up to a week is acceptable in the UK *Muslims resident in the UK have an attitude closer to that of the indigenous (non-Muslim) population and therefore educational programmes may be successful in changing attitudes of Muslims in Libya and other predominantly Muslim countries
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Acceptability of Post-Mortem Imaging among Muslim and non-Muslim Communities

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Introduction

Autopsy is regarded as the gold standard for determining cause of death (1). Clinically important information is discovered in up to 46% of neonatal and infant autopsies and the procedure is important for eliminating abuse as a cause of death (2). In the last three decades, however, autopsy rates across the world have declined by 40-50% (3). This decline has been influenced by religious, cultural and emotional factors (4). Furthermore, fewer parents are willing to consent and fewer clinicians are asking for permission to perform the autopsy (2, 5). Other reasons given for this decline include administrative bottlenecks when requesting an autopsy and delays in providing the autopsy report (6).

Muslims teach that Allah stressed the importance of maintaining the dignity of the body before and after death. Islam, therefore, calls for respect for the body and recommends that the body should not be disfigured, based on the Hadith, "The breaking of the bone of a dead person is like breaking the bone of a live person" (7). Furthermore, Islam requires that the body be buried soon after death, and that there be no cremation (8). An Islamic fatwa (opinion), issued in 1982, however, states that the benefits of autopsy may be greater than its disadvantages, if it serves justice (9).

Over the last three decades, post-mortem imaging has been increasingly used as part of the forensic examination and provides significant information. Post-mortem computed tomography (PMCT) or magnetic resonance imaging (PMMRI) scans can be used to detect some causes of death as an addition to, or instead of, a conventional autopsy (1). Medical imaging is particularly useful when consent for conventional autopsy has been withheld. PMCT offers a rapid method of scanning the whole body (including inside a body bag) (2) and is now widely used in forensic medicine in adults.

Currently, however, neither MRI nor CT are sufficiently accurate to replace an autopsy as the post-mortem (PM) investigation of choice. In recent studies of PMCT, misinterpretation of PM change and/or poor imaging have led to the cause of death being misdiagnosed (10, 11). Caution and the development of expertise in interpretation are therefore required. In their study, Sieswerda-Hoogendoorn and van Rijn (2010) state that CT identifies bone fractures more reliably than autopsy, including sites such as the face, which might be overlooked during an autopsy examination (3). MRI has been shown to be more acceptable to some parents than conventional autopsy for identifying the cause of death of their child (12, 13). Recently, some UK healthcare centres have begun issuing death certificates which include reports of PMMRI findings that are accepted as medicolegal documents (14).

PM imaging has the advantages of being non-invasive and less time consuming than conventional autopsy. Data storage offers the chance to review cases in later years and the ability to highlight areas of interest before (and thereby guiding) the forensic pathology investigation (15). Despite these advantages, conventional autopsy is still the only modality available in Libya for both children and adults. A search of the literature in PubMed, Medline and the Cochrane Systematic Review databases was conducted to identify studies related to the opinion of Muslims on the use of PM imaging to diagnose cause of death; no relevant publications were identified. Prior to the (potentially widespread) introduction of PM imaging to Libya, we aimed to ascertain the opinions and preferences of Muslims and non-Muslims regarding PM imaging (PMCT and PMMRI).

Methods

Study Design

This study used a non-validated questionnaire (Figure 1) divided into three sections, the first being related to respondents' demographics. The second section addressed respondents' knowledge of PM examinations (autopsy, CT and MRI). The third and final section explored reasons why PM examinations might be unacceptable to respondents. A total of 400 questionnaires were

distributed to adult volunteers as follows: Group 1: 75 Muslim adults attending an out-patient clinic at [redacted] Hospital, which is one of the main hospitals in the central region of Libya and 75 Muslim students and teaching staff at [redacted] University in Libya, Libya; Group 2: 50 Muslim Libyans self-selected from those attending a regular monthly Libyan community meeting in [redacted], UK; Group 3: 200 non-Muslims (110 distributed to members of a community centre in [redacted] and 90 to staff and students at the University of [redacted]). The questionnaire was in Arabic for all respondents in Libya and in English for those respondents resident in the UK.

