



## Compression force behaviours: An exploration of the beliefs and values influencing the application of breast compression during screening mammography



Fred Murphy<sup>a,\*</sup>, Julie Nightingale<sup>a</sup>, Peter Hogg<sup>a</sup>, Leslie Robinson<sup>a</sup>, Doreen Seddon<sup>a</sup>, Stuart Mackay<sup>b</sup>

<sup>a</sup> University of Salford, United Kingdom

<sup>b</sup> University of Liverpool, United Kingdom

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### ABSTRACT

This research project investigated the compression behaviours of practitioners during screening mammography. The study sought to provide a qualitative understanding of 'how' and 'why' practitioners apply compression force. With a clear conflict in the existing literature and little scientific evidence base to support the reasoning behind the application of compression force, this research project investigated the application of compression using a phenomenological approach.

Following ethical approval, six focus group interviews were conducted at six different breast screening centres in England. A sample of 41 practitioners were interviewed within the focus groups together with six one-to-one interviews of mammography educators or clinical placement co-ordinators.

The findings revealed two broad humanistic and technological categories consisting of 10 themes. The themes included client empowerment, white-lies, time for interactions, uncertainty of own practice, culture, power, compression controls, digital technology, dose audit-safety nets, numerical scales. All of these themes were derived from 28 units of significant meaning (USM).

The results demonstrate a wide variation in the application of compression force, thus offering a possible explanation for the difference between practitioner compression forces found in quantitative studies. Compression force was applied in many different ways due to individual practitioner experiences and behaviour. Furthermore, the culture and the practice of the units themselves influenced beliefs and attitudes of practitioners in compression force application. The strongest recommendation to emerge from this study was the need for peer observation to enable practitioners to observe and compare their own compression force practice to that of their colleagues. The findings are significant for clinical practice in order to understand how and why compression force is applied.

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### Introduction and background

Breast compression force during screening mammography requires a degree of practitioner knowledge and expertise to achieve optimum image quality and reduce the mean glandular radiation dose.<sup>1,2</sup> Whilst it is recognised that the application of compression

\* Corresponding author. School of Health Sciences, Frederick Road, Salford M6 6PU, University of Salford, United Kingdom. Tel.: +44 161 295 6974; fax: +44 161 295 2432.

E-mail addresses: [f.j.murphy@salford.ac.uk](mailto:f.j.murphy@salford.ac.uk) (F. Murphy), [j.nightingale@salford.ac.uk](mailto:j.nightingale@salford.ac.uk) (J. Nightingale), [p.hogg@salford.ac.uk](mailto:p.hogg@salford.ac.uk) (P. Hogg), [l.robinson@salford.ac.uk](mailto:l.robinson@salford.ac.uk) (L. Robinson), [D.Seddon@salford.ac.uk](mailto:D.Seddon@salford.ac.uk) (D. Seddon), [s.mackay@liverpool.ac.uk](mailto:s.mackay@liverpool.ac.uk) (S. Mackay).

force is an important skill<sup>3</sup> there is, surprisingly, sparse and conflicting guidance available for practitioners as to how to apply compression force and to what pressure. While quantitative studies largely agree on a slow and steadily increasing application of pressure to reduce pain, the traditional measures of checking that adequate compression force has been applied (eg. blanching of the skin and tautness of the breast) have been questioned.<sup>4</sup> Various studies<sup>4,5</sup> have found contradicting results, some find that too much compression force is applied whilst others have found that compression force is often insufficient.

Recently pilot work in one mammography screening centre<sup>6</sup> identified a surprising variability in the amount of compression force applied for similar breast types, with practitioners aligned with consistently low, intermediate or high compression force

categories. An extension of this study<sup>7</sup> assessed compression values over three consecutive analogue screening mammography invitations (500 clients). Individual client compression force over the three screens varied significantly, and was highly dependent upon the practitioner who performed the mammogram, rather than the client. Individual practitioners are assumed to be setting their own compression force tolerance levels, regardless of the client's breast type, and this will likely have implications for the patient experience, their mean glandular radiation dose, and image quality consistency across subsequent screens. This is despite attempts made by manufacturers to reduce variability with technological developments.

While the influence of different amounts of compression force on visual image quality is currently disputed,<sup>8</sup> insufficient compression force may be detrimental to image quality and lesion visibility resulting in the potential for incorrect diagnoses. Standard texts suggest there may be a level of compression force beyond which additional compression forces cease to have any advantageous effect<sup>9</sup> and that additional compression force applied does have a marked effect on the woman's tolerance of the procedure and related discomfort.<sup>9</sup> However there is a lack of empirical evidence to substantiate these claims.

