



# Patient obesity and the practical experience of the plain radiography professional: On everyday ethics, patient positioning and infelicitous equipment



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## ABSTRACT

Patient obesity is increasingly placing significant and multifaceted strain upon medical imaging departments, and professionals, in (particularly Western) healthcare systems. The majority of obesity-related studies in radiology are, however, primarily focused only upon the technical business of collecting diagnostically-efficacious images. This study, using Interpretative Phenomenological Analysis (IPA), qualitatively explores the everyday clinical experiences of eight expert UK diagnosticians working in plain radiography. Focus herein falls particularly upon (a) problems with patient positioning during examination, and (b) challenges arising around available equipment. In line with extant research, participants reported that difficulties with positioning obese patients could have negative impacts on image quality, and that insufficient table weight limits and widths, and inadequate detector sizes, can adversely affect examination. They also raised some more novel issues, such as how the impact of available gown sizes upon a patient's sense of dignity can cause practical and ethical dilemmas for a clinician *in situ*. The issue of how one might 'train' *experience* in positioning patients without bony landmarks as a reference point was also made salient, with strong implications for undergraduate radiography curricula. It is finally highlighted how the participating radiographers themselves seldom conceptualised any given problem as a purely 'technical' one, instead recurrently recognising the interlinking of material, socio-economic and moral matters in real healthcare contexts. By better understanding such nuance and complexity as lived by real radiographers, it is contended, a more context-sensitive and flexible path to effective training and guideline-production can be mapped.

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## Introduction

Affecting all socioeconomic groups, ages and genders, obesity ranks alongside smoking and heavy drinking in terms of precipitating a wide range of chronic health conditions, not least coronary heart disease, diabetes mellitus, osteoarthritis and respiratory problems.<sup>1,2</sup> Moreover, these associated comorbidities, and their corollary impacts upon premature mortality, place a significant strain upon (particularly Western) healthcare systems.<sup>3</sup> In the UK by 2013, one quarter of all adults were classed as clinically obese.<sup>4</sup> This upward trend is widely thought to be a major contributory factor in the increasing workloads of medical imaging professionals.<sup>5</sup>

As such, and as noted by Buckley et al.<sup>6</sup>, it is necessary for radiology departments to carefully prepare for this ongoing potentiality in order to manage associated workload-increasing difficulties such as, for example, the need for repeat projections. It is the case, however, that the primary literature pertaining to the practical, everyday problems *experienced* by radiographers when encountering such 'bariatric' individuals remains in a fledgling stage. Without strong foundational research, professional guidelines on specific aspects of conduct can have, at best, limited application to both the specificity and range of difficulties that may emerge in real medical encounters.<sup>7</sup> Moreover, and as may well be familiar to any clinical practitioner, over-rigid and/or top-down directives (usually derived from second-hand, abstract or generalised knowledge) can 'fly in the face' of the practical, nuanced and experience-based solutions to everyday problems found by practitioners themselves.<sup>7</sup> Indeed, directives of this order have been

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shown to sometimes have potentially *counter-productive* influence in everyday medical activity.<sup>8,9</sup>

As such, using Interpretative Phenomenological Analysis (henceforth IPA)<sup>10</sup>, this paper emerges from a broader study designed to produce a detailed analysis of the ways in which eight experienced diagnosticians working in plain radiography (computed radiography and digital radiography, henceforth CR and DR respectively) have actively worked through the practical business of imaging obese patients. Focusing chiefly upon issues around (a) patient positioning and (b) equipment<sup>c</sup>, it is contended that the emergent observations can help further inform and ground prospective endeavours to provide radiographers with pragmatic assistance in addressing such potentially challenging scenarios.

## Literature review

There is a substantial body of literature relating to the impacts of patient obesity upon medical practice emerging within the healthcare sciences, not least in nursing.<sup>11–13</sup> Relatively little of this corpus, however, relates directly to radiological disciplines, and even less to plain radiography itself. It is further evident that the majority of pertinent studies attend primarily to the influence of patient obesity on image quality and diagnostic efficacy.<sup>14–17</sup> Rather less emphasis is placed upon other orders of concern that can emerge within everyday clinical work. Outlined herein, thus, are key studies from all radiological domains that have (direct or potential) relevance to the practice of plain radiography.