Statistical Analysis

Descriptive statistics summarise respondents' demographics and non-parametric tests were used to compare between groups and methods of investigation. Comparison between groups was by the chi-squared test. Monte-Carlo significances were calculated rather than the traditional asymptotic analysis approach; this removed the need to worry over small sample sizes. For age, a Kruskal-Wallis test was used and a Mann-Whitney for sex. Cochrane-W was used to compare the differences between the different investigations. Statistical analyses were performed using the Statistical Package for the Social Sciences, version 24 (IBM, Armonk NY). Statistical significance was set at $p < 0.05$.

Ethical approval was granted through the University of [redacted] approval process (Reference Number 007234).

Results

Of the 400 distributed questionnaires, there was a high return rate of 320 (80%) (Table 1, Figure 2). There was a significant difference in the age of the three groups (KW= $p<0.01$) with median (90% CI) for Groups 1, 2 and 3 being 30 (27-32), 38 (35-41) and 27 (24-28) years respectively.

In response to whether they had previously heard about post-mortem imaging (PMCT and/or PMMRI), (16% PMCT and 14% PMMRI) of Group 1, (7% PMCT and 6% PMMRI) of Group 2 and (31% PMCT and 80% PMMRI) of Group 3 answered positively ($p<0.001$).

For both adult and child burials, differences in opinion concerning an acceptable delay in burial were significant when comparing the three respondent groups and when comparing all Muslims to non-Muslims (p ranged from <0.001 to < 0.011, Table 2). Muslims in Libya preferred more rapid burial, particularly for children; 77% of Group 1, 16% of Group 2 and only 7% of Group 3 preferring to bury a child within 12 hours of death ($p < 0.001$).

More of Groups 1 and 2 (88% and 91% respectively) than Group 3 (72%) felt that autopsy leads to an unnecessary delay in burial ($p < 0.001$, Table 3). More non-Muslims were unconcerned about the impact of traditional autopsy on the dignity of the corpse than Muslims (Table 3, Figure 3). The ability of post-mortem imaging to preserve the dignity of the corpse was independent of religion, however Muslims felt differently about the emotional impact of autopsy, with 93%, 98% and 64% of Groups 1, 2 and 3 respectively, responding that autopsy has a negative emotional effect on the family ($p < 0.001$, Figure 4).

In terms of identifying the cause of homicidal deaths, 58% of Group 1, 64% of Group 2 and 52% of Group 3 felt that autopsy should be used ($p = 0.289$). In contrast, 42% of Group 1, 47% of Group 2 and 26% of Group 3 preferred the use of CT to

investigate the causes of natural and unexplained death (p = 0.004), while no respondent from Group 1, 2% of Group 2 and 16% of Group 3 preferred conventional autopsy to investigate natural expected deaths (p < 0.001). Finally, 31% of Group 1, 51% of Group 2 and 52% of Group 3 (p = 0.001) preferred the use of MRI over autopsy to investigate the causes of suspicious deaths (Table 4).

There was a significant difference in annual income between Muslim and non-Muslim respondents (p < 0.001), however, there was no difference in salary between those who approved of conventional autopsy and those who did not (p=0.894).

Discussion

The recent Arab uprising has been associated with considerable damage to infrastructure and a significant number of people have been killed (16); a total of 21,490 persons were killed in Libya between February 2011 and February 2012. Due to the high number of criminal offences and the limited number of consultant pathologists in Libya, there are difficulties with investigating and explaining the circumstances of death (17). Post-mortem imaging may play an important role.

As far as we are aware, this study is the first to formally evaluate the acceptability of PM CT and MRI of Libyan Muslims and UK Muslims of Libyan descent with that of non–Muslim UK residents.

The fact that the questionnaire had response rates of 92% from Muslims and 69% from non-Muslims shows the importance given to this subject amongst the respondents. This study shows that both Muslims and non-Muslims perceive conventional autopsy to have a negative emotional effect on family members due to its invasiveness and (for Muslims) the delay to burial that it causes.