Myklebust et al., 2009<sup>10</sup> suggested that there is wide variability in applied compression force where the level of compression force is linked to the patients' experience of pain but found this did not influence their level of satisfaction with the procedure. However, Drossaert et al. (2002)<sup>11</sup> concluded that poor compression force experience was found to influence the client's decision to engage in future breast screening.

Whilst quantitative approaches give valuable data, a humanistic, qualitative, perspective is also required in order to fully understand this phenomenon in-depth and to provide a unique insight INTO the factors influencing how compression force is applied.

Using a phenomenological approach this study investigated the experiences of, and the influences on the behaviour of, practitioners applying compression force in mammography. By exploring the individual and collective beliefs and values that influence compression force practice this paper seeks to identify 'how' and 'why' practitioners practice as they do.

## Methodology

Qualitative research is an overall term for a group of approaches that is concerned with the investigation of experiences and behaviour, and the meanings and interpretations that people attach to these.<sup>12</sup> It is therefore an exploration of the natural setting; in this case the breast screening units in this study. An ethnographic approach of observing practice was initially considered but this was rejected as being too intrusive for the clients and potentially a contentious ethical issue. It was however recognised that by seeking the practitioners own perspective the validity of the findings were limited to their interpretation of their compression force practice.

Since qualitative inquiry is an inductive analysis of human interactions it has to follow a philosophical perspective to be methodologically sound and, quite critically, rigorous in its application.<sup>13</sup> The philosophical stance that underpins this research is that of phenomenology. The discipline of phenomenology may be defined as the study of experiences or consciousness.<sup>12</sup> It is the investigation of phenomena or things as they appear in our experience. The historical movement of phenomenology is the philosophical tradition launched by Husserl, Heidegger and Sartre. Phenomenology has been particularly popular in the field of psychology and provided the basis for qualitative research in healthcare.<sup>14,15</sup>

This particular approach seeks to understand the 'essence' of experiences related to the phenomenon.<sup>16</sup> In this case, it was the understanding of the mammographers' beliefs and thus the researchers were capturing the etic perspective-exploring cultural phenomena from the perspective of one who does not participate in the culture being studied.

Hycner's model<sup>17</sup> was used as the framework for this study since it fitted with the focus of the research and provided a clear process in order to illicit units of general meaning (UGM) and units of significant meaning (USM). The use of these units in the analysis of the data provided a series of procedural steps which do not always fit with those of 'true' phenomenologists since they may be seen as reductionist as they are similar to a positivistic approach. However, phenomenology is concerned with lived experience, and is thus ideal for investigating personal beliefs and attitudes. The main focus of phenomenology is with reflective experiences and feelings<sup>18</sup> (the essence of a phenomenon), and a key aspect of this research was exploring practitioners reasoning about the application of compression. Although phenomenology was considered to be the most appropriate approach to address the research question, 'no one particular method should be arbitrarily imposed on a phenomenon since that would do a great injustice to the integrity of that phenomenon' (Hycner, 1985<sup>17</sup>(p280)).

## Method

Following NHS (R&D) and University ethics approval, focus group interviews were conducted at six different breast screening centres in England, these included large training centres and smaller screening units. The focus groups were conducted by two researchers: an experienced qualitative researcher and a subject expert in mammography, therefore both interviewers brought a good deal of theoretical sensitivity<sup>17</sup> to the data collection phase. The interviews were carried out with the close adherence to the guidance notes: *Using Focus Groups in Research*<sup>18</sup>. Focus groups captured the thoughts of several participants at the same time providing easier access to busy practitioners; they did however limit the in-depth response that may have been obtained by one to one interviews.<sup>19</sup> The questions were semi structured and were derived from the existing body of knowledge in order to address the research question. A similar approach was taken for the educator interviews.

Using a purposive sample six sites were recruited to the study giving a wide geographical spread across the United Kingdom. Information sheets outlining the purpose of the study were sent to each department or education centre. The aim was to recruit a heterogeneous sample from each unit and arrange a convenient time for the focus groups and interviews to take place.

Each group consisted of between 5 and 8 breast screening staff of different grades and experience. In addition to these focus groups, one to one interviews were conducted with six mammography educators and clinical placement co-ordinators.

The conversations were captured on a digital recorder after each participant had signed the consent form and been allocated an anonymous number for the purpose of the recording.<sup>20</sup> The additional group of educators and placement co-ordinators further informed the study and gave some factual information towards the understanding of this phenomenon. The one-to-one interviews were analysed with a traditional thematic analysis framework<sup>21</sup>. Whilst the focus groups were analysed from a phenomenological perspective, both sets of data were synthesised in order to address the research question.

Following verbatim transcription, a research panel consisting of four very experienced qualitative researchers, bracketed their own presuppositions and 'laid bare' their own theoretical sensitivities

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