In terms of the impact of patient obesity upon radiological practice *writ large*, a longitudinal documentary study conducted by Uppot et al.<sup>16</sup> examined radiology reports between 1989 and 2003. Findings indicate that over this fifteen year period, during which obesity rates had steadily risen, there had been a small but significant linear increase in the number of reports that claimed the quality of the images collected was ‘limited due to body habitus’. The study further surmises, conversant with the findings of de Bucourt et al.<sup>14</sup> and Reynolds<sup>17</sup>, that patient obesity most directly affects image quality in chest radiography and ultrasound, due to decreased penetration and attenuation through the subcutaneous fat. In a similar vein, Yanch et al.<sup>18</sup> argue that beam attenuation, low image contrast, long exposure times and motion artefacts are also recurrent upshots of patient obesity in these realms. Using phantoms and subcutaneous adipose tissue to simulate patients when X-raying chests and abdomens, they conclude that to reduce the exponential dose increase, positioning the patient with the thinnest fat layer closest to the image receptor is most effective wherever the thinnest layer is (anterior or posterior).

Obesity-related difficulties have been reported to arise in mammography due to loss of image specificity; the number of false positives increases in obese patients, with a corollary higher recall incidence and biopsy rate.<sup>17</sup> Further challenges include over-exposure of the patient, and missed areas of interest. Abdominal radiographs are also difficult to achieve in larger patients, and require particularly careful positioning. When the area of interest is missed, repeats will be required or the abdomen may need to be imaged in quadrants.<sup>17</sup> In functional terms, meanwhile, contemporary image receptor sizes have been found to be too small for the effective imaging of obese patients, and it has been proposed that multiple receptors should be used to fully incorporate the area of interest.<sup>3,6</sup>

Optimal image quality (and image acquisition) is further dependent on proper positioning of the patient, which can be

highly problematic when that patient is obese.<sup>19</sup> Many older patients, moreover, are even more obese, and suffer from comorbidities that mandate special considerations when positioning them, such as additional staff to assist.<sup>19</sup> Carucci<sup>3</sup> proposes that when attempting to position the patient and receptor for a pelvic examination in such situations, the level of the patient's elbow can be used to approximate where the iliac crests are situated. This technique may have some facility, but implies that all patients' elbows are at the level of the iliac crests, a notion itself challenged in other research.<sup>12</sup> Excess adipose tissue in the abdominal and thoracic regions, and limited space for descent of the diaphragm, are also noted concerns during the imaging process.<sup>20,21</sup> McClean et al.<sup>21</sup> observe that breathing is more laborious for an obese patient, given that there is a reduction in the expiratory reserve volume, especially in the supine position. In order to overcome the risk of aspiration, a slight ‘head-up’ position is recommended.<sup>19</sup>

Within Computed Tomography (CT) and Magnetic Resonance Imaging (MRI), table weight limits and gantry sizes are reported to be significant obstacles to the effective imaging morbidly obese patients.<sup>5,6,15,22</sup> This can sometimes mandate that clinicians who are unaware of a patient's weight in advance make an *ad-hoc* switch to other diagnostic imaging modalities<sup>14</sup>, rather than risk damage to expensive equipment.<sup>15</sup> Furthermore, table *width* is typically determined by normative shoulder-to-shoulder measurements. With obese patients, however, the abdominal area is often the widest point of the body, rendering some imaging tables simply unfit for purpose<sup>5</sup> in these circumstances. Such problems arising *during* an examination can have a highly undesirable psychosocial impact on the patient.<sup>6</sup> At the very least, and as noted by Uppot et al.<sup>16</sup>, clear advanced knowledge of a patient's weight and diameter can assist in scheduling an obese patient in for an examination in a manner that is helpful for patient and clinician alike.

In sum, obesity-related research in radiology as a whole has, to date, focused upon three primary domains that have implications for understanding everyday work in plain radiography. These are: (a) image quality, (b) the physical handling and positioning of the patients, and (c) the adequacy of equipment.

## Methods

Given the complex, personalised and contextually-specific nature of activity within radiographic encounters, the broader project from which this paper emerges was designed to explore the lived experience of radiographers themselves, with a view to illuminating how patient obesity impacts upon everyday practice. In this sense, IPA is oriented to the classically phenomenological question of “How is this thing *really* experienced, *in situ*?” in all of its pragmatic contingency, rather than the currently dominant concern within radiographic literature regarding “How should this thing *ideally* be handled, for regulation purposes?” As Smith, Flowers, & Larkin<sup>10</sup> argue, this form of approach can help critique existing models in an evidence-based manner, advance the development of current practice models without recourse to supposition or mechanistic reasoning, and also inform future field-based research endeavours.

### Participants

IPA studies conventionally use relatively small sample sizes, facilitating high-definition investigation of experience and perception within a particular, tightly-defined population.<sup>23</sup> For this study, with institutional ethical approval and full informed consent, eight practising diagnostic radiographers, with individual experience levels varying from 5 to 35 years in clinical work, were interviewed (mean experience = 21.56 years). Five were

<sup>c</sup> It should be noted that the absence of other core matters is an output of these issues being the focus of further papers emerging from the same original study.

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