Most non-Muslim participants had heard about post-mortem imaging compared to only a small minority of Muslims (mainly doctors and/or those resident in the UK). By comparison, most Muslim and non-Muslim participants were aware of conventional autopsy as an investigational procedure. These differences in awareness between Muslim and non-Muslim participants may be attributed to the fact that several UK healthcare providers now routinely offer post-mortem MRI in children and PMCT in adults and that some families may have participated in or have been aware of previous/on-going diagnostic accuracy studies of PM imaging. In Libya on the other hand, conventional autopsy is the only available means of PM investigation. We pre-empted this lack of awareness when distributing the questionnaires by providing a short background to conventional autopsy, PMCT and PMMRI as an introduction to the questionnaire.

The time to burial of the body is important in the Libyan culture and is an essential issue for the Muslim family of the deceased, since the culture enforces the religious belief that the body should be buried as soon as possible to reduce the emotional effect on the family and to respect the deceased. It is clearly demonstrated in this study that Muslim participants in Libya support this view, with a significant number feeling that burial should occur within 12 hours of death. This contrasts with the views of non-Muslims, for which no respondent felt that burial was necessary within 24 hours of death and that delays of up to a week were acceptable. Age appears to be negatively related to time of burial but is best interpreted as an artefact of the data collection, where UK Muslims tended to be older than Libyan Muslims and UK non-Muslims i.e. there is a lack of mature non-Muslims in our study population. These views were irrespective of sex. Of interest, more Muslims in the UK had no concerns if burial was delayed for up to 3 days following death. This might be due to differences in the process of obtaining approval for burial and/or due to their living in the UK and assimilating the views of that population. Our results support those of Gatrad et al., that Muslims prefer to bury the body immediately or as soon as possible after death (8, 18). Another study showed that three days is generally considered

the maximum delay before burial of a body in the Muslim world (7), which is in keeping with the attitudes of the Muslims we surveyed in the UK. Lishimpi et al. (2001), who studied the guardians and parents of deceased children in Zambia, also found that concerns about time delay before burial had an influence on decisions to refuse an autopsy, although the religion of their study participants was not provided (19). Only a small number of Muslim participants in our study thought (perhaps incorrectly) that CT and MRI could lead to unnecessary delay to burial.

"Mutilation" of the body is an important reason that might lead a family to refuse a PM examination (9) along with a fear that organs might be sold for transplantation (19). Less invasive methods such as medical imaging can help maintain the body's dignity, which Muslim and non-Muslim participants of this study also believe. On the other hand, non-Muslim participants were more prepared to accept that a conventional autopsy would not violate the body's dignity and here, the influence of religion is clearly seen. This result is supported by Ben-Sasi et al. who pointed out that generally, traditional autopsy was perceived comparatively favourably (scored 8 out of 10), with certain demographic factors affecting the overall autopsy acceptability, including ethnicity (more Caucasian and African individuals preferred autopsy compared to Asian or Arabic individuals) and religion (Christians and those with no religious beliefs found autopsy more acceptable than did those of Muslim or Sikh faiths) (20). Other studies supporting our results include 1) Lynch, who found that Hindus and those of other religions are considered to have a less intrinsic objection to autopsy than Muslims (21). 2) Cox et al who reported from Uganda, that 59% of relatives (Muslim and non-Muslim) were opposed to autopsy for reasons including delayed burial, body mutilation and associated reasons of a religious nature. Furthermore, the rate of autopsies decreased by approximately 9% due to cultural beliefs and fears that it might lead to infertility among women (22). 3) Loughrey who showed that relatives and parents might not consider the benefits of an autopsy and may prefer to "maintain the physical dignity" of their loved one, rather than define the precise cause of death (23) and 4) Parmar and Rathod, most of whose study participants refused conventional autopsy due to the delay in burial and concern about the cutting of the body or removal of organs (24). Furthermore, consenting to post-mortem examination, especially for infants or children, is psychologically distressing for all guardians involved.

Despite the overall preference for PM imaging over conventional autopsy, it was interesting to find that Muslim participants preferred conventional autopsy for the investigation of homicides and PM imaging for the investigation of unsuspicious deaths. This might imply more belief, by Muslims, in the intrinsic superiority of conventional autopsy to identify the cause of any death. This might not be a misguided belief, since Hussain et al showed that autopsy explained 78% of cases of homicidal deaths (11). On the other hand, PMMRI has been shown to be accurate in detecting abnormal pathology in fetuses (sensitivity 77%, specificity 95%), with slightly lower specificity and sensitivity in children (25), while PMCT identified the main pathologic process leading to death in 39 of 40 adults (26), such that in certain instances, PM imaging is not inferior to conventional autopsy.

Our survey included 15 physicians (all Muslim) who did not respond significantly differently to the non-physicians. It has been shown that some physicians find the request from relatives for PM examination of a loved one, to be one of the most difficult and unpleasant quarters of paediatric medical practice (22). Interestingly, in their survey of general practitioners and clinicians, Midelfart and Aase showed that the number of doctors participating in their study who found that the value of autopsy had decreased due to improvements in CT and MRI techniques was 81% and 71% for each modality respectively (27). We disagree that the value of autopsy has decreased and do not perceive it as a case of performing one or the other technique, but rather we believe that PM imaging should be viewed as an adjunct to conventional autopsy and a replacement only when consent for conventional autopsy is withheld. This is a view we have previously expressed and that is held by others (28, 29, 30).

Roberts et al. pointed out that the cost implications of PM imaging may be a concern; MRI in particular is more expensive than traditional autopsy (31). In Group 1, the average salary was particularly low and in Libya, healthcare is paid for by the individual. It might be expected that in Libya, caution over the cost of MRI would be a concern, which is congruent with over half of the people in Group 1 being cautious of using this technique. A similar caution may be applied to CT. Healthcare in the UK is free at the point of delivery and therefore cost is not necessarily of personal concern to the individual. Sex had no effect on the results of the survey. As far as we know, there are no published studies that have previously measured the impact of variables such as sex and income on the acceptance rate of autopsies.

In conclusion, religious beliefs and age of the deceased (child versus adult) affect individual preference for PM investigational methods. The preference amongst Muslims for PM imaging is mainly related to the perception that it leads to less delay to burial and is less invasive. Interestingly, conventional autopsy is preferred by Muslims when the cause of death is suspicious. Muslims resident in the UK have an attitude closer to that of the indigenous (non-Muslim) population and therefore in conjunction with developing expertise in performing and reporting on post-mortem imaging investigations, educational programmes may be successful in changing attitudes of Muslims in Libya and other predominantly Muslim countries.

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Figure Legends:

Figure 1: Non-validated questionnaire used for this study

* Homicide is the term used when the cause of death of one person can be attributed to another (32). Natural death occurs in the course of nature with no unusual circumstances. Unexpected deaths are sudden deaths from natural causes. Suspicious deaths may include accidents, murder and suicide.

Figure 2: Distribution of questionnaires/response rate

The figure summarises distribution of the questionnaire and response rate from the various groups of respondents

Figure 3: Post-mortem methods investigations that preserve the dignity

Figure 4: Post-mortem methods lead to a negative emotional effect on the family

Table Legends:

Table 1: Respondents' demographics

* Group 1 = **Muslims in Libya Group 2 = Muslims (in UK) Group 3 = Non-Muslims (in UK)**

Table 2: Acceptable time to burial of children and adults according to religion and the country of residence of participants

* Group 1 = **Muslims in Libya Group 2 = Muslim (in UK) Group 3 = Non-Muslim (in UK)**

Table 3: Respondents' impression of investigations that lead to delay in burial and preserve the dignity of the corpse

Table 4: Respondents' preference for post-mortem investigation depending on nature of death

* Group 1 = **Muslims in Libya Group 2 = Muslims (in UK) Group 3 = Non-Muslims (in UK)**

Figure 1

Public Perception Of Using Medical Imaging To Identify Causes Of Death Amongst The Libyan Community In Libya And XXXX.

Background

The examination of a body after death to find out why somebody has died is termed post-mortem examination (PM). The traditional and gold standard method for this is autopsy, where body parts are opened up surgically and examined by specialists. An alternative method is conducting this examination using CT (computed tomography) or MRI (magnetic resonance imaging), which do not require the body to be surgically opened.

We are conducting a survey to assess the views and experience of XXXX resident in XXX, and XXXX and non XXX (muslims/non-muslims) resident in XXXX, regarding post-mortem examinations (either autopsy or CT/MRI).

By filling out and returning this questionnaire, you agree to us using your responses for the purposes of our research. We reassure you that it will not be possible for anyone to identify you from the answers that you give.

Thank you for your time in reading the information sheet and in considering whether or not to take part in this study.

Section 1:

About You

1. **Age (years):** _____

2. Occupation: _____

3. **Sex:**

Male ☐

Female ☐

4. Religion:

Muslim ☐

Christian ☐

Hindu ☐

None ☐

Other ☐ Please specify_____

5. Ethnicity: _____

6. Country of origin:_____

7. Highest qualification:

None ☐

University ☐

Secondary School ☐

Primary School ☐

8. Annual household income:

< £10600 ☐

£10601– £31000 ☐

£31001 - £785000 ☐

£785001 - £150000 ☐

> £150,000 ☐

Section 2:

Your Experience of PM (Autopsy, CT or MRI) Examination

1. Have you come across PM examination (autopsy) before?
   Yes ☐ No ☐

2. Have you heard of PM examination by computed tomography (CT)
   Yes ☐ No ☐

3. Have you heard of PM examination by magnetic resonance imaging (MRI)?
   Yes ☐ No ☐

4. Do you know anyone (family, relative or friend) who had a PM?
   Yes ☐ No ☐

5. If yes to Question 4, please complete the table below.

Section 3:

Cases	Age	Sex	When	Type of Autopsy		
				Conventional autopsy	CT scan	MRI
1.						
2.						
3.						
4.						
5.						

Your Views on PM Examination (Autopsy)

1. Performing PM examination leads to a delay in burial. What length of delay do you think is acceptable?

For An Adult:

< 12 hours ☐

12 – 24 hours ☐

1 - 3 days ☐

3 – 7 days ☐

> 1 week ☐

For A Child:

< 12 hours ☐

12 – 24 ☐

1- 3 days ☐

3 – 7 days ☐

> 1 week ☐

2. In general, which form of PM would you accept CT/MRI or conventional autopsy in the following situations:
   a. Homicide/suicide cases. CT ☐ MRI ☐ Autopsy ☐ None ☐
   b. Suspicious but natural deaths CT ☐ MRI ☐ Autopsy ☐ None ☐
   c. Natural, but unexplained deaths CT ☐ MRI ☐ Autopsy ☐ None ☐
   d. Natural and expected. CT ☐ MRI ☐ Autopsy ☐ None ☐

3. What concerns you about PM examinations?
   a. Delays in burial.
      CT ☐
      MRI ☐
      Autopsy ☐
      None ☐
   b. Dignity and sacredness of the body.
      CT ☐
      MRI ☐
      Autopsy ☐
      None ☐
   c. Emotional burden on the family.
      CT ☐
      MRI ☐
      Autopsy ☐
      None ☐
   d. Cost effectiveness.
      CT ☐
      MRI ☐
      Autopsy ☐
      None ☐

Do you have other comments you would like to make or do you have any other anxieties about PM examinations?

……

……

Thank you for your time and cooperation. XXXXXX

PhD Student, University of XXXXX. If you have any questions, please do not hesitate to contact me on:
XXXXXX

Or contact

Supervisor: XXXXX at the XXXXXX Telephone: XXXXX

Figure 2

Figure 2: Distribution of Questionnaires/Response Rate

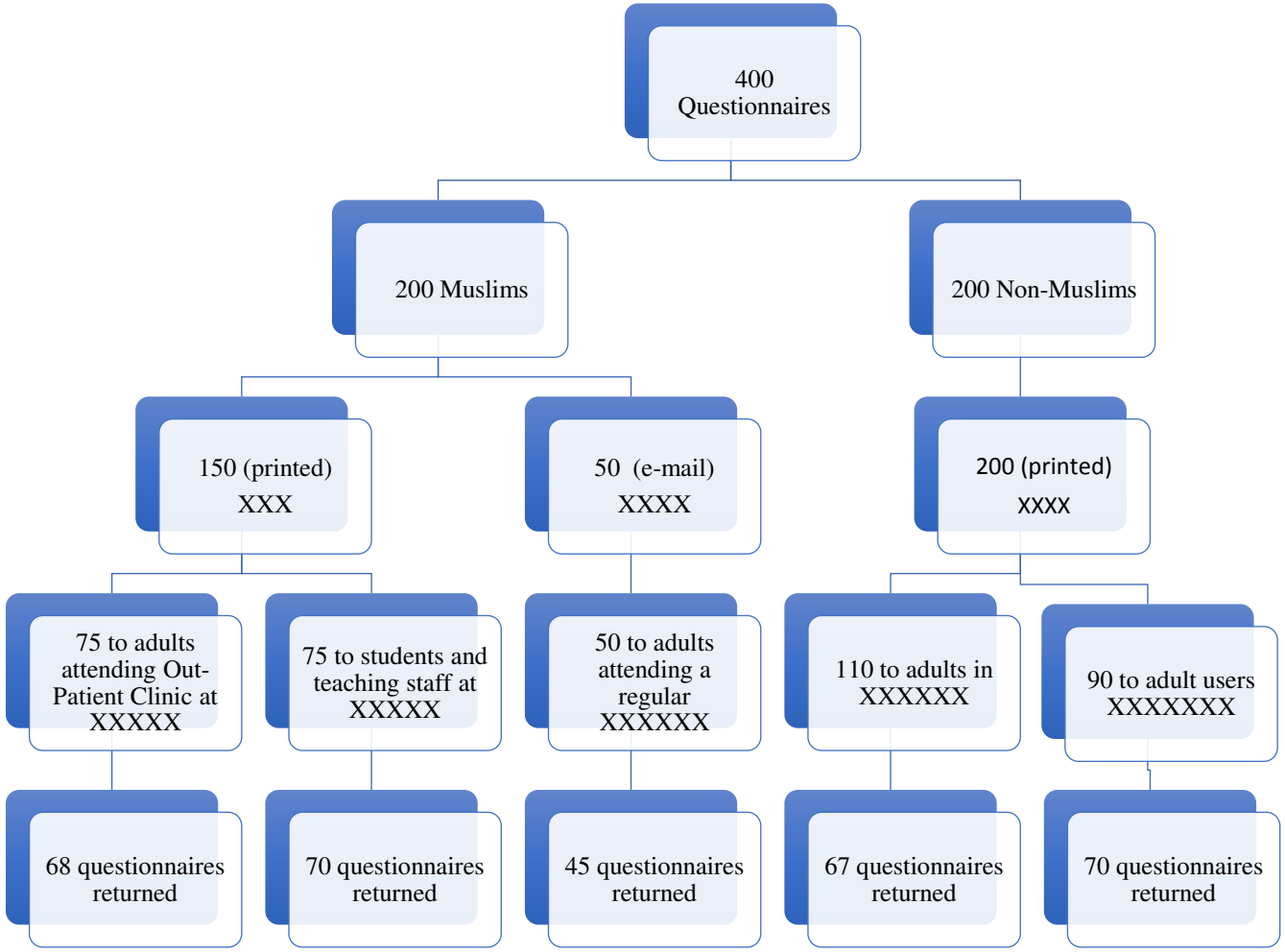

Figure 3

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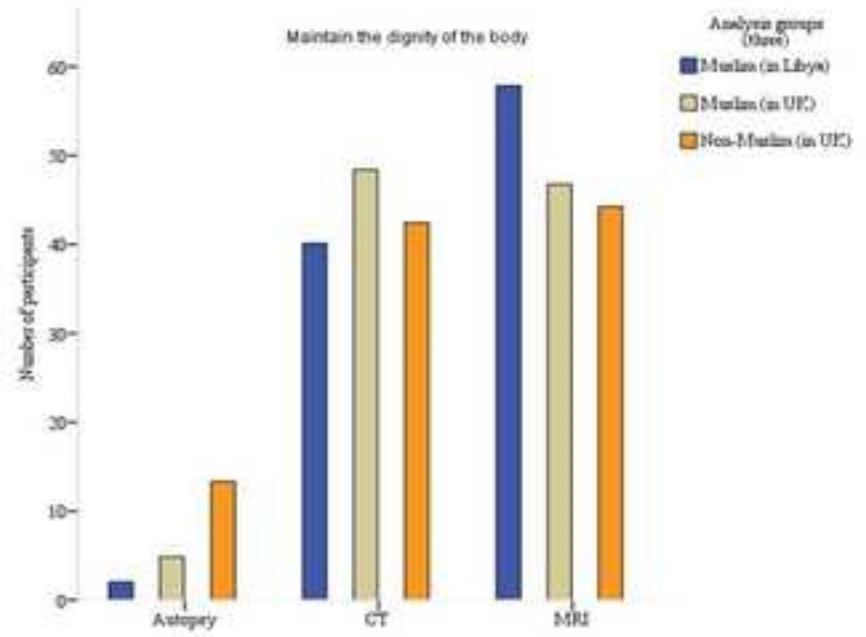

Figure 4

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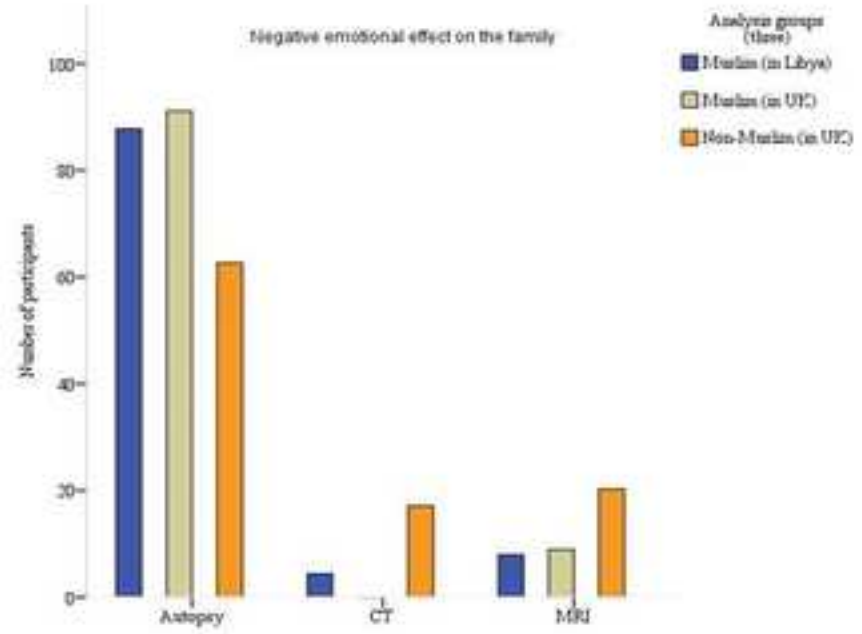

Table 1: Respondents' Demographics

		Analysis Groups *							
Religion		**Group 1**		**Group 2**		**Group 3**		**Total**	
Age	**<= 25**	43	31%	0	0%	63	46%	106	33%
	26 - 30	35	25%	6	13%	28	20%	69	22%
	31 - 40	24	17%	21	47%	21	15%	66	21%
	41 - 65	34	25%	18	40%	23	17%	75	23%
	66+	2	1%	0	0%	2	2%	4	1%
Sex	**Male**	88	64%	31	69%	73	53%	192	60%
	Female	50	36%	14	31%	64	47%	128	40%
Ethnicity	**Mixed**	138	100%	45	100%	1	1%	184	58%
	White	0	0%	0	0%	86	63%	86	27%
	African	0	0%	0	0%	18	13%	18	6%
	Black	0	0%	0	0%	7	5%	7	2%
	Asian	0	0%	0	0%	24	18%	24	8%
	Other	0	0%	0	0%	1	1%	1	0%
Income	**Less than £250**	30	2%	4	9%	1	1%	35	11%
	£250 - 500	14	10%	2	4%	0	0%	16	5%
	£500 - 750	30	22%	4	9%	16	12%	50	16%
	£750 - 1000	45	33%	11	24%	37	27%	93	29%
	£1000 - 2000	15	11%	14	31%	16	12%	45	14%
	£2000 - 3000	2	1%	5	11%	48	35%	55	17%
	More than £ 3000	2	1%	5	11%	19	14%	26	8%

*** Group 1 = Muslims in Libya Group 2 = UK Muslims Group 3 = UK Non-Muslims**

Table 2: Acceptable time before burial of children and adults

Religion/ Residence*	Time to Burial (Child)					Time to Burial (Adult)				
	< 12 hrs	**12-24 hrs**	**1-3 days**	**4 -7days**	**>7days**	**< 12 hrs**	**12-24 hrs**	**1-3 days**	**4 -7days**	**>7days**
Group1	101	37	0	0	0	62	54	22	0	0
Group 2	21	13	11	0	0	12	17	16	0	0
Group 3	9	18	43	34	33	4	11	43	29	50

*** p values:**

Child Burials	**Adult Burials**	**Child versus Adult Burials**
Group 1 Vs Group 2: $p < 0.001$	Group 1 Vs Group 2: $p < 0.011$	Group 1: chi-squared test was statistically significant at $p < 0.001$
Group 2 Vs Group 3: $p < 0.001$	Group 2 Vs Group 3: $p < 0.001$	Group 2: chi-squared test was statistically significant at $p < 0.001$
Muslims (All) Vs Group 3: $p < 0.001$	Muslims (All) Vs Group 3 $p < 0.001$	Group 3: chi-squared test was statistically significant at $p < 0.001$

* **Group 1 = Muslims in Libya Group 2 = UK Muslims Group 3 = UK Non-Muslims**

Table 3: Unacceptable delay in burial and preservation of the corpse's dignity

Causes an Unacceptable Delay in Burial n (%)				
Post-mortem method	**Muslims in Libya (Group 1)**	**UK Muslims (Group 2)**	**UK Non-Muslims (Group 3)**	**P value**
CT	6 (4%)	0 (0%)	27 (20%)	<0.001
MRI	11 (8%)	4 (9%)	32 (23%)	0.001
Autopsy	122 (88%)	41 (91%)	99 (72%)	<0.001
Dignity of the Corpse				
CT	59 (43%)	30 (67%)	70 (51%)	0.019
MRI	85 (62%)	29 (64%)	73 (53%)	0.264
Autopsy	3 (2%)	3 (7%)	22 (16%)	< 0.001

Table 4

Table 4: PM imaging versus conventional autopsy

Mode of Death				
Homicide/suicide n (%)				
Religion	**Group 1**	**Group 2**	**Group 3**	**p value**
CT	29 (21%)	15 (33%)	66 (48%)	< 0.001
MRI	30 (22%)	19 (42%)	56 (41%)	0.001
Autopsy	80 (58%)	29 (64%)	71 (52%)	0.289
Natural but unexplained				
Religion	**Group 1**	**Group 2**	**Group 3**	**p value**
CT	58 (42%)	21 (47%)	35 (26%)	0.004
MRI	55 (40%)	29 (64%)	54 (39%)	0.008
Autopsy	27 (20%)	4 (9%)	73 (53%)	< 0.001
Natural and expected				
Religion	**Group 1**	**Group 2**	**Group 3**	**p value**
CT	89 (65%)	33 (73%)	21 (15%)	< 0.001
MRI	51 (37%)	17 (38%)	36 (26%)	0.119
Autopsy	0 (0%)	1 (2%)	22 (16%)	< 0.001
Suspicious				
Religion	**Group 1**	**Group 2**	**Group 3**	**p value**
CT	52 (38%)	18 (40%)	50 (37%)	0.903
MRI	43 (31%)	23 (51%)	71 (52%)	0.001
Autopsy	45 (33%)	16 (36%)	44 (32%)	0.935

* **Group 1 = Muslims in Libya Group 2 = UK Muslims Group 3 = UK Non-Muslims**